VELS UNIVERSITY

VELS INSTITUTE OF SCIENCE, TECHNOLOGY & ADVANCED STUDIES (VISTAS)

(Deemed to be University Estd. u/s 3 of the UGC Act, 1956)

NAAC ACCREDITED

PALLAVARAM - CHENNAI - INDIA

B.Sc. Chemistry

Curriculum and Syllabus

(Based on Choice based credit system)

Effective from the Academic Year

2018 – 2019

Department of Chemistry

School of Basic Sciences

Program Education Objective

PEO 1	Graduate will have significant opportunities to get employment at Domestic and National level, and can work as analyst, quality controller, research assistant and in government sector job.
PEO 2	Basis of specialized knowledge and experience, graduate students will be able to do synthesis, separation and analysis.
PEO 3	In order to make the students to design, experiment, analyze, and interpret in the core field with the help of other multi-disciplinary concepts wherever applicable.
PEO 4	Graduate will continuously learn and adopt new skills and techniques to overcome the problem related with new technologies.
PEO 5	Graduate the students in building national capabilities in technology, education and research.

PROGRAM OUTCOME (PO)

PO1	**Scientific Knowledge:** Apply knowledge of mathematics, science, engineering fundamentals and chemical specialization to the solution of complex chemical problems.
PO2	**Problem analyze:** Identify, formulate, review research literature and analyze the chemical problems reaching substantiated conclusions using basics concepts of mathematics, physics and biology.
PO3	**Design and development of solutions:** Design solutions for complex chemical problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems:** Use research based knowledge and including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
PO5	**Modern tool usage:** Create, select and apply appropriate techniques, resources, and modern analyzing instruments tools, including prediction and modeling, to complex chemical activities, with an understanding of the limitations.
PO6	**The chemist and society:** Apply reasoning informed by the contextual knowledge to the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to chemical practice.
PO7	**Environment and sustainability:** Understand the impact of scientific solutions in a societal context and demonstrate knowledge of and need for sustainable development.

PROGRAMME SPECIFIC OUTCOME (PSO)

PSO1	To become an outstanding graduate in the modern scientific world
PSO2	To be an entrepreneur to start a small industry with a support from biocon, sipcot etc.,
PSO3	To pursue post graduation and research in a innovative field
PSO 4	Of designing, executing experiments and confident handling of equipments in Chemistry for industries.
PSO 5	To execute new ideas in the field of research and development using principles and techniques of science learned through activities such as expert lecturers, workshops, seminars and field projects.

BOARD OF STUDIES

S. No	NAME	AFFILIATION	ROLE
1.	**Dr . G.Nithya**	Associate Professor & HoD, Department of Chemistry, Vels Institute of Science, Technology and Advanced Studies, Pallavaram, Chennai - 600 117.	Chair Person
2.	**Dr. Narasimhan Srinivasan**	Chairman and Managing Director, Asthagiri Herbal Research Foundation, Perungudi.	External Expert
3.	**Mr.V. Neelakantan**	Managing Director, Kousikh Therapeutics Private Limited, Gerugambakkam	External Expert
4.	**Ms. M. Vidhya lakshmi**	Chemist, Instrumentation department, ABC Techno labs India Private Limited.	Alumini Member
5.	**Dr. R. A. Kalaivani**	Professor & Director, School of Basic Sciences, Vels Institute of Science, Technology and Advanced Studies, Pallavaram,Chennai - 600 117.	Internal member
6.	**Dr. T. Somanathan**	Associate Professor, Department of Chemistry, School of Basic Sciences, Vels Institute of Science, Technology and Advanced Studies, Pallavaram,Chennai - 600 117.	Internal member
7.	**Dr.M. Revathy**	Associate Professor, Department of Chemistry, School of Basic Sciences, Vels Institute of Science, Technology and Advanced Studies, Pallavaram,Chennai - 600 117.	Internal member
8.	**Mr.V.Sriraman**	Assistant Professor, Department of Chemistry, School of Basic Sciences, Vels Institute of Science, Technology and Advanced Studies, Pallavaram,Chennai - 600 117.	Internal member
9.	**Dr.R.Sudha**	Assistant Professor, Department of Chemistry, School of Basic Sciences, Vels Institute of Science, Technology and Advanced Studies, Pallavaram,Chennai - 600 117.	Internal member

VELS INSTITUTE OF SCIENCE, TECHNOLOGY AND ADVANCED STUDIES (VISTAS)

CHENNAI - 600 117

REGULATIONS 2018

CHOICE BASED CREDIT SYSTEM

DEGREE OF BACHELOR OF SCIENCE IN CHEMISTRY

1. DURATION OF THE PROGRAMME

1.1. Three years (six semesters)

1.2. Each academic year shall be divided into two semesters. The odd semesters shall consist of the period from July to November of each year and the even semesters from January to May of each year.

1.3 There shall be not less than 90 working days for each semester.

2. ELIGIBILITY FOR ADMISSION

2.1. Candidates for admission to the first year of the degree of Bachelor of Science program shall be required to have passed the Higher Secondary Examinations (Academic or Vocational stream) with chemistry as one of the subject, conducted by the Government of Tamil Nadu or an Examination accepted as equivalent thereof by the Syndicate of the Vels Institute of Science, Technology & Advanced studies.

3. CREDIT REQUIRMENTS AND ELIGIBILITY FOR AWARD OF DEGREE

3.1. A Candidate shall be eligible for the award of the Degree only if he/she has undergone the prescribed course of study in a College affiliated to the University for a period of not less than three academic years and passed the examinations of all the Six Semesters prescribed earning a minimum of 140 credits as per the distribution given in for Part I, II, III and also fulfilled such other conditions as have been prescribed thereof.

4. COURSE OF STUDY, CREDITS AND SCHEME OF EXAMINATION

4.1. The Course Components and Credit Distribution shall consist Part I, II & III:

(Minimum number of Credits to be obtained)

Credit Assignment Each course is assigned certain number of credits based on the following: Contact period per week CREDITS

1 Lecture Period - 1 Credit

1 Tutorial Period - 1 Credit

2 Practical Periods - 1 Credit

(Laboratory / Seminar / Project Work / etc.)

5.REQUIREMENTS FOR PROCEEDING TO SUBSEQUENT SEMESTER

5.1. **Eligibility:** Students shall be eligible to go to subsequent semester only if they earn sufficient attendance as prescribed therefor by the Board of Management from time to time.

5.2. **Attendance:** All Students must earn 75% and above of attendance for appearing for the University Examination. (Theory/Practical)

5.3. **Condonation of shortage of attendance:** If a Student fails to earn the minimum attendance (Percentage stipulated), the HODs shall condone the shortage of attendance up to a maximum limit of 10% (i.e. between 65% and above and less than 75%) after collecting the prescribed fee towards the condonation of shortage of attendance. Such fees collected and should be remitted to the University.

5.4**. Non-eligibility for condonation of shortage of attendance:** Students who have secured less than 65 % but more than 50 %of attendance are NOT ELIGIBLE for condonation of shortage of attendance and such Students will not be permitted to appear for the regular examination, but will be allowed to proceed to the next year/next semester of the program

5.5. **Detained students for want of attendance:** Students who have earned less than 50% of attendanceshall be permitted to proceed to the next semester and to complete the Program of

study. Such Students shall have to repeat the semester, which they have missed by rejoining after completion of final semester of the course, by paying the fee for the break of study as prescribed by the University from time to time.

5.6. **Condonation of shortage of attendance for married women students:**In respect of married women students undergoing UG programs, the minimum attendance for condonation (Theory/Practical) shall be relaxed and prescribed as 55% instead of 65% if they conceive during their academic career. Medical certificate from the Doctortogether with the attendance details shall be forwarded to the university to consider the condonation of attendance mentioning the category.

5.7. **Zero Percent (0%) Attendance:** The Students, who have earned 0% of attendance, have to repeat the program (by rejoining) without proceeding to succeeding semester and they have to obtain prior permission from the University immediately to rejoin the program.

5.8. **Transfer of Studentsand Credits:** The strength of the credits system is that it permits inter Institutional transfer of students. By providing mobility, it enables individual students to develop their capabilities fully by permitting them to move from one Institution to another in accordance with their aptitude and abilities.

5.8.1. Transfer of Students is permitted from one Institution to another Institution for the same program with same nomenclature. Provided, there is a vacancy in the respective program of Study in the Institution where the transfer is requested. Provided the Student should have passed all the courses in the Institution from where the transfer is requested.

5.8.2.The marks obtained in the courses will be converted and grades will be assigned as per the University norms.

5.8.3. The transfer students are not eligible for classification.

5.8.4.The transfer students are not eligible for Ranking, Prizes and Medals.

5.8.5. Students who want to go to foreign Universities upto two semesters or Project Work with the prior approval of the Departmental/College Committee are allowed to get transfer of

credits and marks which will be converted into Grades as per the University norms and are eligible to get CGPA and Classification; they are not eligible for Ranking, Prizes and Medals.

6. EXAMINATION AND EVALUATION

6.1.Register for all subjects:Students shall be permitted to proceed from the First Semester up to Final Semester irrespective of their failure in any of the Semester Examination. For this purpose, Students shall register for all the arrear subjects of earlier semesters along with the current (subsequent) Semester Subjects.

6.2. Marks for Internal and End Semester Examinations for PART I, II, III

6.2.1 There shall be no passing minimum for Internal.

6.2.2 For external examination, passing minimum shall be 40% [Forty Percentage] of the maximum marks prescribed for the paper for each Paper/Practical/Project and Viva-Voce.

6.2.3 In the aggregate [External/Internal] the passing minimum shall be of 40%.

6.2.4. He/She shall be declared to have passed the whole examination, if he/she passes in all the papers and practical wherever prescribed as per the scheme of the examinations by earning 140 CREDITS in Part I, II, III.

7. MAXIMUM PERIOD FOR COMPLETION OF THE PROGRAMS TO QUALIFY FOR A DEGREE

7.1.A Student who for whatever reasons is not able to complete the programs within the normal period (N) or the Minimum duration prescribed for the programme, may be allowed two years period beyond the normal period to clear the backlog to be qualified for the degree. (Time Span = N + 2 years for the completion of programme)

8. REVISION OF REGULATIONS, CURRICULUM AND SYLLABI

The University may from time to time revise, amend or change the Regulations, Curriculum, Syllabus and Scheme of examinations through the Academic Council with the approval of the Board of Management.

BSc Chemistry Curriculum

Total No. of Credits: 140

Category	Code	Course	Hours per week			Credits
			Lecture	Tutorial	Practical	
SEMESTER I						
LANG	18LTAM11 18LHIN11 18LFRE11	Language – I (Tamil, Hindi & French)	5	0	0	5
ENG	18LENG11	English - I	5	0	0	5
CORE	18CBHC11	Basic Chemistry	4	0	0	4
CORE	18CBHC12	Chemistry of Hydrocarbons	3	0	0	3
CORE	18CBHC13	Mathematics – I	4	0	0	4
CORE	18PBHC11	Inorganic Preparation and Quantitative Analysis Practical	0	0	4	2
			21	**0**	**4**	**23**
SEMESTER II						
LANG	18LTAM21 18LHIN21 18LFRE21	Language – II (Tamil, Hindi & French)	5	0	0	5
ENG	18LENG21	English – II	5	0	0	5
CORE	18CBHC21	Stereochemistry and molecular rearrangement	4	0	0	4
CORE	18CBHC22	Analytical Techniques	3	0	0	3
CORE	18CBHC23	Mathematics – II	4	0	0	4
CORE	18PBHC21	Gravimetric Analysis Practical	0	0	4	2
			21	**0**	**4**	**23**
SEMESTER III						
LANG	18LTAM31 18LHIN31 18LFRE31	Language – III (Tamil, Hindi & French)	5	0	0	5
ENG	18LENG31	English – III	5	0	0	5
CORE	18CBHC31	Electrochemistry and surface chemistry	4	0	0	4
CORE	18CBHC32	Fundamendals of Physics – I	4	0	0	4
CORE	18PBHC31	Physical Chemistry Practical	0	0	4	2
CORE	18PBHC32	Physics Practical	0	0	4	2
SEC		Skill Enhancement Course – I	2	0	0	2
			20	0	**8**	**24**

Category	Code No.	Course	Hours per week			Credits
			Lecture	Tutorial	Practical	
SEMESTER IV						
LANG	18LTAM41	Language – IV (Tamil, Hindi & French)	5	0	0	5
ENG	18LENG41	English – IV	5	0	0	5
CORE	18CBHC41	Coordination chemistry	4	0	0	4
CORE	18CBHC42	Fundamentals of Physics - II	4	0	0	4
CORE	18PBHC41	Organic Qualitative Analysis Practical	0	0	4	2
AECC		Environmental Studies	2	0	0	2
SEC		Skill Enhancement Course - II	2	0	0	2
			22	**0**	**4**	**24**
SEMESTER V						
CORE	18CBHC51	Quantum mechanics and thermodynamics	5	0	0	5
DSE		Discipline Specific Elective - I	4	0	0	4
DSE		Discipline Specific Elective - II	4	0	0	4
DSE		Discipline Specific Elective - III	4	0	0	4
DSE		Discipline Specific Elective Practical	0	0	4	2
GE		Generic Elective – I	2	0	0	2
SEC		Skill Enhancement Course - III	2	0	0	2
			21	**0**	**4**	**23**
SEMESTER VI						
CORE	18CBHC61	Fundamentals of spectroscopy	5	0	0	5
DSE		Discipline Specific Elective - IV	4	0	0	4
DSE		Discipline Specific Elective - V	4	0	0	4
GE		Generic Elective – II	2	0	0	2
SEC/VAC		Skill Enhancement Course - IV	2	0	0	2
DE	18RBHC61	Project Work	0	0	12	6
			17	**0**	**12**	**23**
			122	**0**	**36**	**140**

LIST OF DISCIPLINE SPECIFIC ELECTIVE COURSES (DSE)

S. No.	Code	Courses
1.		Chemistry of metals and non metals
2.		Bio Inorganic chemistry
3.		Nuclear and solid state chemistry
5.		Phase Equilibria and kinetics
6.		Chemistry of natural products
7.		Introduction to nanoscience and nanotechnology
8.		Agro industrial chemistry
9.		Chemistry of materials
10.		Pharmaceutical chemistry
11.		Chemistry in everyday life
12.		Forensic chemistry
13.		Dye chemistry
14.		Green methods in chemistry
15.		Industrial chemicals and environment
16.		Volumetric analysis

LIST OF GENERIC ELECTIVE COURSES (GEC)

S. No.	Subject code	Subject Title
1.		Disasters management
2.		Consumer Affairs
3.		Green Chemistry
4.		Chem informatics
5.		Food Chemistry and Adulteration

LIST OF LANGUAGES

S. No.	Code	Courses	
1.	18LTAM11	Tamil-I	Language -I
	18LHIN11	Hindi-I	
	18LFRE11	French-I	
2.	18LENG11	English - I	
3.	18LTAM21	Tamil-II	Language -II
	18LHIN21	Hindi-II	
	18LFRE21	French-II	
4.	18LENG21	English - II	
5.	18LTAM31	Tamil-III	Language -III
	18LHIN31	Hindi-III	
	18LFRE31	French-III	
6.	18LENG11	English - III	
7.	18LTAM41	Tamil-IV	Language -IV
	18LHIN41	Hindi-IV	
	18LFRE41	French-IV	
8.	18LENG41	English - IV	

LIST OF ABILITY ENHANCEMENT COMPULSORY COURSES (AECC)

S. No.	Subject code	Subject Title
1		Environmental studies

LIST OF SKILL ENHANCEMENT ELECTIVE COURSES (SEC)

S. No.	Subject code	Subject Title
1		Soft skills - I
2		Soft skills - II
3		Personality Development - I
4		Personality Development - II
5		Personality Development - III
6		National Service Scheme – I
7		National Service Scheme – II
8		National Service Scheme – III
9		National Service Scheme – IV
10		National Service Scheme – V

SYLLABUS
CORE COURSES

18CBHC11 BASIC CHEMISTRY 4 0 0 4

Course objective

To revive the fundamentals and basics of chemistry learned at school level with detailed explanation.

Unit I Introduction and Field effect 12

Electron displacement effects: Inductive, mesomeric, resonance, hyperconjugation and steric effects. Tautomerism: Keto-enol tautomerism-Amido-imidol and nitro acinitro forms. Stability of reaction intermediates, carbocation, carbanion, and free radicals.

Aromaticity and resonance: Huckel's rule, Benzene, Naphthalene, Heterocyclic compounds

Unit II Nomenclature, Classification and Basic Properties 12

Nomenclature of simple organic compounds. Isomerism- optical, geometric-basic concepts Mechanism: addition, elimination, substitution with specific examples. Hybridization and Geometry of simple molecules like CH_4, C_2H_4, C_2H_2, C_6H_6

Unit III Gaseous stare 12

Gaseous state – Gas laws – postulates of kinetic theory – collisions – gas pressure – average kinetic energy of translational- Boltzmann constant. Calculation of most probable, average, and root mean square speeds of molecules. Real gases, compressibility factor, deviation from ideality – van der Waals' equation – Boyle temperature – critical phenomena – critical constants – law of corresponding states and reduced equation of state – intermolecular forces and liquefaction of gases.

Unit IV Liquids and Solutions 12

Liquid state – Qualitative treatment of the structure of the liquid state – liquid crystals (elementary discussion on classification, structure and properties).

Solutions: Solutions of gases in liquids – Henry's law, Solution of liquids in liquids. Raoult's law, Binary liquid mixtures – Ideal solutions – vapour pressure – Clapeyron – Clausius equation- uses – elevation of boiling point and depression of freezing point, calculation of molecular weights.

Unit V Weights, Mole Concepts and Chemical Bonding 12

Atomic weight – equivalent weight- molecular weight mole concept. Pauli's exclusion principle.Hunds rule. Aufbau principle –classification of elements viz., s.p,d and f –block elements.

Ionic bond-Lattice energy-Born, Haber cycle –covalent bond power and polarisability – Fajan's rules, VB theory and VSPER theory –shapes of simple inorganic molecules and ions containing lone pairs and bond pairs. MO theory – bonding and antibonding orbitals-non bonding orbitals- MO configuration of simple diatomic molecules (H_2, He_2, N_2, O_2, B_2, F_2, CO, NO and their ions,-comparison of V band MO theories.

Total: 60 hrs

Course Outcome

- To understand the nature and function of reaction intermediates
- To learn the stability and aromaticity of organic molecules
- To understand the geometry of simple organic compounds
- To know the basic mechanism of different reactions (addition, elimination & substitution)
- To understand the laws of gaseous behaviour

Text Books

1. P. L. Soni, "Text Book of Organic Chemistry" Sultan Chand & sons. 32nd edition. **2013**
2. B. R. Puri, L. R. Sharma, Pathania, "principle of Physical Chemistry" Vishal Publishing & Co., 46th edition **2013**
3. P. L. Soni, "Text Book of Inorganic Chemistry" Sultan Chand & sons. 32nd edition. **2013**

Reference Books

1. James E. Huheey, Ellen, A. Keiter, Richard, L. Keiter, "Inorganic Chemistry" Pearson education (Singapore Pvt Limited) 9th edition, **2013**
2. J. D.Lee, Concise Inorganic chemistry" Blackwell Science Limited (France) 9th edition **2013**
3. Robert Thornton Morrison, Robert Neilson Boyd, "Organic Chemistry" Ashok K. Ghosh 10th edition, **2013**
4. Dr. Jagadamba singh, Dr. L. D. S. Yadav, "Advanced Organic Chemistry" Pragati Prakashan, 7th Edition, **2011**
5. Kundu and Jain, "Physical Chemistry" S. Chand, 6th edition, **2011**

18CBHC12 CHEMISTRY OF HYDROCARBONS 3 0 0 3

Course objective

To know about what are hydrocarbons and their classification, conformations, preparations, properties and about aromaticity.

Unit I Classifications of hydrocarbons 09

Chemistry of alkanes and cycloalkanes petroleum source of alkanes-Methods of preparing alkanes and cycloalkanes – chemical properties –mechanism of free radical substitutions in alkanes –uses.

Unit II Conformational Analysis 09

Conformational study of ethane and n-butane – Relative stability of cyclo alkanes from cyclopropane upto cyclooctane – Bayer's straintheory – Limitations – cyclohexane and mono-and disubstituted cyclohexanes.

Unit III Preparation methods of hydrocarbons 09

General methods of preparation and properties of Alkenes and alkynes-electrophilic and radical addition mechanisms- addition reactions with H_2,X_2, HX, HOX, H_2SO_4, H_2O , hydroboration Ozonolysis and peroxide effect. Hydroxylation of alkenes with $KmnO_4$- allylic substitution of alkenes by NBS –acidity of alkynes and formation of acetylides-test for alkenes and alkynes.

Unit IV Types of Dienes and reactions 09

Dienes-types-stability-preparation of 1, 3 butadiene, isoprene and chloroprene-reactivity –1, 2 and 1, 4 additions in conjugated dienes,-Diels-Alder reaction. Types of polymerization-mechanisms of ionic and free radical addition polymerization.

Unit V Aromaticity and preparation of aromatic compounds 09

Aromaticity-Huckel's rule-resonance in benzene –electrophilic substitution in aromatic compounds-general nitration, sulphonation, Friedelcraft's alkylation and acylation-Orientation and reactivity in monosubstituted benzenes polynuclear hydrocarbons –naphthalene, anthracene and phenanthrene – preparation, properties and uses.

Total: 45 hrs

Course Outcome

- To be well versed in Classifications of hydrocarbons
- To understand the chemical properties and mechanism of free radical substitutions in
- alkanes
- To understand the Conformational Analysis of saturated and unsaturated organic compounds
- To clearly understand electrophilic substitution in aromatic compounds-general nitration, sulphonation, Friedelcraft's alkylation

Text Book

1. P. L. Soni, “Text Book of Organic Chemistry” Sultan Chand & sons. 32nd edition. **2013**

Reference Books

1. Robert Thornton Morrison, Robert Neilson Boyd, “Organic Chemistry” Ashok K. Ghosh 10th edition, **2013**
2. Dr. Jagadamba singh, Dr. L. D. S. Yadav, “Advanced Organic Chemistry” Pragati Prakashan, 7th Edition, **2011**

18CBHC13 **MATHEMATICS-I** **4 0 0 4**

Course objective

To know about matrices, algebra, different equations, differential calculus and trigonometry.

UNIT I Matrices **12**

Introduction-Basic operations-Symmetric-skew symmetric-Hermitian-Skew Hermitian –Unitary-orthogonal-Inverse of a matrix -Solution of linear system(Cramer's rule)- Finding the Eigen roots and Eigen vectors of a matrix-Cayley Hamilton theorem(without proof)

UNIT II Algebra **12**

Partial fractions: Binomial, exponential and logarithmic series (without proof), summation and approximation problems.

UNIT III Theory of Equations **12**

Polynomial equations with real coefficients, irrational roots, complex roots, symmetric functions of roots, Transformation of equation by increasing or decreasing roots by a constant, reciprocal equations, Newton's method to find the root approximately.

UNIT IV Differential calculus **12**

Differentiation – Successive differentiation – Partial differentiation – Maxima and Minima of functions of two variables.

UNIT V Trigonometry **12**

Introduction – Angles – Expansions of $\sin n\theta$ $\cos n\theta$,$\tan n\theta$. Expansion of $\sin\theta$, $\cos\theta$, $\tan\theta$, interms of θ- Simple problems.

Total: 60 hrs

Course outcome

- Show that the following matrices are Symmetric,skew symmetric,Hermitian,Skew Hermitian
- Solve the Partial fractions
- Solve the Polynomial equations with real coefficients, irrational roots, complex roots, symmetric functions of roots
- Solve the Differentiation Successive ,differentiation Partial differentiation
- Find the Expansions of $\sin n\theta$ $\cos n\theta$,$\tan n\theta$

REFERENCE BOOKS

1. P.R. Vittal, Allied Mathematics, Margham Publications, 4th Edition 2009.
2. A. Singaravelu, Allied Mathematics, Meenakshi Agency, 2007.

18PBHC11 INORGANIC QUANTITATIVE ANALYSIS AND PREPARATIONS PRACTICAL 0 0 4 2

Course objective

To know about different types to titrations namely acid base, redox, and complexometric.

Acid – Base Titrations

1. Estimation of Hydrochloric acid using oxalic acid
2. Estimation of sodium Hydroxide using sodium carbonate
3. Estimation of Borax

Redox Titrations

4. Estimation of oxalic acid using Mohr's salt
5. Estimation of Ferrous Sulphate using oxalic acid
6. Estimation of Ferric Iron using Potassium Dichromate

Complexometric titrations

7. Estimation of Magnesium
8. Estimation of Calcium

Any 5 preparations

1. Preparation of Paranitroacetanalide
2. Preparation of benzhydrol
3. Preparation of paranitro benzaldehyde
4. Preparation of metadinitro benzene
5. Preparation of benzoic acid
6. Preparation of tetraamminecopper (II) sulphate.
7. Preparation of potassium trioxalatoluminate.
8. Preparation of potassium trioxalatochromate.

Total: 60 hrs

Course Outcome

- To learn the common experimental titration methods.
- To know the estimation of various inorganic elements.
- To learn the precipitation titration involving oxidation, reduction.

- To learn the common experimental techniques of synthesis of organic molecules.
- To know the preparation involving molecular rearrangement.

Text Books

1. Vogel's – "Textbook of quantitative Inorganic Analysis", Longmann, 12th edition, **2011.**
2. Gnanaprakasam, Ramamurthy, "Organic Chemistry Lab Manual" S. Viswanathan Pvt. Ltd. 3rd edition **2011**

Reference Books

1. S. Sundaram and K. Raghavan "Practical Chemistry", S. Viswanathan. Co. 3rd edition **2011**.
2. J. N. Gurtu and R. Kapoor "Advanced experimental Chemistry", S. Chand and Co. 6th edition, **2010.**
3. Vogel's – "Textbook of qualitative organic Analysis", Longmann, 12th edition, **2011**
4. J. N. Gurtu and R. Kapoor "Advanced experimental Chemistry", S. Chand and Co. 6th edition, **2010**

18CBHC21 STEREOCHEMISTRY AND MOLECULAR REARRANGEMENT 4 0 0 4

Course objective

To understand about what is isomers their classification conformational analysis and the mechanism of important rearrangement.

UNIT-I Stereoisomerism 12

Definition – classification into optical and geometrical isomerism. Optical isomerism: optical activity – conditions for optical activity – asymmetric center – chirality – methods of racemisation and resolution – asymmetric synthesis – (partial and absolute) – Walden inversion.

UNIT-II Absolute Configuration 12

Cahn – Ingold – Prelog rules, R-S notations (Biphenyl, Allene, Spirane and Hexahelicine) for optical isomers with one and two asymmetric carbon atoms (configuration of Glyceraldehyde, Isoserin, Lactic acid and Tartaric acid).

UNIT-III Geometrical Isomerism 12

Cis, *trans* and E, Z notations – geometrical isomerism in maleic, fumaric acid, disubstituted cyclopropane, disubstituted 1, 2-cyclobutane, 1,3-disubstituted cyclobutane, disubstituted cyclopentane and cyclohexane) physical and chemical methods of distinguishing geometrical isomers.

UNIT-IV Conformational Analysis 12

Conformers-dihedral angle – conformational analysis of ethane and n-butane – energy diagram – conformers of cyclohexane – boat, twisted boat and chair forms. Conformation and stability of 1,2-,1,3-, 1,4-dimethycyclohexane and conformation of decalin.

UNIT-V Molecular Rearrangements 12

Mechanism, examples for Pinacol-Pinacolone, Wagner Meerwein, Wolff, Beckmann, Hofmann, Benzilic acid, Cope and Claisen rearrangements. Migration aptitude, Nighboring group participation and their role in rearrangements.

Total: 60 hrs

Course Outcome

- To recognize and comment on different synthetic strategies and methods for stereocontrol when faced with a synthetic scheme
- To predict the conformational preferences of common organic structures based on steric and electronic interactions and describe stereochemical and conformational structure on the chemical reactivity and on the mechanisms of organic reactions
- To discuss the significance of chirality of allenes, spiranes and biphenyls
- To draw mechanisms for reactions involving heterocycles as starting materials, intermediates and products, and to propose syntheses of heterocycles from the major classes

- To describe about aromaticity, nonaromaticity and antiaromaticity in carbocyclic and heterocyclic compounds

Text books

1. I. L. Finar. "Organic chemistry: Stereochemisty and the Chemistry of Natural Products. Vols. II, Pearson education, London 5th edition, **1975**.
2. P. S. Kalsi, "Stereochemistry: Conformation and Mechanism" New age international Pvt ltd. 6th edition **2005**

Reference Books

1. Robert Thornton Morrison, Robert Neilson Boyd, "Organic Chemistry" Ashok K. Ghosh 10th edition, **2013**
2. Dr. Jagadamba singh, Dr. L. D. S. Yadav, "Advanced Organic Chemistry" Pragati Prakashan, 7th Edition, **2011**

18CBHC22 **ANALYTICAL TECHNIQUES** **3 0 0 3**

Course objective

To understand the basic concepts about errors and their minimization. Various practical's in chemistry with their concepts, instruments and their utility.

Unit-I Safety in the Chemistry Lab and Error in chemical analysis **09**

Storage and handling of chemicals, Handling of acids, ethers, toxic and poisonous chemicals. Antidotes, threshold vapour concentration and first aid procedure. MSDS, COSHH. Accuracy and precision, Absolute and relative errors. Methods of eliminating or minimizing errors. Precision: mean, median, average deviation and coefficient of variation. Significant figure and its relevance. Normal error curve and its importance.

Unit-II Titrimetric Methods of Analysis **09**

Methods of expressing concentration of solutions. Types of titrations. Requirements for analysis. Primary and secondary standards. Limitation of volumetric analysis. 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 and choice of indicators. Stability of complexes.Titration involving EDTA. Metal ion indicators and their characteristics.

Unit-III Precipitation titrations and Gravimetric methods of analysis **09**

Concept of sparingly soluble salts. Relation between solubility and solubility products. Argentometric titrations, indicators for precipitation titrations involving silver nitrate. Determination of chloride by Volhard's method. Adsorption indicators. Separation by precipitation. Factors affecting solubility, gravimetric factor. Purity of precipitates, von Weiman ratio. Co-precipitation and post precipitation. Precipitation from homogeneous solution.

Unit-IV Chromatographic techniques and applications **09**

Principles of adsorption and partition chromatography: Column and Paper. TLC, ion-exchange chromatography – technique and applications. Gas chromatography, principle, detector and applications. Purification of solid organic compounds: recrystallisation, sublimation. Use of miscible solvents. Use of drying agents and their properties. Purification of liquids. Experimental techniques of distillation – fractional distillation – vacuum distillation – steam distillation.

Unit-V Polarography and Thermal methods **09**

Polarography – theory, apparatus, DME, Diffusion, Kinetic and catalytic currents, Current – voltage curves for reversible and irreversible system, qualitative and quantitative applications to inorganic systems. Amperometric titrations-theory, apparatus, types of titration curves, successive titrations and indicator electrodes – Applications. Principle of thermogravimetric analysis (TGA). Differential thermal analysis (DTA): Instrumentation and applications. Factors affecting TGA and DTA curves. TGA of $AgNO_3$, $CaC_2O_4.H_2O$ and DTA of sulphur.

Total: 45 hrs

Course Outcome

- To explain the theoretical principles and important applications of classical analytical methods within titration (acid/base titration, complexometric titration, redox titration), and various techniques within gravimetric and coulometric methods.
- To explain the theoretical principles of various separation techniques in chromatography, and typical applications of chromatographic techniques.
- To know the different types of chromatography and its application.
- To get idea about the basics and Merits of electro analytical techniques.
- To learn the theory and working of polarography and its application in inorganic elements can be clearly known.

Text Book

1. B. K. Sharma. “Instrumental method of chemical analysis” Goel publishing house, 27th edition, **2011.**

Reference Book

1. Grudeep R. Chatwal, Sham K. Anand. “Instrumental Methods of Chemical Analysis” Himalaya Publishing House, 5th edition, **2013.**

18CBHC23 **MATHEMATICS-II** **4 0 0 4**

Course Objective

To impart the knowledge of Integral calculus, Differential Equations, Fourier Series and Laplace transform. The course will also serve as a prerequisite for post graduate and specialized studies and research.

UNIT-I INTEGRAL CALCULUS **12**

Integral calculus: Integration – Definite integrals – Bernoulli's formula -Reduction formula for $\int sin^n x dx, \int cos^n x dx, \int tan^n x dx, \int x^n e^{ax} dx.$

UNIT-II ORDINARY DIFFERENTIAL EQUATIONS **12**

Ordinary differential equations: First order of higher degree equations – Second order and non-homogenous linear differential equations with constant coefficient – Second order linear differential equations with variable coefficients.

UNIT-III PARTIAL DIFFERENTIAL EQUATIONS **12**

Formation of partial differential equations by eliminating arbitrary constants and arbitrary function- Solutions of standard types of first order equations- f(p,q)=0; f(x,p,q)=0, f(y,p,q)=0, f(z,p,q)=0, z = px +qy +f(p,q) -Lagrange method of solving linear partial differential equation
Pp +Qq = R.

UNIT-V LAPLACE TRANSFORM **12**

Laplace transform: Definition, Laplace transform of basic trigonometric, exponential and algebraic functions - Inverse laplace transform- Solving differential equation of second order with constant coefficients using laplace transform.

UNIT-V FOURIER SERIES **12**

Fourier series of periodic functions on the interval [c,c+2π] –Even and Odd functions- Half range series.

Total: 60 hrs

Course outcome

- Evaluvate Definite integrals Bernoulli's formula
- Derivation of Reduction formula for $\int \sin^n x\,dx$, $\int \cos^n x\,dx$, $\int \tan^n x\,dx$, $\int x^n e^{ax} dx$
- Solved Second order linear differential equations with variable coefficients.
- Form the partial differential equations by eliminating arbitrary constants and arbitrary function
- Determine Even and Odd functions,Half range series.

TEXT BOOKS

1. P. Kandaswamy and K.Thilagavathy, Allied Mathematics paper II, 2nd Semester, S.Chand Publishing Pvt. Ltd. 1st Edition, 2004.

REFERENCE BOOKS

3. P.R. Vittal, Allied Mathematics, Margham Publications, 4th Edition 2009.
4. A. Singaravelu, Allied Mathematics, Meenakshi Agency, 2007.

18PBHC21 GRAVIMETRIC ANALYSIS PRACTICAL 0 0 4 2

Course objective

To learn and practice the various quantitative estimations; Ba, Pb, Ca, Mg, Zn, Al, Cr and SO_4^{2-} by gravimetry

List of Experiments

1. Estimation of Barium as Barium Sulphate
2. Estimation of Sulphate as Barium Sulphate
3. Estimation of lead as lead chromate
4. Estimation of Calcium as Calcium oxalate monohydrate
5. Estimation of Chloride as Silver Chloride
6. Estimation of nickel as Ni –DMG Complex
7. Estimation of Magnesium as magnesium Oxinate
8. Estimation of Zinc as Zinc Oxinate
9. Estimation of Aluminium as Aluminium Oxinate
10. Estimation of Chromium as lead Chromate
11. Estimation of Magnesium as Magnesium pyrophosphate
12. Estimation of Lead as Lead sulphate

Total: 60 h

Course Outcome

- To estimate the amount of substance present in a given sample by determining the weight of the precipitate obtained from the solutions of different metal ions
- To interpret the weight of the precipitate obtained for the calculation of amount of metal present
- To develop the concept of gravimetric analysis
- To compare theoretical concepts with practical experiments
- Compare theoretical concepts with practical experiments.

Text Book

1. Vogel's "Textbook of quantitative Inorganic Analysis" Longmann, 4th edition, **2009**

Reference Book

1. Dr. S. K. Agarwal and Dr. Keemti Lal "Advanced Inorganic Analysis, Pragati Prakashan, 7th edition, **2009**

18CBHC31 ELECTROCHEMISTRY AND SURFACE CHEMISTRY 4 0 0 4

Course objective: To have detailed knowledge about electrochemistry, theories of electrochemistry and surface chemistry.

Unit I Electrochemistry-I 12

Conductance – cell constant specific conductance and equivalent conductance measurement. Variations of equivalent conductance with concentration weak and strong electrolytes motilities of ions – transport number Kohlraush's law. Applications of Ostwald dilution law – conductance –titrations (acid-base, precipitation) solubility product dissociation constant.

Unit II Electrochemistry-II 12

Potentiometry – cells electromotive force – electrode potential – their thermodynamic significance. Nernst equation standard electrode potentials and its determination. Reference electrodes hydrogen electrode calomel, quinhydrone and glass electrodes. Types of cells – chemical and concentration cell – liquid junction potential salt bridges. Redox systems.

Unit III Electrochemistry-III 12

Theory of indicators- pH Henderson equation – determination of pH by Potentiometry. Electrolytes – strong and weak-ionic equilibria constant hydrolysis of salts-hydrolysis constant and its determination by potentiometry. Potentiometric titrations – acid-base, redox, precipitation.

Unit IV Surface Chemistry-I 12

Laws of photochemistry Grotthus Drapper law, Einstein's law of photochemical equivalence- quantum yield. Kinetics of photochemical reactions of CH_3CHO and $H_2 – Cl_2$. Photophysical processes fluorescence and phosphorescence chemiluminescence.

Unit V Surface Chemistry-II 12

Physisorption and adsorption isotherms – Freundlich and its use in surface area determination. Colloids-types, stability and electrical double layer, and electro-osmosis –association colloids (micelles) and critical micelle concentration.

Total: 60 hrs

Course Outcome

- To know the concept of specific conductance and equivalent conductance measurement
- To clearly explain the concept of applications of ostwald dilution law
- To understand the Nernst equation standard electrode potentials and its determinations
- To clearly explain the concept of various types of chemical and concentration cells photochemical equivalence
- To clearly explain the concept of photophysical processes, fluorescence and

Text Books

1. P.W. Atkins, “Physical Chemistry” Oxford publishers, 11th edition, **2009**
2. B. R. Puri, L. R. Sharma, Pathania, “principle of Physical Chemistry” Vishal Publishing & Co., 46th edition **2013**

Reference Books

1. P.L. Soni, “Text Book of Physical Chemistry” Sultan Chand & sons. 12th edition, **2011**
2. Kundu and Jain, “Physical Chemistry” S. Chand, 6th edition, **2011**
1. S. Glasstone, “Text Book of Physical Chemistry” –Macmillan. 7th edition **2012**

18CBHC32 FUNDAMENDALS OF PHYSICS – I 4 0 0 4

Course Objective

To make the students to understand, the elasticity of a material and different kinds of moduli; surface tension and viscosity of fluids; transmission of heat via Conduction, Radiation process involved in thermal physics; properties of sound using experimental methods and principles of electricity and its conversion into ammeter and voltmeter.

UNIT I Elasticity and Bending Moment 12

Hooke's law - Elastic modulli - Work done in stretching and work done in twisting a wire - Twisting couple on a wire - Determination of rigidity modulus of a wire using torsion pendulum - Expression for bending moment - Uniform bending - Experiment to determine young's modulus using pin and microscope method.

UNIT II Fluids 12

Surface Tension: Definitions-Expression for surface tension of a liquid by capillary rise method - Viscosity: Poiseuille's formula for rate of flow of liquid in a capillary tube by dimensions - Analogy between current flow and liquid flow - streamlined motion – Stoke's formula.

UNIT III Thermal Physics 12

Conduction in solids: Thermal conductivity - Lee's disc method - Wiedmann-Franz law - Convection: Newton's law of cooling – Radiation: Distribution of energy in the spectrum of a black body – Planck's law of radiation (no derivation) and its deduction.

UNIT IV Sound 12

Simple harmonic motion: free, damped, forced vibrations and resonance - Intensity and loudness of sound - Decibels – Melde's string experiment – Determination of frequency of tuning fork - Acoustics of buildings: Reverberation time - Sabine's formula.

UNIT V Electricity 12

Current and Current density – Ohm's law - Resistors - I-V characteristics - colour coding- conversion of galvanometer into an ammeter and voltmeter – Kirchhoff's laws – Balance condition of Wheatstone's bridge - Potentiometer – Measurement of potential difference and current.

Total: 60 hrs

Course Outcomes:

- Understand the bending of beams under different loading conditions.
- Identify the stress developed in beams due to bending.
- Develop an understanding of the general energy equation and its application to the flow of fluids.

- Apply the concepts and principles of black-body radiation to analyze radiation phenomena in thermodynamic systems.
- Analyze acoustic properties of typically used materials for design consideration.

Text Books

1. Properties of Matter: R. Murugeshan, S Chand & Co. Pvt. Ltd., New Delhi
2. Heat and thermodynamics: D S Mathur, S Chand & Co., New Delhi
3. Text book of Sound by M N Srinivasan – Himalaya Publications, 1991
4. Electricity & Magnetism by K K Tewari, S Chand & Co., 3rd Edition, 2001.

18PBHC31 PHYSICAL CHEMISTRY PRACTICAL 0 0 4 2

Course objective

To know and practice the important experiments, in chemical kinetics, phase rule and electrochemistry.

Determination of the order of the following reactions

1. Iodination of acetone
2. Soapanification of an ester (ethyl acetate)
3. Acid catalyzed hydrolysis of an ester (ethyl acetate)

Distribution Law

4. Iodination of acetone
5. Soapanification of an ester (ethyl acetate)
6. Acid catalyzed hydrolysis of an ester (ethyl acetate)

Heterogeneous equilibria

7. Phenol-water system – CST
8. Effect of Impurity- 2% NaCl or succinic acid solutions on phenol-determination of the concentration of the given solution.
9. Determination of transition temperature of the given salt hydrate. $Na_2S_2O_3$. $5H_2O$, CH_3COONa. $3H_2O$, $SrCl_2$ $6H_2O$, $MnCl_2$ $4H_2O$.
10. Molecular weight of a solute-Rast's method using naphthalene, m-dinitrobenzene and diphenyl as solvents.
11. Determination of strength of a strong acid by conduct metric titration (HCl *vs* NaOH).
12. Determination of the strength of Fe (II) by potentiometric redox titration.

Total: 60 hrs

Course Outcome:

- To develop expertise relevant to the professional practice of chemistry
- To developed an understanding of the breadth and concepts of physical chemistry
- To Know the role of physical chemistry in the chemical sciences and Engineering
- To develop an understanding to the role of the chemist and chemical engineer in tasks employing physical chemistry
- To understand the methods employed for problem solving in physical chemistry

Text Books

1. B. Viswanaathan, P.S. Raghavan "Practical Physical Chemistry", Viva Books private Ltd. ,**2005**
2. Slowiski, Wolsey-Indian, "General Chemistry A Lab Manual" Congage learning India Private Ltd.**2010**

Reference Books

1. Williamson, Peck-Indian “Lab Manual Fox General Chemistry”, Congage learning India Private Ltd.**2009**
2. R.K.P Singh, Jagadamba Singh, Jaya Singh “ Advanced Practical Chemistry”, Pragati Prakashan, **2011**
3. V.K Abluwalia, Sunita Dhingra, Adarsh Gulati, “College Practical Chemistry”,University Press(India) Private Ltd **2005**

18PBHC32 **PHYSICS PRACTICAL** **0 0 4 2**

Course Objective:

To impart the knowledge for the bending of beams under different loading conditions, to know the comparative study of viscosity, spectrometerand conductance.

Any 10 Experiments

1. Young's modulus by uniform bending - Pin and Microscope.
2. Young's modulus by non-uniform bending - Pin and Microscope.
3. Rigidity modulus - torsion pendulum
4. Coefficient of viscosity of a liquid - Poiseuilles method
5. Thermal conductivity of a bad conductor - Lee's disc method.
6. Spectrometer - grating - normal incidence method.
7. Spectrometer – Dispersive Power of a prism.
8. Coefficient of viscosity of a liquid – Stoke's method
9. Ultrasonic Interferometer
10. Sonometer-Frequency of Tuning Fork
11. Compound Pendulum.
12. Air wedge - thickness of a wire

Total: 60 hrs

Course outcome

- Calculate the Young's modulus of the material.
- Estimate the parameters associated with torsional oscillation.
- Analyze the coefficient of viscosity at different pressure head.
- Calculate the wavelengths of different spectral line using spectrometer grating.
- Examine the thermal conductivity of bad conductor using Lee's disc method.

Text Books

1. Properties of Matter: R. Murugeshan, S Chand & Co. Pvt. Ltd., New Delhi
2. Heat and thermodynamics: D S Mathur, S Chand & Co., New Delhi

18CBHC41 **COORDINATION CHEMISTRY** **4 0 0 4**

Course objective

To learn about what is coordination chemistry, nomenclature and various theories: Werner theory, valence bond theory, crystal field theory and John-Teller theory.

Unit – I Introduction **12**

Nomenclature- Werner Theory- EAN Rule – Chelation- Stability of complexes – factors affecting the stability – Stepwise and overall formation constant Isomerism: structural isomerism- stereoisomerism – geometrical and optical isomerism in 4 and 6 coordinated Complexes

Unit – II Theories of Coordination – I **12**

Valence bond theory – shortcomings of VB theory – crystal field theory –CFSE – Spectrochemical series- colour and magnetic properties of complexes– high spin and low spin complexes Defects of CFT, Comparison of VBT and CFT

Unit –III Theories of Coordination – II **12**

Evidences of covalent bonding in metal – legend bonding Molecular Orbital theory of 6 bonded complexes only Jahn Teller effect and electronic spectra of complexes comparison of CFT and MOT

Unit – IV Metal Carbonyls **12**

Metallic carbonyls – Preparation – Reaction – Classifications Structure and Bonding in Carbonyls – Back bonding – Evidences for π– bonding – Applications of carbonyls Ferrocene – preparation – properties – Aromatic character of ferrocene – Structure.

Unit – V Coordination complexes reaction and mechanisms **12**

Liability and inertness of complexes – mechanism of acid hydrolysis and base hydrolysis of octahedral complexes – SN^1, $SN^2$and SN^1CB mechanisms – evidence for SN^1CB mechanism *trans*- effect – trans effect series – Theories of trans effect – applications of trans effect.

Total: 60 hrs

Course Outcome

- To appreciate the postulates of werners theory of coordination compounds
- To Know the meaning of the terms: coordination entity, central metal atom/ion, ligand, coordination number, coordination sphere
- To learn the rules of nomenclature of coordination compounds
- To define different types of isomerism in coordination compounds
- To understand the nature of bonding in coordination compounds in terms of the valence Bond and crystal Field theories

Text Book

1. Puri B. R, Sharma L. R. Kalia K. K “Principles of inorganic Chemistry” Milestone publishers, 31st edition, **2013.**

Reference Books

1. R. D. Madhan, "Modern Inorgnaic Chemistry" S. Chand & Co., 6th edition **2012**
2. James E. Huheey, Ellen, A. Keiter, Richard, L. Keiter, "Inorganic Chemistry" Pearson education (Singapore Pvt Limited) 9th edition, **2013.**
3. J. D.Lee, Concise Inorganic chemistry" Blackwell Science Limited (France) 9th edition **2013**
4. F. A cotton G. Wilkinson and P. L. Gvas "Basic Inorganic Chemistry" John Wiley, 11th edition, **2009.**

18CBHC42 FUNDAMENDALS OF PHYSICS – II 4 0 0 4

Course Objective

To make the students to understand and study, the interference and diffraction properties of light; principles of magnetism; dual nature of matter wave and significance of wave function and Schrodinger equation; principles of nuclear physics and radiation physics; the working of electronic components in the digital circuits.

UNIT I OPTICS: Interference 12

Air wedge - determination of diameter of a thin wire by air wedge – Diffraction: Fresnel diffraction & Fraunhofer diffraction - plane diffraction grating - theory and experiment to determine wavelength (normal incidence) - Polarization: Double refraction.

UNIT II Magnetism and Electromagnetism 12

Magnetism: Susceptibility - permeability - intensity of magnetization - properties of dia, para and ferro magnetic materials – Electromagnetism: Faraday's laws of electromagnetic induction, Lenz's law – self-inductance – mutual inductance.

UNIT III Nuclear and Radiation Physics 12

Nuclear Physics: Nuclear constituents, size, mass, spin and charge - binding energy - binding energy curve - nuclear fission - chain reaction – nuclear reactor - Radiation Physics: radioactive disintegration – half-life period.

UNIT IV Relativity and Quantum Mechanics 12

Relativity: Frames of references - postulates of special theory of relativity - Lorentz transformation equations - Wave mechanics: matter waves - de Broglie wavelength - properties of wave functions - Quantum mechanics: postulates of quantum mechanics -Schrödinger equation - Time dependent and time independent wave equations.

UNIT V Electronics 12

Diodes, transistors and ICs: - Zener diode – characteristics - transistor configuration CE mode - IC – Pin diagram of 741 – Digital electronics: binary numbers – conversion of decimal number to binary number - binary number to decimal number – binary addition, subtraction and basic logic gates (OR, AND, NOT. NOR & NAND) – EXOR gate – De Morgan's theorem.

Total: 60 hrs

Course Outcome

- Understand the basics of interference, diffraction and polarization.
- Identify some typical magnetic materials and their properties.
- Demonstrate an understanding of the basic principles of the special theory of relativity.
- Understand and examine the structure of various number systems and its application in digital design.
- Design and analyze the combinational logic circuits.

Text Books

1. Optics: Brij Lal & Subramaniam, S Chand & Co., New Delhi
2. Electricity and magnetism: R Murugeshan, 8th Edn, 2006, S Chand & Co., New Delhi
3. Principles of Electronics: V K Mehta, 5th edition 2001, S Chand & Co., New Delhi,
4. Atomic and Nuclear Physics: Brij Lal & Subramaniam, S Chand & Co., 2000
5. Quantum Mechanics: V. Devanathan, Narosa, Chennai, 2005.
6. Modern Physics: R Murugeshan, Kiruthiga, Sivaprasath S Chand & Co. 2007
7. Physics of Radiation Therapy: FM Khan - Williamd and Wilkins, Third edition, 2003

Reference Books

1. Fundamentals of Physics, 6th Edition by D Halliday, R Resnick and J Walker, Wiley NY 2001.
2. Physics, 4th Edition vols. I, II & II Extended by D Halliday, R Resnick and K S Krane, Wiley NY 1994.
3. Nuclear Medicine Physics: Chandra, Lippincot Williams and Wilkins, 1998.

18PBHC41 ORGANIC QUALITATIVE ANALYSIS PRACTICAL 0 0 4 2

Course objective

To know the identification of various functional groups in a unknown compound and to know how to prepare various organic compound by a single stage preparation.

Organic analysis

Reaction of the following functional groups:

1. Aldehyde
2. Ketone
3. Carboxylic acid (mono and di)
4. Ester
5. Carbohydrate (reducing and non reducing)
6. Phenol
7. Aromatic primary amine
8. Amide
9. Nitro compound
10. Diamide
11. Anilide

The given organic compound containing one functional group should be analyzed and to be reported with a characteristic derivative.

Determination of boiling point and melting point (Demonstration only**)**

Total: 60 hrs

Course Outcome

- To understand how to identify the given organic substance is aliphatic or aromatic
- To learn how to find the given organic substance is saturated or unsaturated
- To learn the reaction mechanism of identification for special elements through lassigne's test
- To learn the preliminary test of identification for various functional groups like carbohydrate, carboxylic acid, aldehyde, phenolic compound, amines, ketones, nitro compounds
- To practice the various confirmatory tests for different functional groups

Text Book

1. Gnanaprakasam, Ramamurthy, "Organic Chemistry Lab Manual" S. Viswanathan Pvt. Ltd. 3rd edition **2011**

Reference Book

1. Vogel's – "Textbook of qualitative organic Analysis", Longmann, 12th edition, **2011**

18CBHC51 QUANTUM MECHANICS AND THERMODYNAMICS 4 0 0 4

Course objective: To know and understand what is quantum mechanics, various fundamental concepts as well as about thermodynamics, different laws in thermodynamics, enthalpy, entropy, free energy various processes.

Unit – I Quantum Mechanics I 12

Electron and old quantum Theory, Rutherford scattering experiments Rutherford atomic models Quantum Theory of radiation, Photoelectric effect, Bohrs Theory of hydrogen atom alternative explanation for the emission of fine spectrum

Unit – II Quantum Mechanics II 12

Dual character of electron debrogile's equation, the Davison Germens experiment Heisenberg uncertainty principle Compton effect, Quantum Mechanics, Schrodinger wave equation (No Derivation) Zeeman effect, Pauli's exclusion principle

Unit –III Thermodynamics –I 12

Definitions of thermodynamic terms – intensive and extensive variables, isolated, closed and open systems. Thermodynamic processes, cyclic processes, reversible and irreversible processes, thermodynamic functions and their differentials, Zeroth law of thermodynamics. Concepts of heat and work.

Unit – IV Thermodynamics –II 12

First law of thermodynamics and internal energy (U), enthalpy (H), relation between Cp and Cv Calculations of w, q, d, U and dH for expansion of ideal gas under isothermal and adiabatic conditions, for reversible and irreversible processes including free expansion, Joule's law, Joule Thomson coefficient

Unit – V Thermodynamics –III 12

Application of first law of thermodynamics – Hess's law of constant heat summation, Enthalpy of solution, enthalpy of dilution, enthalpy of neutralization, enthalpy of ionization and enthalpy of formation of ions. Bond dissociations energy, Born-Haber cycle for calculation of lattice energy, Kirchoff's equation, relation between ΔH and ΔU of a reaction. Spontaneous processes, heat engine, Carnot cycle and its efficiency, statements of second law, Nernst heat theorem, third law of thermodynamic.

Total: 60 hrs

Course Outcome:

- To explain the Basic principle of quantum chemistry
- To explain the concept of wavefunction
- To state about the postulates of quantum chemistry
- For solving the problems in quantum chemistry
- To explain operators and mathematical entities

Text Books:

1. P.W. Atkins, "Physical Chemistry" Oxford publishers, 11th edition, **2009**

2. D. A. McQuarrie, “Quantum Chemistry” University Science Books, Mil Valley, California, 7th edition **1983.**
3. S. Glasstone, “Thermodynamics for Chemist” EastWest Press, 6th edition, **1999**

Reference Books:

1. P.L. Soni, “Text Book of Physical Chemistry” Sultan Chand & sons. 2th edition, **2011**
2. . Kundu and Jain, “Physical Chemistry” S. Chand, 6th edition, **2011**
3. S. Glasstone, “Text Book of Physical Chemistry” –Macmillan. 7th edition **2012**

18CBHC61 FUNDAMENTALS OF SPECTROSCOPY 4 0 0 4

Course objective: To understand what is spectroscopy, classification and fundamental concepts of IR, UV-Visible, NMR and Mass spectroscopy.

Unit – I Introduction 12

Type of Energy, types of radiation energy conversion. Electromagnetic radiation its interaction with matter Electromagnetic spectrum, Electrical Spectra Magnetic Spectra exchanged Energy types and regions of various spectra, Energy associated with each spectra.

Unit – II Classification of Spectroscopy 12

Concept of excitation ground state excited state. Absorption of emission spectra, line spectra band spectra Atomic spectra and molecule spectra interpretation methods

Unit –III Microwave and IR Spectra 12

Basic principle of M.W. concept of selection rule Instrumentation. Basic principle of IR Spectra Region of IR spectra plotting methods sampling and functional technique concept of groupings FTIR

Unit – IV UV visible and Mass Spectra 12

Lambert Beers law- Basic principle of UV visible Spectra and Woodword Fiesher rule Chromophores Auxo – chromes plotting methods of spectra-solvent effect. Basic principle of mass spectra and plotting methods fragmentation Pattern and methods base peak Molecular ion peak meta stable peak Nitrogen rule Mc lafferty rearrangement

Unit V NMR Spectra 12

Classification- atoms based on nuclear types nuclear moment principle of nuclear magnetic resonance – oscillating frequency larmour frequency-chemically and magnetic environments reference Nucleic plotting method chemical shift low resolution and high resolution spectra Spin-Spin coupling concept PMR C^{13}, F^{15}, P^{35} FTNMR

Total: 60 hrs

Course Outcome

- To understand agonist, anti agonist, partial agonist and inverse agonist
- To gain the knowledge of various receptor theories
- To understand the role of receptors and auto radiography
- To learn various receptors like GABA and familiar adriginic receptors
- To learn lead molecules choice and API modification

Text Books

1. B. K. Sharma. “Instrumental method of chemical analysis” Goel publishing house, 27th edition, **2011.**
2. Grudeep R. Chatwal, Sham K. Anand. “Instrumental Methods of Chemical Analysis” Himalaya Publishing House, 5th edition, **2013.**

Reference Books

1. Robert M. Silverstin, Clayton Bassler and Terence C. Morril, “Spectrophotometer Identification of organic compounds” John Wiley Sons. 6th edition, **2009.**
2. H. H.Willard, J. A. Dean, L.L. Merit “Instrumental method of chemical analysis” Words Worth, 7th edition, **1999.**

SYLLABUS

DISCIPLINE SPECIFIC ELECTIVE (DSE)

COURSES

CHEMISTRY OF METALS AND NON METALS 4 0 0 4

Course objective

To learn about the periodic table classification, properties and comparative studies of elements in different series.

Unit-I Chemistry of `d' block elements 12

Characteristics of `d' block elements. Comparative study of Ti, V, Cr, Mn and Iron group metals- occurrence, oxidation states, magnetic properties, catalytic properties and color.

Unit II Metallurgy 12

General principles of metallurgy –occurrence- concentration of the ores- extraction of the metals Extraction of following metals: Al, Ca, Ti, Cr, Mn, Ni, V, Sn and Pb.

Unit-III Chemistry of P block elements 12

Carbon family – Comparison of properties of carbon and silicon valencies, oxides, halides, hydrides and oxyacids classification, properties and uses of carbides. Classification of silicates.

Unit-IV Nitrogen and Oxygen family 12

Comparative study of N, P, As, Sb, and Bi – elements, oxides, oxyacids, halides and anhydrides, valency states – preparation, properties, structure and uses of hydrazine, hydroxylamine and hydrazoic acids, preparation and uses of $NaBiO_3$.

Comparative study of O, S, Se, and Te – elements, hydrides, oxides and oxyacids of sulphur including peroxy acids.

Unit-V Halogens and Nobel Gases 12

Comparative study of F, Cl, Br, I and At – elements reactivities, hydrogen halides, oxides and oxyacids. Interhalogen compounds and pseudo halogens. Exceptional properties of Fluorine. Electronic onfiguration and position in the periodic table. Applications, clathrates and compounds of xenon, hybridization and geometries of XeF_2, XeF_4, $XeOF_4$.

Total: 60 hrs

Course Outcome

- To clearly explain the Characteristics of `d' block elements
- To understand the comparative study of Ti, V, Cr, Mn and Iron group metals
- To clearly explain the general principles of metallurgy, occurrence and concentration of
- the ores
- To clearly explain the extraction of the selected metals

Text Books

1. P. L. Soni, “Text Book of Inorganic Chemistry” Sultan Chand & sons. 32nd edition. **2013**
2. R. D. Madhan, “Modern Inorgnaic Chemistry” S. Chand & Co., 6th edition **2012**

Reference Books

1. James E. Huheey, Ellen, A. Keiter, Richard, L. Keiter, “Inorganic Chemistry” Pearson education (Singapore Pvt Limited) 9th edition, **2013**
2. J. D. Lee, Concise Inorganic chemistry” Blackwell Science Limited (France) 9th edition **2013**

BIO – INORGANIC CHEMISTRY 4 0 0 4

Course objective

To understand about human biochemistry, proteins, enzymes, vitamins. Chemistry involved in agriculture, nitrogen fixing and photosynthesis.

Unit – I Introduction 12

Essential and trace metal lions – membrane- structure, function, transport properties active transport – phosphate hydrolysis – Role of alkali and alkaline earth metal lions in biological systems- sodium pump

Unit – II Oxygen Carriers 12

Hemeproteins – Hemoglobin and myoglobin – structure – oxygenation mechanism Bohr effect co-operativity effect in hemoglobin

Unit –III Metalloenzymes 12

Enzymes- Definition, Nomenclature, Sources, Classification and Specificity – Factors affecting enzyme activity- substrate pH, temperature –Coenzyme- vitamin B_{12} coenzymes- peroxidase and catalyses

Unit – IV Nitrogen Fixation and Iron – Sulphur proteins 12

Nitrogen fixing microorganisms (In VIVO nitrogen Fixation)-Nitrogenous) Reactivity of nitrogenous-postulated mechanisms for biological nitrogen fixation Rurbredoxin, Ferredoxins structure, and functions

Unit – V Photosynthesis and Toxicity 12

Chloroplast- light reactions – structure of chlorophyll- Photosynthesis – Reactions – Type I and Type II photosynthetic reactions – Role of Manganese complex in evolution of oxygen Toxicity – Hg, Cd, Zn, Pb, and As

Total: 60 hrs

Course Outcome

- To know the essentials of metal ions in human body
- To learn the importance of ATP cycle and sodium potassium pump
- To understand the structure and functions of hemoglobin and myoglobin
- To understand the process and basis of nitrogen fixation in organisms
- To realize the mechanism of biological nitrogen fixation

Text Book

1. Lippard and Berg, "Principle of Bioinorganic Chemistry" –University- Science Book 7th edition, **1994**

References Books

1. Bertini, Gray, Hippard and Valentire – "Bioinorganic Chemistry" –Viva Books Pvt Ltd. 3rd edition, **2011**
2. David E. Fertion , "Bio-coordination Chemistry" Oxford chemistry Primer, 7th edition1995

NUCLEAR AND SOLID STATE CHEMISTRY 4 0 0 4

Course objective: To learn about nuclear components, nuclear energy, forces, nuclear reactors, nuclear power projects in India and various countries and to understand solid structure, crystals types, X-ray diffraction, semi conductors and solid defects

Unit – I Introduction **12**

The nucleus – subatomic particles- nuclear force- mass defect- packing fraction – Binding energy – n/p ratios in stable and metastable nuclei –Nuclear shell model the liquid drop model –nuclear isomerism- isotopes, isobars, isotones – mirror nuclelli magic numbers

Unit – II Fragmentation and Assay **12**

Nuclear fission – fission fragments and their mass distribution – fission energy – Theory of fission Nuclear reactors – Fast Breeder reactors – atomic power projects in India Nuclear fusion – Nuclear fusion in Sun's atmosphere Detection and determination of activity by G.M counter and Scintillation counter.

Unit –III Tracer techniques **12**

Radioactive Tracers: - Principles of separation of isotopes- uses in analytical chemistry, reaction mechanism and agriculture – radio carbon dating

Artificial radioactivity- Transmutation of elements – cyclotron – induced radioactivity- Q values of nuclear reactions

Unit – IV Solid state I **12**

Crystalline and amorphous solids- Elements of symmetry of a crystal – unit cell – Bravais lattices – miller indices – Bragg's law – X- ray diffraction of crystals – structure of NaCl, CsCl diamond, Graphite zinc and Futile – radius ratio rule

Unit – V Solid state II **12**

Defects in solids-Band Theory – Semiconductors – p-type and n- type semiconductors – applications – Solid state electrolytes- Types of magnetic, Dia, Para, Ferro, Antiferro and ferrimagnetism**.**

Total: 60 hrs

Course Outcome

- To define Atomic nucleus, Isotopes, Types of isotopes and Nuclear isomers
- To explain different types of Nuclear reactions, stability of Nucleus, Nuclear forces and Emission of alpha, beta and gamma rays
- To know about radioactivity, Nuclear fission, Nuclear fusion , Nuclear reactors and breedor reactors
- To learn about rate of radioactive decay, half life period and activity of Radioactive substance
- To describe general characteristics of solid state

Text Books

1. Antony R. West, "Solid State Chemistry" Wiley edition, 7th edition, **2011**
2. H. J Arnikar: "Essentials of nuclear Chemistry" New Age International Pvt. Limited. 5th edition, **2014**

Reference Books

1. R. Gopalan, “Elements of nuclear Chemistry” S. Viswanathan & Co., 7th edition, **2009.**
2. A. F. Wells “Structural Inorganic Chemistry” Oxford University Press, 11th edition, **2009.**
3. Phillips F. C. “An introduction to crystallography” Longmans Green, New York., 7th edition, **2012**

PHASE EQUILIBRIA AND KINETICS **4 0 0 4**

Course objective

To know about chemical kinetics, catalysis rate determination, phases and its concepts: components, degrees of freedom, phase diagram.

Unit-I Phase Equilibria **12**

Phase Rule: Concepts of phase, component and degrees of freedom, with examples. Gibb's phase rule phase diagram and application of phase rule: *One-component system*- Water and sulphur systems. Solid-liquid equilibria –Binary systems *Two component system*- Simple eutectic: Lead-silver system - Distribution law statement and limitations applications to simple systems involving association,dissociation and complex formation

Unit-II Free Energy and Chemical Equilibria **12**

Spontaneous reaction-Free energy-Chemical Equilibrium – Thermodynamic treatment of the law of mass action-Von't Hoff Reaction Isotherm-Relation between K_p K_c and K_x Homogeneous equilibria-Dissociation Of N_2O_4 and PCl_5.Integrated Form of the van't Hoff Equation. Heterogenous Equilibria-Equilibrium constants for reaction involving real gases-Le Chatelier's Principle

Unit-III Chemical Kinetics-I **12**

Rate of a reaction – Rate equation- Rate constant, Order and Molecularity – Methods of rate measurement. Derivation of kinetic equation for rate constants of I, II order reactions – Third and zero order reactions and examples (No derivation of rate constant). Rate determining step and mechanism of elemental process – Arrhenius law- activation energy.

Unit IV Chemical Kinetics-II **12**

Collision theory of reaction rates, collision cross section, collision number. Effect of solvent and ionic strength on reaction rates. Unimolecular reactions steady state treatment Lindemann hypothesis Chain reaction.

Unit V Chemical Kinetics-III **12**

Homogeneous and Heterogenous Catalysis – definition – examples and differences. Reactions in gases and in solutions (Acid, base and Wilkinson's catalysts). Enzyme catalysis elementary of the principle of the activated complex using steady state treatment Michaelis – Menten kinetics.

Total: 60 hrs

Course Outcome

- To identify and understand the principles of chemical equilibrium thermodynamics to solve multiphase equilibria and chemical reaction equilibria
- To write down the basic equations for vapor-liquid equilibrium using the gamma and phi
- Methods and find vapor-liquid equilibrium phase compositions

- Ability to construct phase diagrams for single and multi-component systems
- Able to derive Nernst Equation and distribution coefficient

Text Books

1. P.L. Soni, " Text Book of Physical Chemistry" Sultan Chand & sons, 12th edition, **2010**
2. B. R. Puri, L. R. Sharma, Pathania, "principle of Physical Chemistry" Vishal Publishing & Co., 46th edition **2013**

Reference Books

1. Kundu and Jain, "Physical Chemistry" S. Chand, 6th edition, **2011**
2. S. Glasstone, "Text Book of Physical Chemistry" –Macmillan. 7th edition **2012**

CHEMISTRY OF NATURAL PRODUCTS 4 0 0 4

Course objective

To understand what are carbohydrates proteins amino acid, alkaloids, terpenoide their classification structure, elucidation and to know about dyes

UNIT-I Carbohydrates **12**

Classification – Constitution of glucose and fructose. Reactions of glucose and fructose-osazone formation. Mutarotation and its mechanism. Cyclic structure. Pyranose and furanose forms. Determination of ring size. Haworth projection formula. D and L configuration of monosaccharides – chain lengthening and chain shortening of aldoses. Inter conversion of aldoses and ketoses.

UNIT-II Amino Acids and Proteins **12**

Aminoacids and proteins – Classification of amino acids. Essential and nonessential amino acids, preparation of alpha aminoacids, properties and reactions. Zwitter ions, isoelectric points – Peptide synthesis – structure determination of polypeptides – end group analysis.

UNIT-III Vitamins and Alkaloids **12**

Vitamins: - classification, biological importance of vitamins A, B_1, B_2, B_6, B_{12} and C. General methods of isolation and general methods of structure determination of Conine,

Piperine and Nicotine.

UNIT-IV Terpenoids **12**

Isoprene rule, special isoprene rule, Structural elucidations of – Geraniol, menthol and alpha terpineol.

UNIT-V Dyes and Pigments **12**

Theory of colour and constitution. Classification – according to structure and method of application. Preparation and uses of 1) Azo dye-methyl orange and Bismark brown 2) Triphenyl methane dye Malachite green. 3) Phthalein dye – phenolphthalein and fluroescein 4) Vat dye – indigo 5) Anthraquinone dye – alizarin.

Total: 60 hrs

Course Outcome

- To be well versed in Basic Structure and Reactions of Glucose and Fructose
- To clearly explain the Haworth projection formula and D & L configuration of carbohydrates
- To understand the classification, function and reactions of amino acids and proteins
- To demonstrate the concept of synthesis and structural determination of polypeptides
- To classify fat soluble and water soluble vitamins with suitable examples and the biological importance

Text Book

1. Ashutosh Kaur. “Chemistry of Natural Products” Vol. I & II. B. S. publishers. 2nd edition, **2012.**

Reference Books

1. Jagadamba Singh. “Natural Products Chemistry” Pragati Prakashan, 2nd edition **2012.**
2. O. P. Aggarwal. “Chemistry of Natural Products” Vol. I & II. Goel publishers. 41st edition. **2009.**

INTRODUCTION TO NANOSCIENCE AND NANOTECHNOLOGY 4 0 0 4

Course Objective

Impart the basic knowledge on Nanoscience and technology. Understand the various process techniques available for the processing of nanostructured materials. Impart knowledge on the exotic properties of nanostructured materials at their nanoscale lengths. Acquire the knowledge above the various nanoparticles process methods and their skills. Study the reactive merits of various process techniques.

Unit-I Introduction 12

Definition of a nano system – Basic concepts of and technology – Scientific revolutions of nanotechnology – atomic & molecular size – Time and length at nanoscale – Scope of nanoscience and technology – Commercial Applications of Nanotechnology.

Unit-II Nanostructures and Dimensions 12

Definition of Nanostructure materials – Classification of nanostructures – zero, one, two and three dimensional nanostructures. Size Dependency in Nanostructures –quantum size effects in nanostructures.

Unit-III Nanomaterial Synthesis 12

Synthesis of nanomaterials – top down and bottom up approach –Method of nanomaterials preparation – Physical methods – Inert gas condensation and evaporation, chemical synthesis – sol-gel and chemical reduction – Biological methods – nanoparticles using plant extracts, bacteria, fungi etc.

Unit-IV Nanomaterial Properties 12

Surface properties of nanoparticles – Surface to volume ratio- mechanical – optical,-electronic – magnetic – thermal and chemical properties of nanomaterials. Size dependent properties-size dependent absorption spectra – self-assembly in nanotechnology – Types of SAMs, Methods of self-assembly, Applications of self assembled monolayers

Unit-V Applications of Nanomaterials 12

Applications of metal nanoparticles in technologically imperative fields like sensors, Nanomaterials for energy storage – Batteries and fuel cells - photovoltaic devices –solar cells – optical memory devices – Quantum nanoelectronic devices –quantum computing.

Total: 60 hrs

Course Outcome

- To learn about the definition of a nano system and the basic concepts of nanoscience and technology
- To understand the Scientific revolutions of nanotechnology.
- To know about the Scope of nanoscience and technology and commercial applications of Nanotechnology
- To familiarize the Classification of nanostructures, Size Dependency in Nanostructures and quantum size effects in nanostructures
- To learn about the Synthesis of nanomaterials

Text Books

1. C. P. Poole and J.F. Owens, “Introduction to Nanotechnology”, Wiley Interscience, 2003.

2. M. A. Ratner. And D. Ratner, “Nanotechnology: A Gentle Introduction to the Next Big Idea”, Prentice Hall PTR, First Edition, 2002.

3. T. Pradeep, “Nano: The Essential Nanoscience and Nanotechnology”, Tata McGraw hill, 2007.

Reference Books

1. G. Cao, “Nanostructures & Nanomaterials: Synthesis, Properties &Applications”, Imperial College Press, 2004.

2. C. N. R. Rao, A. Muller and A. K. Cheetham, “The Chemistry of nanomaterials: Synthesis, Properties and Applications”, Wiley-VCH verlag GmBH & Co.KGA, 2004.

AGRO INDUSTRIAL CHEMISTRY 4 0 0 4

Course objective

To know the various water sources, treatment analysis and its importance in agriculture, types of solid fertilizers, pesticides, sugar, oils, fats and waxes.

UNIT I Water source for agriculture- Water Treatment & Water Analysis 12

Sources of water supply for agriculture. Hard and soft water. Water softening methods: lime soda process, phosphate conditioning, permutit and ion-exchange processes. Water analysis; determination of hardness of water, acidity, alkalinity, pH value, amount of free CO_2, fluoride content, chloride content and their estimation. Biological oxygen demand (BOD), chemical oxygen demand (COD), chlorine demand and their determinations. Recycling of water.

UNIT II Chemistry of soil-soil classification and soil analysis 12

Definition of soils. Classification of soils. Properties of soils-physical properties and mechanical analysis. Structure and Texture. Soil water, soils air and soil temperature. Chemical properties- soil mineral matter-soil colloids, ion-exchange reactions. Soil fertility and its evaluation. Soil organic matter and their influence on soil properties –N ratio effects. Soil reactions. Soil pH, acidity, alkalinity, buffering of soils and its effects on the availability of N, P, K, Ca, Mg, I, AI, Mn & sulphuric acid. Soils salinity, acid & alkaline soils- their formation and reclamation.

UNIT III Fertilizers & Pesticides 12

Effect of N,P,K, secondary nutrients and micro nutrients on plant growth and development. Importance of nitrogenous fertilizers. Nitrogen cycle and fixation of atmospheric nitrogen. Principle and manufacture of ammonium nitrate, ammonium sulphate, and urea Phosphate fertilizers. Preparation and uses of mono and diammonium phosphates, super phosphate and triple super phosphate.

Potassium fertilizers-potassium nitrate, potassium chloride, potassium sulphate. Mixed fertilizers. Methods of compost in green manuring, concentrated organic manures and their chemical composition. Oil cakes, horn and hoof metal.

Pesticides Classification-Insecticides, fungicides and herbicides. General methods of preparation, application and toxicity. Insect attractants and repellants-fluorine compounds, boron compounds, arsenic compounds, organomercuric compounds, DDT, BHC,2,4 –D compounds, pyridine compounds.

UNIT IV Chemistry of sugar and fermentation 12

Details of manufacture of sucrose from cane sugar-extraction of juice, purification, concentration, crystallization, separation and refining of crystals, recovery of sucrose from molasses. Manufacture of

sucrose from beetroot. Estimation of sucrose and inversion sugar by polarimetry. Manufacture of alcohol from molasses and starch by fermentation process.

UNIT V Oils, fats and Waxes 12

Classification of oils fats and waxes: distinction between oil, fats and waxes hydrogenation of oils-principle and manufacturing details. Definition and determination of soapanification value, acid value, iodine value RM value and Hehner value and their signification. Elaidin test for oils. Some common waxes like spermaceti, Bees wax, baybeery wax and their uses. Soap and its manufacture; toilet and transparent soaps. Cleansing action of soap. Detergent.

Total: 60 hrs

Course Outcome

- To explain about the basic concept of water source for agriculture and its classification and purification process
- To identify the appropriate water analysis method and learn about the recycling of water
- To extend skills about the classification of soils and it properties (physical and chemical)
- To gain appreciation knowledge about the soil analysis and understand the salinity, acid & alkaline soils- their formation and reclamation
- To understand the effect of nitrogenous fertilizers and their preparation and uses in agriculture

Text Books

1. Applied Chemistry- Theory and Practise- O.P.Vermani & A.K.Narula
2. Industrial Chemistry-B. N. Chakrabarty

Reference books

1. Nature and properties of soils-Harry, O Buckman N Yle C. Brandy
2. Soils Sceince-A.Sankara
3. Insecticides, Pesticides and Agro based Industries – R. C. Palful, K. Goel, R. K. Gupta
4. Industrial Chemistry-B. K. Sharma.

CHEMISTRY OF MATERIALS 4 0 0 4

Course objective

To know multiphase materials, liquid crystals, polymeric materials, organic solids and high Tc materials

UNIT- I Multiphase Materials 12

Ferrous alloys: Fe-C phase transformation in ferrous alloys: stainless steels, non-ferrous alloys, properties of ferrous and non-ferrous alloys and their applications.

Thin films and Langmuir-Blodgett Films

Preparation techniques; evaporation/sputtering. Chemical processes, MOCVD, sol-get etc. Langmuir-Blodgett (LB) film, growth techniques, photolithography, properties and applications of thin and LB lilms.

UNIT- II Glasses and Ceramics Composites 12

Glasses, Ceramics, Composites and nanomaterials, Glassy state, glass formers and glass modifiers, applications. Ceramic structures, mechanical properties, clay products. Refractories, characterizations, properties and application. Microscoipc composites; dispersion-strengthened and particle- reinforces, fibre-reinforced composites, nanocrystalling phase, preparation procedures, special properties.

UNIT- III Liquid Crystals 12

Mesmorphic, liquid crystals, positional order, bond orientational order, nematic and smectic mesophases; smectic-nematic and clearing ternperature-horneotropic, planar and schlieren textures, twisted nematics, chiral nemations, molecular arrangement in smectic A and smectic C phases, optical properties of liquid crystals. Dielectric susceptidility and dielectric comstants. Lyotropic phases and their description of ordering in liquid crystais.

Polymeric Materials: Molecular shape, structure and configuration, crystallinity, and their applications. Conducting and ferroelectric polymers.

UNIT- IV Ionic Conductors 12

Types of ionic conductors. Mechanism of ionic conduction, interstitial jumps (Frenkel).vacancy mechanism. Diffusion superiohic conductors. Phase teransitions andmechanism of conduction in superionic conductors examples and applications of ionic conductors.

B- High Tc Materials: Defect perovskites, high Tc superconductivity in cuprates, preparation and characterization of 1-2-3 and 2-1-4 materials, normal state properties; anisotropy; anisotropy; temperature dependence of electrical resistance; optical phonon modes, supenerconducting state; heat capacity; coherence length, elastic constants, position lifetimes, microwave absorption-pairing and multi gap structure· in high Tc materials applications of high Tc materials.

UNIT- V Materials for solid State Devices **12**

Rectifiers, transistors, capacitors-IV, V compounds, low- dimensional quantum structures; optical properties.

Organic Solids. Fullerenes. Molecular Devices: Conducting organics, organic superconductors, magnetism in organic materials. Fullerenes-doped, fullerenes as superconductors. Molecular rectifiers and artificial photosynthetic devices. Optical storage memory and sensors. Nonlinear optical materials: nonlinear optical effects. Second and third order-molecular hyperpolarisability and second order electric susceptibility-materials for second and third harmonic generation.

Total: 60 hrs

Course Outcome

- To clearly explain the phase transformation in ferrous alloys
- To known the concept of thin films and Langmuir-Blodgett Films
- To understand the concept of glasses, ceramics and composites
- To clearly explain the characterizations, properties and application nanomaterials
- To known the concept of polymeric materials and their applications

Text Books

1. Solid State Physics, N.W. Ashcroft and N.D. Mermin Saunders College.
2. Material Science and Engineering. An Introduction. ·W.D. Callister. Wiley.

Reference Books

1. Principles of the Solid State, H.v. Keer. Wiley Eastern.
2. Materials Science, J.e. Anderson, K.D. Leaver, J.M. Alexander and R.D. Rawlings, ELBS
3. Thermotropic Liquid Crystals Ed. G.W. Gray. John Wiley.
4. Handbook of Liquid Crystals. Kelker and Hafz. Chemie Verlag.

PHARMACEUTICAL CHEMISTRY **4 0 0 4**

Course objective

To know the terminology in pharmaceutical chemistry, and about antibiotics anasthetics antibacterials as well as various harmones and their functions in human systems.

UNIT- I Pharmaceutical Chemistry –I **12**

Definition of the following terms: Drug, pharmocophore, pharmacology, pharmacopeia, pharmacodynamics, bacteria, virus, and vaccine. Cause, systems, and drugs for anaemia, Jaundice, cholera, malaria and filoria. Indian medicinal plants and uses- Neem, tulasi, kizhanelli, mango, semparathi, adathodai and thoothuvalai. Blood: Grouping, composition, Rh- Factor, blood-pressure hypertension and hypotension.

UNIT –II Pharmaceutical Chemistry – II **12**

Antibiotics: Definition and uses with examples (Structure not required). Antiseptics anddisinfectants: Definition and uses with examples. Analgesics: Definition and uses of narcotics, non-narcoatics, disadvantages.

UNIT – III Pharmaceutical Chemistry-III **12**

Anaesthetics: Classification and uses. CNS Drugs: Definition, Classitication and uses with examples. Drugs and treatments of (a) AIDS (anti-HIV) (b) Diabetes (c) Cancer

UNIT –IV Pharmaceutical Chemistry – IV **12**

Antibacterials: Definition, Classification –Sulphadrups, examples. Anti- Pyretic and anti- inflammatory agents. Cardiovascular drugs, anti-arithemitic drugs antihypertensive antianginal agents, vasodialators: Definition, examples with uses

UNIT –V Pharmaceutical Chemistry- V **12**

Physiological functions of hormones: Adrenalin, thyroxin, insulin, oxytocin, progesterone, estrone and testosterone. Micronutrients and their biological role in human systems.

Total: 60 hrs

Course Outcome

- To demonstrate the importance of chemistry in the development and application of therapeutic drugs
- To develop an understanding of the physico-chemical properties of drugs
- To Understand how current drugs were developed and how new scientific techniques will provide future drugs
- To clearly explain the classification, function and uses of antibiotics and antiseptic and disinfectants

- To describe the function and uses of narcotic and non narcotics analgesics

Text Books

1. Surendra N. Pandeya “Textbook of medicinal chemistry (Synthetic Bio chemical approach)” vol. I & II S. G. Publishers, 5th edition, **2011.**
2. Gurdeep R Chatwal. “Synthetic drugs” Himalaya publishing house, 2nd edition, **2013.**

Reference book

1. K.D. Tripathi. “Essentials medical pharmacology” J. P. Brothers. 7th Edition, **2009.**

CHEMISTRY IN EVERYDAY LIFE 4 0 0 4

Course objective

To know about various compounds in nature, building materials, Food and nutrition, agriculture chemistry, color chemicals.

Unit-I General survey of chemicals 12

General survey of chemicals used in everyday life. Air- Components and their importance, Photosynthetic reaction, Green house effect and their impact on our life style. Water-sources of water, qualities of potable water, soft and hard water, methods of removal of hardness.

Unit – II Building materials 12

Building materials: - Cement, Ceramics, Glass and Refractories. Definition, composition and application only. Plastics: - Definition, Types with examples, uses, merits and demerits, environmental impact and awareness. Biodegradable polymers.

Unit –III Food and Nutrition 12

Food and Nutrition: Carbohydrates, proteins, Fats Definition source and their importance as food constituents balanced diet- Calorie, minerals and vitamins. Cosmetics: General formulation and possible hazards.

Unit – IV Agricultural chemistry 12

Agricultural chemistry: Fertilizers, Pesticides Classification and used Energy sources: Fuels classification – Solid, liquid and gaseous, nuclear fuel, propellants – utility and awareness.

Unit – V Color chemical 12

Color chemical: Pigments and Dyes: Example, uses. Explosives: Classification and examples. Chemistry in Technology: Uses, examples.

Course Outcome

- To be well versed in general survey of chemicals
- To understand the concept of greenhouse effect and their impact on our life style
- To understand the composition and application of building materials
- To clearly explain the concept offood and nutrition
- To understand the importance of minerals and vitamins

Text Book

1. A. K. De, Environmental Chemistry, Himalaya publishing house, 7th edition **2011**

Reference Books

1. R. Norris Shreve “Chemical Process Industries” (4th Edition)
2. Perfumes, Cosmetics and Soaps –W.A. Poucher (Vol 3)

FORENSIC CHEMISTRY **4 0 0 4**

Course objective

To know about history and development of forensic chemistry crime detection, forgery, counterfeit, misuse of drugs, cybercrime

Unit I Introduction **12**

Definition, History, Development and Scope of Forensic Science. Divisions of Forensic Science and Laboratory Set up. Forensic Chemistry: Introduction, Conventional methods of chemical analysis, presumptive tests (colour & spot); Drugs of Abuse: Introduction and classification; Forensic Toxicology: Introduction and General Methods of chemical analysis for alcohol, Classification of Poisons.

UNIT II Crime detection **12**

Accidental explosions during manufacture of matches and fire-works (as in Sivakasi). Human bombs, possible explosives (gelatin sticks, RDX). Metal detector devices and other security measures for VVIP. Composition of bullets and detection of powder burns. **Scene of crime**: finger prints and their matching using records. Smell tracks and police dogs. Analysis of blood and other body fluids in rape cases. Typing of blood. DNA finger printing for tissue identification in bodies. Blood stains on clothing. Cranial analysis (head and teeth).

UNIT III Forgery and Counterfeiting **12**

Detecting forgery in bank cheques / drafts and educational records (mark lists, certificates), using UV-light. Alloy analysis using AAS to detect counterfeit coins. Checking silver line water mark in currency notes. Jewellery: detection of gold purity in 22 carat ornaments, detecting gold plated jewels, authenticity of diamonds (natural, synthetic, glassy).

UNIT IV Medical Aspects: AIDS **12**

Cause and prevention. Misuse of scheduled drugs. Burns and their treatment by plastic surgery. Metabolite analysis, using mass spectrum – gas. Detecting steroid consumption among athletes and race horses.

UNIT V Identification and Detection **12**

Identification and detection of biological fluids (Blood, Semen, Saliva and Urine) and their Medico-logical importance. Personal Identification through somatometry and Somatoscopy; Study and hair and fibers. Examination of skeletal remains-identification of bones, differentiation between human and non human, determination of age, sex and height from skeletal remains. Modern Developments and their concepts (Nacre analysis, Brain fingerprinting, DNA Profiling, voice identification, Cyber crime, Forensic Odontology and Bitemarks).

Total: 60 hrs

Course Outcome

- To be well versed in development and scope of forensic science
- To clearly explain thegeneral methods of chemical analysis for alcohol and classification
- of poisons
- To understand the concept of crime detection
- To known the concept of DNA finger printing for tissue identification in bodies

Text Books

1. B.R. Sharma: Forensic Science in Criminal Investigation and Trials, Central Law Agency, Allahabad (2003).
2. S. Nath: An Introduction to Forensic Anthropology, Gian Publishing House, N. Delhi (1989).

Reference Books

1. K. S. Narayan Reddy, *The Essentials of Forensic Medicine and Toxicology*, 12th ed., Sri Lakshmi Art Printers, Hyderabad, 1990.
2. R. Saferstein, Criminalistics, Prentice Hall (1998).
3. W.G. Eckert, Introduction of Forensic Science, CRE Press, Bock Raton (1997).
4. I.P. Singh and M.K. Bhasin, A Laboratory Manual of Biological Anthropology, K.R. Enterprises, N. Delhi (2005).
5. S. Nath: Personal Identification through Fingerprints, Shree Publisher & Distributors, New Delhi (2006).

DYE CHEMISTRY **4 0 0 4**

Course objective: To understand what are dyes and pigments their classification, synthesis, reactions, applications in the field of textile, medicine, cosmetics, foods and beverage.

UNIT I Chromophores and Auxochromes **12**

Colour and constitution-Relationship of colour observed-to wave length of light absorbed-Terms used in colour chemistry-Chromophores, Auxochromes, Bathochromic shift, Hypsochromic shift. Colour of a substance-Quinonoid theory and molecular orbital approach.

UNIT II Classification of Dyes **12**

Classification of Dyes-chemical classification-classification according to their applications-Acid dyes-Basic dyes. Azoic dyes, mordant dyes, vat dyes, Sulphur dyes, Disperse dyes, Nitro dyes-and Nitroso dyes process of dyeing (simple treatment). Azo dyes-Principles governing azo coupling-mechanism of diazotization-Coupling with amines, coupling with phenols Classification according to the number of azo group & application-Tautomerism in azo dyes.

UNIT III Di and Triphenyl methane dyes and Phthalocyanines-Cyanine dyes **12**

Synthesis, reactions and applications of Di and Triphenyl methane dyes-phthalein dyes-Xanthen dyes-acridine dyes-sulphur dyes. Phthalocyanines-Cyanine dyes. Malachite green, Para-rosaniline, crystal violet.

UNIT IV Azine, Oxazine and Triazine Dyes **12**

Azine, Oxazine and Triazine Dyes. Synthesis and applications of quinonoid dyes including vat dyes based on anthraquinone.

UNIT V Pigments **12**

Pigments-requirements of a pigment: Typical Organic and Inorganic pigments- application and their uses in paints. Reaction of dyes with fibres and water-Fluorescent Brightening agents. Application of dyes in other areas-medicine, chemical analysis, cosmetics, colouring agents, food and beverages.

Total: 60 hrs

Course Outcome

- To clearly explain about the basic concept of colour and constitution and relationship of colour observed-to wave length of light absorbed
- Understanding about Quinonoid theory and molecular orbital approach of a colour substance
- To extend skills about the classification of dyes such as Acid dyes, Basic dyes. Azoic dyes, Nitro dyes-and Nitroso dyes process of dyeing (simple treatment)
- Identify the classification according to the number of azo group & application
- Gain appreciation knowledge about the synthesis, reactions and applications of Di and Triphenyl methane dyes

Text books

1. S. K. Jain & S. K. Mailk “Modern paint pigment and Varnish” Industries Small business Publication, New Delhi. **2001.**

2. I. L. Finar “Organic chemistry Vol. I & II, ELBS, 11th edition,**2009.**

Reference books

1. Dyes and their intermediates-E. N. Abraha, Bergamon Press, **1969**.
2. The chemistry of synthetic dyes and pigments-H.A.Lubs, ACS Publication, Halner, **1970**.
3. The chemistry of synthetic dyes Vol, I, II, III & IV-K.Venkataraman, Academic Press N.Y., **1949**.
4. Physical and Chemistry applications of dyestuffs-F.P.Schafer, Springer-Veriag N.Y.**1976**.

GREEN METHODS IN CHEMISTRY **4 0 0 4**

Course objective

To learn what is green chemistry twelve principles energy sources of a country and cases study

Unit-I Introduction **12**

Definitions of Green Chemistry. Brief introduction of twelve principles of Green Chemistry, with examples, special emphasis on atom economy, reducing toxicity, green solvents.

Unit –II Alternative Sources of Energy **12**

Green Chemistry and catalysis and alternative sources of energy, Green energy and sustainability.

Unit –III Surfactants **12**

Surfactants for Carbon Dioxide – replacing smog producing and ozone depleting solvents with CO_2 for precision cleaning and dry cleaning of garments.

Unit –IV Toxicity Replacement **12**

Designing of Environmentally safe marine antifoulant. Right fit pigment: synthetic azo-pigments to replace toxic organic and inorganic pigments.

Unit –V Green Synthesis **12**

An efficient, green synthesis of a compostable and widely applicable plastic (poly lactic acid) made from corn.

Total: 60 hrs

Course Outcome

- To understand the importance of Green methods and its need for future of the mankind
- To solve the problems of pollutions, degradation of environment
- To address the issues like degradation, global warming, the deplection of ozone layer and loss of biodiversity
- To get an idea about the nature and purity of the crystal
- To get knowledge about the synthesis of different complexes and their analytical study by spectroscopy.

Text Books

1. Anastas, P.T. and Warner, J.K. *Oxford Green Chemistry- Theory and Practical*, University Press, 1998

2. Matlack, A.S. *Introduction to Green Chemistry*, Marcel Dekker, 2001

Reference Books

1. Cann, M.C. and Connely, M.E., *Real-World Cases in Green Chemistry*, American Chemical Society, Washington, 2000

2. Ryan, M.A. and Tinnesand, M., *Introduction to Green Chemistry*, American Chemical Society, Washington, 2002

INDUSTRIAL CHEMICALS AND ENVIRONMENT **4 0 0 4**

Course objective

To learn about various industrial gases chemicals and its impact on environment. Different type of pollution and its preventive measures.

Unit-I Industrial Gases and Inorganic Chemicals **12**

Industrial Gases: Large scale production, uses, storage and hazards in handling of the following gases: oxygen, nitrogen, argon, neon, helium, hydrogen, acetylene, carbon monoxide, chlorine, fluorine, sulphur dioxide and phosgene. *Inorganic Chemicals:* Manufacture, application, analysis and hazards in handling the following chemicals: hydrochloric acid, nitric acid, sulphuric acid, caustic soda, common salt, borax, bleaching powder, sodium thiosulphate, hydrogen peroxide, potash alum, chrome alum, potassium dichromate and potassium permanganate.

Unit-II Industrial Metallurgy **12**

Preparation of metals (ferrous and nonferrous) and ultrapure metals for semiconductor technology.

Unit-III Environment and its segments **20**

Ecosystems. Air Pollution: Major regions of atmosphere. Air pollutants: types, sources, Photochemical smog: its constituents and photochemistry. Major sources of air pollution. Effects of air pollution on living organisms and vegetation. Greenhouse effect and Global warming, Ozone depletion. *Water Pollution*: Hydrological cycle, Sludge disposal. Industrial waste management, incineration of waste. Water treatment and purification (reverse osmosis, electro dialysis, ion exchange).

Unit-IV Energy & Environment **12**

Sources of energy: Coal, petrol and natural gas. Nuclear Fusion / Fission, Solar energy, Hydrogen, geothermal, Tidal and Hydel, etc. Nuclear Pollution: Disposal of nuclear waste, nuclear disaster and its management.

Unit-V Biocatalysis **04**

Introduction to biocatalysis: Importance in – Green Chemistry and Chemical Industry.

Total: 60 hrs

Course Outcome:

- To handle the chemicals safely in lab as well as industry
- To know the importance of isolations of metal and its different types of isolations and its various applications
- To address issues like degradation, global warming,
- To know issues of depletion of ozone layer and loss of biodiversity

- To understand the definition of energy, different sources of energy and various methods of its generation and its various bio- applications

Text Books

1. E. Stocchi: *Industrial Chemistry*, Vol-I, Ellis Horwood Ltd. UK. 7th edition **2011**
2. R.M. Felder, R.W. Rousseau: *Elementary Principles of Chemical Processes*, Wiley Publishers, New Delhi. 4th edition **2007**

Reference Books

1. J. A. Kent: Riegel's *Handbook of Industrial Chemistry*, CBS Publishers, New Delhi.
2. S. S. Dara: *A Textbook of Engineering Chemistry*, S. Chand & Company Ltd.

VOLUMETRIC ANALYSIS **0 0 4 2**

1. Estimation of sodium hydroxide using standard carbonate.
2. Estimation of HCl using standard oxalic acid.
3. Estimation of oxalic acid using standard sulphuric acid.
4. Estimation of borax- standard Na_2CO_3.
5. Estirnation of temporary and permanent hardness of water
6. Estimation of ferrous sulphate- standard Mohr salt solution.
7. Estimation of oxalic acid - standard $FeSO_4$.
8. Estimation of $KMno_4$- standard NaOH.
9. Estimation of ferrous ion using diphenylamine as internal indicator.
10. Estimation of Zinc using EDTA- standard $MgSO_4$
11. Estimation of alkalinity in water sample.
12. Estimation of chloride content using silver nitrate.

Total: 60 hrs

Course Outcome

- To handle the chemicals safely in lab as well as industry
- To know the importance of inorganic titrations.
- To know the standardization various solutions
- To estimate the amount of substance present in a given solution
- To know the estimation of various compounds present in water

Text Books

1. B. Viswanaathan, P.S. Raghavan “Practical Physical Chemistry”, Viva Books private Ltd. ,**2005**
2. Slowiski, Wolsey-Indian, “General Chemistry A Lab Manual” Congage learning India Private Ltd.**2010**

Reference Books

1. R.K.P Singh, Jagadamba Singh, Jaya Singh “ Advanced Practical Chemistry”, Pragati Prakashan, **2011**

2. V.K Abluwalia, Sunita Dhingra, Adarsh Gulati, “College Practical Chemistry”,University Press(India) Private Ltd **2005**

INORGANIC QUALITATIVE ANALYSIS PRACTICAL **0 0 4 2**

Course objective

To learn the technique to identify acid radicals and basic radicals of each two with to interfering radicals as well as to prepare simple coordination compounds.

Inorganic Qualitative Analysis

Reactions of mercury, lead, copper, bismuth, cadmium, antimony, tin, ferrous and ferric iron, aluminium, zinc, manganese, cobalt, nickel, calcium, strontium, barium, magnesium, and ammonium; sulphide, carbonate, nitrate, sulphate, chloride, bromide, iodide, fluoride, oxalate, arsenite, phosphate, chromate and borate radicals. Semimicro analysis of a mixture containing two cations and two anions of which one is an interfering ion.

List of Experiments

1. Reaction of simple radicals
2. Reaction of Interfering acid radicals
3. Reactions of groups I, II and III cations
4. Reactions of groups IV, V and VI cations
5. Elimination of interfering acid radicals
6. Analysis of salt mixture – I
7. Analysis of salt mixture – II
8. Analysis of salt mixture – III
9. Analysis of salt mixture – IV
10. Analysis of salt mixture – V

Course Outcome

- To familarise with the reactions of basic radicals
- To understand the analysis of various inorganic mixtures
- To learn the elimination of interfering radicals
- To know the identification of various metals of group
- To know the reaction of simple radicals

Text Book

1. Vogel's – "Textbook of qualitative Inorganic Analysis", Longmann, 12th edition, **2011**

Reference Books

1. S. Sundaram and K. Raghavan "Practical Chemistry", S. Viswanathan.Co. 3rd edition **2011**

2. J. N. Gurtu and R. Kapoor “Advanced experimental Chemistry”, S. Chand and Co. 6th edition, **2010**

SYLLABUS
GENERIC ELECTIVE
COURSES

DISASTERS MANAGEMENT **2 0 0 2**

UNIT I - Introduction to Disasters **06**

Concepts and definitions (Disaster, Hazard, Vulnerability, Resilience, Risks).

UNIT II – Disasters: Classification Causes, Impacts (including social, economic, political, environmental, health, psychosocial etc.) **06**

Differential impacts - in terms of caste, class, gender, age, location, disability Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change.

UNIT III – Approaches to Disasters Risk reduction: **06**

Disaster cycle – its analysis, Phases, Culture of safety, prevention, mitigation and preparedness, community based DRR, Structural – non structural measures, roles and responsibilities of community, Panchayat Raj Institutions/Urban Local Bodies (PRIs/ULBs), states, Centre and other stake-holders.

UNIT IV – Inter-relationship between Disasters and Development: **06**

Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc. Climate Change Adaptation. Relevance of indigenous knowledge, appropriate technology and local resources.

UNIT V - Disaster Risk Management in India **06**

Hazard and Vulnerability profile of India. Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management Institutional arrangements (Mitigation, Response and Preparedness, DM Act and Policy, Other related policies, plans, programmes and legislation).

Total: 30 hrs

Course Outcome

- To understand basis of disaster risk management .
- To know about interrelationship between disaster and development
- To learn the Basics of risk reduction.
- The lesson helps to choose a source of energy suitable for rural India.
- The lesson creates an awareness in the reader as to the usefulness of animals for the human society.

Text Books:

1. Alexander David, Introduction in 'Confronting Catastrophe', Oxford University Press, 2000.
2. Andharia J. Vulnerability in Disaster Discourse, JTCDM, Tata Institute of Social Sciences Working Paper no. 8, 2008.
3. Blaikie, P, Cannon T, Davis I, Wisner B 1997. At Risk Natural Hazards, Peoples' Vulnerability and Disasters, Routledge.

4. Coppola P Damon, 2007. Introduction to International Disaster Management.

5. Carter, Nick 1991. Disaster Management: A Disaster Manager's Handbook. Asian Development Bank, Manila Philippines.

CONSUMER AFFAIRS **2 0 0 2**

Course Objective

This paper seeks to familiarize the students with their rights and responsibilities as a consumer, the social framework of consumer rights and legal framework of protecting consumer rights. It also provides an understanding of the procedure of redress of consumer complaints, and the role of different agencies in establishing product and service standards. The student should be able to comprehend the business firms interface with consumers and the consumer related regulatory and business environment.

Unit I Conceptual Framework **06**

Consumer and Markets: Concept of Consumer, Nature of markets: Liberalization and Globalization of markets with special reference to Indian Consumer Markets, E-Commerce with reference to Indian Market, Concept of Price in Retail and Wholesale, Maximum Retail Price(MRP), Fair Price, GST, labeling and packaging along with relevant laws, Legal Metrology.

Consumer buying process, Consumer Satisfaction / dissatisfaction – Grievances – complaint, Consumer Complaining Behavior: Alternatives available to Dissatisfied Consumers, Complaint Handling Process: ISO 10000 suite.

Unit II The Consumer Protection Law in India **06**

Consumer rights and UN Guidelines on consumer protection, Consumer goods, defect in goods, spurious goods and services, service, deficiency in service, unfair trade practice and restrictive trade practice. Advisory Bodies: Consumer Protection Councils at the Central, State and District Levels; Adjudicatory Bodies: District Forums, State Commissions, National Commission: Their Composition, Powers, and Jurisdiction (Pecuniary and Territorial), Role of Supreme Court under the CPA with important case law.

Unit III Grievance Redressal Mechanism under the Indian Consumer Protection Law **06**

Grounds of filing a complaint; Limitation period; Procedure for filing and hearing of a complaint; Disposal of cases, Relief/Remedy available; Temporary Injunction, Enforcement of order, Appeal, frivolous and vexatious complaints; Offences and penalties. Leading Cases decided under Consumer Protection law by Supreme Court/National Commission: Medical Negligence; Banking; Insurance; Housing & Real Estate; Electricity and Telecom Services; Education; Defective Products; Unfair Trade Practices.

Unit IV Role of Industry Regulators in Consumer Protection 06

Banking: RBI and Banking Ombudsman, Insurance: IRDA and Insurance Ombudsman, Telecommunication: TRAI, Food Products: FSSAI, Electricity Supply: Electricity Regulatory Commission, Real Estate Regulatory Authority.

Unit V Contemporary Issues in Consumer Affairs 06

Evolution of Consumer Movement in India, Formation of consumer organizations and their role in consumer protection, Misleading Advertisements and sustainable consumption, National Consumer Helpline, Comparative Product testing, Sustainable consumption and energy ratings.

Voluntary and Mandatory standards; Role of BIS, Indian Standards Mark (ISI), Ag-mark, Hallmarking, Licensing and Surveillance; Role of International Standards: ISO an Overview.

Total: 30 hrs

Course Outcome

- To understand basis of group theory and its applications
- To know consumer protection and consumer affairs
- To study the principles and theories of consumer affairs
- To conversant the students with major international instruments on **consumer protection**
- To give awareness to the students regarding basic procedures for handling **consumer** dispute.

Text Books

1. Khanna, Sri Ram, Savita Hanspal, Sheetal Kapoor, and H.K. Awasthi. (2007) Consumer Affairs, Universities Press.
2. Choudhary, Ram Naresh Prasad (2005). Consumer Protection Law Provisions and Procedure, Deep and Deep Publications Pvt Ltd.
3. G. Ganesan and M. Sumathy. (2012). Globalisation and Consumerism: Issues and Challenges, Regal Publications.
4. Suresh Misra and Sapna Chadah (2012). Consumer Protection in India: Issues and Concerns, IIPA, New Delhi.
5. Rajyalaxmi Rao (2012), Consumer is King, Universal Law Publishing Company.

GREEN CHEMISTRY **2 0 0 2**

Course Objective

To train the students to use eco-friendly approaches in synthesizing agro-based chemicals viz. insecticides, fungicides, herbicides, bactericides acaricides, weedicides**.** To emphasize green chemistry approach in crop protection which help to reduce global warming

Unit I Introduction **06**

Current status of chemistry and the Environment-Evolution of the Environmental movement: Public awareness – Dilution is the solution to pollution-Pollution prevention

Unit II Green Chemistry **06**

Definition – Principles of Green Chemistry – Why is this new area of Chemistry getting to much attention – Why should chemist pursue the Goals of Green Chemistry – The roots of innovation – Limitations

Unit III Green Chemistry using Bio Catalytic Reactions **06**

Introduction – Fermentation and Bio transformations – Production of Bulk and fine chemicals by microbial fermentation- Antibiotics – Vitamins – Bio catalyses synthesis of industrial chemicals by bacterial constructs – Future Tends.

Unit IV Green House Effect and Global Warming **06**

Introduction – How the green house effect is produced – Major sources of green house gases – Emissions of CO_2 – Impact of green house effect on global climate – Control and remedial measures of green house effect – Global warming a serious threat – Important points

Unit V Future Trends in Green Chemistry **06**

Green analytical methods, Redox reagents, Green catalysts; Green nano-synthesis, Green polymer chemistry, Exploring nature, Biomimetic, Proliferation of solvent-less reactions; Non-covalent derivatization, Biomass conversion, emission control.

Total: 30 hrs

Course Outcome

- To understand the connection between common atoms and complex molecules
- To explain and analysing simple chemical reactions
- To distinguishing between recyclable and non-recyclable materials
- To assessing the potential impact of chemical reactions to environment and human health

- To understand the connection at the chemical level between all matter and will develop your inquiry based activities to explore best practices related to organic farming and resource management.

Text Books

1. M. Lancaster, “Green Chemistry: an Introductory Text”, RSC, 2002
2. Sheldon, Arends, Hanefeld, “Green Chemistry and Catalysis”, Wiley, New York, 2007

Reference Books

1. Anastas & Warner, Green Chemistry : Theory & Practice ,Oxford Univ. Press,New York, 1998
2. S. E. Park, J. S. Chang, S. H. Jhung, “The Role of Catalyst for Green Chemistry”, Chemworld, Vol. 44 (8), 38, 2004

CHEMINFORMATICS **2 0 0 2**

Course Objective

Students completing this paper should be able to understand concepts of molecular chemistry that are basic to cheminformatics.This course will train the students to use QSAR, docking etc.

Unit I Mathematics Process **06**

Graph theory and molecular numerology; Logic, sets and functions; Algorithms, integers and matrices; Mathematical reasoning, induction and recursion; Counting; graphs, trees and sets, basic probability and statistics; Markov processes

Unit II Basics of Stereochemistry **06**

Basic Stereochemistry, Amino acids and Proteins and Properties; pKa, pH and ionization of acids and bases; Protein structure – Primary structure, Secondary structure – helix & sheet; Tertiary structure; Quaternary structure; covalent and non-covalent forces that maintain structures.

Unit III Cheminformation **06**

History of scientific information communication-chemical literature-chemical information-chemical information search-chemical information sources-chemical name and formula searching-analytical chemistry-chemical history-biography-directories and industry sources

Unit IV Biological Databases **06**

Introduction; Experimental sources of biological data; Publicly available databases; Gene expression monitoring; Genomics and Proteomics; Metabolomics; Visualisation of sequence data; Visualization of structures using Rasmol or SPDB Viewer or CHIME; Genetic basis of disease; Personalized medicine and gene-based diagnostics.

Unit V Drug Design **06**

Introduction to drugs, structure-based drug design. QSAR and 3D-QSAR Methods. Pharmacophore Design, Ligand-Based Design and *De Novo* Drug Design Virtual screening/docking of ligands. Protein structure, Drug action & enzymes. Drug action & receptors. Prediction of Binding Modes, Protein–Ligand binding free energies, Fragment-Based Drug Design, ADMET prediction.

Total: 30 hrs

Course Outcome

- To understand basis of group theory and its applications
- To know Logics, sets and functions can be studied
- To study the principles and theories of algorithms, induction Basics and process of photosynthesis
- To learn the Basics of stereochemistry and structure of proteins
- To study the history of science and chemical information could be well studied

Text Books

1. P. Shanmughavel, “Principles of Bioinformatics”, Pointer publishers, 2005.
2. Arfken, “Mathematical Methods for Physicists” Academic Press, 1985.

Reference Books

1. P. Shanmughavel, “Trends in Bioinformatics”, Pointer publishers, 2006.
2. Francis A. Carey and Richard J. Sundberg, “Advanced Organic Chemistry-Part A & B” Third Edition, 1990.

FOOD CHEMISTRY AND ADULTERATION **2 0 0 2**

Course Objective

To understand the basic information of food chemistry and adulteration. To appreciate the importance of food additives and pesticide control. To provide an information about food preservatives

Unit-I Introduction **06**

Food: source, functions of food – food groups – food guide – basic five food groups, usage of the food guide – food in relation to health – objectives of cooking.

Water: Purification processes – Ion exchangers, reverse osmosis, activated charcoal treatment – Use of chlorination, ozone, and UV light disinfection. Specification of drinking water.

Unit-II Constituents of Foods **06**

Carbohydrates: Classification, Principles involved in the analysis of carbohydrates –estimation of carbohydrates.

Proteins: amino acids – peptides – Analysis of proteins – Separation of amino acids by paper chromatography.

Minerals and vitamins: Sources, functions, deficiency of the following minerals (calcium, iron, iodine, fluorine, sodium and potassium (elementary treatment). Vitamins – classification, sources, Vitamins – A, D, E and K, C, B Complex, - B6 & B12.

Unit-III Food Additives **06**

Artificial sweeteners – saccharin, asparatame – food flavours – esters, aldehydes and heterocyclic compounds. Antioxidants. Food colours – changes in cooking. Restricted use. Spurious colours. Emulsifying agents, preservatives – leavening agents. Baking powder –Yeast. Taste enhancers – MSG-vinegar

Unit-IV Pesticides Control **06**

Spoilage of foods by insects and pests, loss in food quantity and quality Various pesticides used in agriculture and post-harvest storage, uses of pesticides for food grain application.

Unit-V Food Adulteration **06**

Common adulterants in different foods – milk and milk products, vegetable oils, and fats, spices and condiments, cereals, pulses, sweetening agents and beverages. Contamination with toxic chemicals – pesticides and insecticides. .

Total: 30 hrs

Course Outcome

- To clearly explain about the basic food groups, sources, function, usage and objective of cooking
- To Understand about water purification processes such as Ion exchangers, reverse osmosis, activated charcoal treatment and also about water borne diseases
- Describe the sources, classification, function and uses of proteins, minerals and vitamins in food industry
- To understand about food additives, artificial sweeteners, food colours and modern foods such as snack foods, fast foods, Instant foods, dehydrated foods
- To be well versed in various pesticides used for food grain application

Text Books

1. Owen R Fennema, “Food Chemistry”, Marcel Decker Inc., New York. 1996.
2. M. Swaminathan “Text Book on Food chemistry”, Printing and Publishing CO., Ltd. 1993.

Reference Books

1. B. Siva Sankar, “Food Processing and Preservatio”, Prentice – Hall of India Pvt. Ltd., New Delhi. 2002.
2. S. Ramakrishnan, K. G. Prasannam, R. Rajan, ”Principles – Text book of medical biochemistry”, Orient Longman Ltd. Third Edition, 2001.

LANGUAGE SYLLABUS

18LTAM11 **தமிழ் –I** **5 0 0 5**

மொழிப்புலம்

தமிழ் மொழி, இலக்கிய வரலாறு – அறிமுகம்

நோக்கம்

தமிழ்மொழி மற்றும் இலக்கியத்தின் வரலாற்றை அறிமுகம் செய்யும் நோக்கில் இப்பாடம் வடிவமைக்கப்பட்டுள்ளது. தமிழ்மொழியின் வரலாற்றை அறிவியல் கண்ணோட்டத்துடனும் மொழிக்குடும்பங்களின் அடிப்படையிலும் விளக்குகிறது. சங்க இலக்கியம் தொடங்கி, இக்கால இலக்கியம் வரையிலான தமிழிலக்கிய வரலாற்றை இலக்கிய வரலாறு அறிமுகப்படுத்துகின்றது. அரசு வேலை வாய்ப்பிற்கான போட்டித் தேர்வுகளுக்குப் பயன்படும் வகையிலும் இப்பாடம் அமைந்துள்ளது.

அலகு 1 தமிழ் மொழி வரலாறு **15**

மொழிக்குடும்பம் – இந்திய மொழிக்குடும்பங்கள் – இந்திய ஆட்சி மொழிகள் – திராவிட மொழிக்குடும்பங்கள் – திராவிட மொழிகளின் வகைகள் – திராவிட மொழிகளின் சிறப்புகள் – திராவிட மொழிகளின் வழங்கிடங்கள் – திராவிட மொழிகளுள் தமிழின் இடம் – தமிழ்மொழியின் சிறப்புகள் – தமிழ் பிறமொழித் தொடர்புகள்.

அலகு 2 சங்க இலக்கியம் **15**

சங்க இலக்கியம் – எட்டுத்தொகை – நற்றிணை – குறுந்தொகை – ஐங்குறுநூறு – பதிற்றுப்பத்து – பரிபாடல் – கலித்தொகை – அகநானூறு – புறநானூறு – பத்துப்பாட்டு – திருமுருகாற்றுப்படை – சிறுபாணாற்றுப்படை – பெரும்பாணாற்றுப்படை – பொருநராற்றுப்படை – மலைபடுகடாம் – குறிஞ்சிப்பாட்டு, முல்லைப்பாட்டு, பட்டினப்பாலை – நெடுநல்வாடை – மதுரைக்காஞ்சி.

அலகு 3 அற இலக்கியங்களும் காப்பியங்களும்
15

களப்பிரர் காலம் விளக்கம் – நீதி இலக்கியத்தின் சமூகத்தேவை – பதினெண்கீழ்க்கணக்கு நூல்கள் அறிமுகம் – திருக்குறள், நாலடியார்.

காப்பியங்கள் – ஐம்பெருங்காப்பியங்கள் மற்றும் ஐஞ்சிறுங்காப்பியங்கள் அறிமுகம் – காப்பிய இலக்கணம் – சிலப்பதிகாரம் – மணிமேகலை – சீவகசிந்தாமணி – வளையாபதி – குண்டலகேசி.

அலகு 4 பக்தி இலக்கியங்களும் சிற்றிலக்கியங்களும்

15

தமிழகப் பக்தி இயக்கங்கள் – பக்தி இலக்கியங்கள் – சைவ இலக்கியம் – நாயன்மார்கள் அறுபத்து மூவர் – சமயக்குரவர் நால்வர் – வைணவ இலக்கியம் – பன்னிரு ஆழ்வார்கள் – முதல் மூன்று ஆழ்வார்கள்.

சிற்றிலக்கியக் காலம் – சிற்றிலக்கியங்கள் – வகைகள் – பரணி – கலிங்கத்துப்பரணி – குறவஞ்சி – குற்றாலக் குறவஞ்சி – பிள்ளைத்தமிழ் – மீனாட்சியம்மைப் பிள்ளைத்தமிழ் – தூது – தமிழ்விடு தூது – கலம்பகம் – நந்திக்கலம்பகம் – பள்ளு – முக்கூடற்பள்ளு.

அலகு 5 இக்கால இலக்கியங்கள்

15

நவீன காலம் – நவீன இலக்கியம் – உள்ளடக்கம் – புதுக்கவிதை – தோற்றமும் வளர்ச்சியும் – நாவல் – முதல் மூன்று நாவல்கள் – நாவலின் வகைகள் – பொழுது போக்கு நாவல்கள் – வரலாற்று நாவல்கள் – சமூக நாவல்கள் – இக்கால நாவல்கள் – மொழிபெயர்ப்பு நாவல்கள் – சிறுகதை – வகைகளும் வளர்ச்சியும் – நாடகம் – காலந்தோறும் நாடகங்கள் – புராண இதிகாச நாடகங்கள் – சமூக நாடகங்கள் – வரலாற்று நாடகங்கள் – மொழிபெயர்ப்பு நாடகங்கள் – நகைச்சுவை நாடகங்கள்.

மொத்தம்: 75 மணி நேரம்

கல்வித்திட்டப் பயன்கள்

தமிழிலக்கிய வரலாற்றை முழுவதும் அறிமுக நிலையில் அறிந்துகொள்ளும் வகையில் இப்பாடத்திட்டம் பயனுடையதாக அமைகிறது . அரசுத் தேர்வுகள் , பொது அறிவுப் போட்டிகள் போன்ற தமிழ் சார்ந்த இயங்குதளங்களில் இந்தப் பாடத்திட்டம் பயன்பாடுடையதாக அமையும்.

பார்வை நூல்கள்

1. அகத்தியலிங்கம். ச., “திராவிடமொழிகள் தொகுதி 1”, மணிவாசகர் பதிப்பகம், முதற்பதிப்பு, 1978.

2. சக்திவேல். சு., “தமிழ்மொழி வரலாறு”, மணிவாசகர் பதிப்பகம், முதற்பதிப்பு 1998.

3. பூவண்ணன், “ தமிழ் இலக்கிய வரலாறு”, சைவசித்தாந்த நூற்பதிப்புக் கழகம், முதற்பதிப்பு, 1998.

4. வரதராசன். மு., ”இலக்கிய வரலாறு”, சாகித்ய அகாதெமி, ஒன்பதாம் பதிப்பு, 1994.

5. விமலானந்தம். மது.ச., “இலக்கிய வரலாறு”, பாரி நிலையம், மறுபதிப்பு, 2008.

18LHIN11 **HINDI - I** **5 0 0 5**

Prose,Letter writing& Technical words

Course Objective

To train the students in the use of Karyalayin Basha. To enable the students to develop the communication skill in Hindi language**.**

Unit I - ' Mamta',letter writing,Technical words. **15**

Aim - Through the story students will be familiar with the writing style of great writer "sri Jayashankar Prasad", &can understand the situation of country during Mughal period .

Unit II - 'Yogyata aur vyavasaya kaa chunaav', letter writing, Technical words. **15**

Aim - To make the children understand the importance of selecting a profession according to one's own interest.

Unit III - 'Rajnithi kaa bantwara', letter writing,Technical words. **15**

Aim - To describe the present situation;politician's behaviour& their selforiented activities.

Unit IV - ' computer:nayi kranthi ki dastak',letter writing, Technical words **15**

Aim - To explain the importance of computer in daily life in all the fields.

Unit V - Raspriya,letter writing,Technical words **15**

Aim - This story helps the students to understand the Writing style of writer "Fanishwarnath renu"who Is wellknown for his village type Stories . Training them different types of letters& technical words will help the students to understand the official work in Hindi.

Total: 75 Hrs

Course Outcome

- Through the story students will be familiar with the writing style of great writer "sri Jayashankar Prasad",&can understand the situation of country during Mughal period .

- To make the children understand the importance of selecting a profession according to one's own interest.
- To describe the present situation;politian's behaviour& their selforiented activities.
- To explain the importance of computer in daily life in all the fields.
- This story helps the students to understand the Writing style of writer "Fanishwarnath renu" who Is wellknown for his village type Stories .

Text Book

1. Gadya Aur Prayojanmulak Hindi ed by Dr. N. Lavanya Mayura Publishers, edition **2008**

18LFRE11 **FRENCH - I** **5 0 0 5**

Course objective: To introduce French Language and enable the students to understand and to acquire the basic knowledge of French language with the elementary grammar.

UNIT I INTRODUCTION **15**

Introduction - Alphabet – Comment prononcer, écrire et lire les mots- Base : Les prénoms personnel de 1er, 2ème et 3ème personnes – Conjugaisons les verbes être et avoir en forme affirmative, négative et interrogative

UNIT II Leçons 1- 3 **15**

Leçons 1.Premiers mots en français,- 2. Les hommes sont difficiles,- 3 Vive la liberté- Réponses aux questions tirés de la leçon - Grammaire : Les adjectives masculines ou féminines – Les articles définis et indéfinis – Singuliers et pluriels

UNIT III Leçons 4- 6 **15**

Leçons 4. L'heure, C'est l ; heure,- 5. Elle va revoir sa Normandie,- 6 .Mettez –vous d'accord groupe de nom - Réponses aux questions tirés de la leçon - Grammaire : A placer et accorder l'adjectif en groupe de nom- Préposition de lieu –A écrire les nombres et l'heure en français

UNIT VI Leçons 7- 9 **15**

Leçons7. Trois visage de l'aventure,- 8. A moi, Auvergne,- 9. Recit de voyage – Réponses aux questions tirés de la leçon - Grammaire : Adjectif possessif – Les Phrases au Présent de l'indicatif - Les phrases avec les verbes pronominaux au présent

UNIT V Composition **15**

A écrire une lettre à un ami l'invitant à une célébration différente ex : mariage – A faire le dialogue - A lire le passage et répondre aux questions

TOTAL : 75 Hrs

Course outcome

- The content of the unit 1 aids the students to explore the basics of the new foreign language.
- The content of unit 2 to experience the basic formations of words and its basic grammar by differentiating with English.
- This imparts the additional information in terms of general in the sense of geographical and culture.
- Enable students for framing the basics sentence.
- Making the students community to know the french format of letter writing and essay writing.

Text Book

1. Jacky GIRARDER & Jean Marie GRIDLIG, Méthode de Français PANORAMA, Clé Intérnational

Goyal Publication, New Delhi., Edition 2004

Reference Books

1. DONDO Mathurin , " Modern French Course", Oxford University Press., New Delhi., Edition 1997
2. Nitya Vijayakumar, "Get Ready French Grammar-Elementary", Goyal Publications, New Delhi., Edition 2010

18LENG11 **ENGLISH- I** **5 0 0 5**

COURSE OBJECTIVE:

To enable students to develop their communication skills effectively.
To make students familiar with the English Language.
To enrich their vocabulary in English
To develop communicative competency

UNIT I - Preparatory Lesson **15**

1. Competition Matters
   Suzanne Sievert

2. A Personal Crisis May Change History
   Dr. A.P.J. Abdul Kalam

3. Why Preserve Biodiversity
   Prof. D. Balasubramanian

UNIT II –Prose **15**

1. The Unexpected
   Robert Lynd

2. My Greatest Olympic Prize
   Jesse Owens

3. If You are wrong, admit it
   Dale Carnegie

UNIT III –Poetry **15**

1. The Night of the Scorpion
   Nissim Ezekiel

2. Pulley or The Gift of God
   George Herbert

3. La Bella Dame Sans Merci
   John Keats

UNIT IV- Short Story **15**

1. The Gift of Magi
   O Henry
2. Three Questions
   Leo Tolstoy

UNIT V – One Act Play **15**

1. The Shirt
   Francis Dilion

2. The Pie and the Tart
   Hugh Chesterman

Total: 75 Hours

Course outcome

CO 1 Examine the difference between poetic language and the language of the prose.
CO 2 Utilize instructions on fundamentals of grammar
CO 3 Develop their own style of writing after studying diverse prose essays.
CO 4 Classify different poems on the basis of their types.
CO 5 Conclude the textual content of both prose and poetry.

Books Prescribed

- Confluence - Anu Chithra Publications

18LTAM21 **தமிழ் –II** **5 0 0 5**

தமிழிலக்கியம்

நோக்கம்

சங்க காலம் தொடங்கி தற்காலம் வரையிலும் தமிழில் உள்ள படைப்பிலக்கியங்களை இப்பாடம் அறிமுகம் செய்கின்றது. தமிழ் இலக்கியத்தில் தேர்ந்தெடுக்கப்பட்ட மிக முக்கியமான செய்யுட்கள், கவிதைகள், கதைகள், உரைநடை ஆகியவற்றைக்கொண்டு இப்பாடம் கட்டமைக்கப்பட்டுள்ளது. மாணாக்கரிடம் இலக்கியத் தேடலை உருவாக்குவதும், தற்சார்புடைய அறிவை மேம்படுத்துவதும் இப்பாடத்தின் நோக்கமாகும்.

அலகு I செவ்வியல் இலக்கியங்கள்

15

திருக்குறள் - அன்புடைமை, ஒழுக்கமுடைமை, பெரியாரைத்துணைக்கோடல் – மூன்று அதிகாரங்கள் முழுமையும்.

புறநானூறு - பாடல் எண்: 18, 55, 182, 183, 192 – ஐந்து பாடல்கள்.

குறுந்தொகை - பாடல் எண்: 2, 167, 27, 202, 184 - ஐந்து பாடல்கள்.

அலகு II காப்பியங்கள்

15

சிலப்பதிகாரம் - கனாத்திறம் உரைத்தக் காதை முழுவதும். மணிமேகலை - பவத்திறம் அறுக எனப் பாவை நோற்ற காதை முழுவதும். கம்பராமாயணம் - மந்தரைச் சூழ்ச்சிப்படலம் (தேர்ந்தெடுக்கப்பட்ட ஒன்பது பாடல்கள்).

அலகு III கவிதையும் புதுக்கவிதையும்

15

பாரதிதாசனின் ‘தமிழியக்கம்’ – (i) நெஞ்சு பதைக்கும் நிலை – (ii) இருப்பதைவிட இறப்பது நன்று – இரண்டு கவிதைகள்.

ஈரோடு தமிழன்பனின், “அந்த நந்தனை எரித்த நெருப்பின் மிச்சம்” என்னும் தொகுதியில் இடம்பெற்றுள்ள ‘விடிகிறது’ என்னும் புதுக்கவிதை.

அலகு IV சிறுகதைகள்

15

தி. ஜானகிராமனின் 'சக்தி வைத்தியம்'

கி. ராஜநாராயணனின் 'கதவு' - இரண்டு கதைகள்

அலகு V உரைநடை

15

வைரமுத்து எழுதிய 'சிற்பியே உன்னைச் செதுக்குகிறேன்' முழுவதும்

மொத்தம்: 75 மணி நேரம்

கல்வித்திட்டப் பயன்கள்

சங்க இலக்கியம் தொடங்கி இக்கால இலக்கியம் வரையில் அமைந்த இலக்கியங்களின் அறிமுகமாக ஒருசில இலக்கியங்களில் இருந்து பாடப்பகுதிகள் தேர்வு செய்யப்பட்டு தமிழிலக்கியம் என்ற தலைப்பில் மாணவர்களுக்குக் கற்பிக்கப்படுகிறது . இவை இலக்கிய வெளிப்பாட்டுத் தன்மையை உணர்த்துவதாக அமைகிறது.

பாட நூல்கள்

1. இரவிச்சந்திரன். சு. (ப.ஆ), "செய்யுள் திரட்டு", வேல்ஸ் பல்கலைக்கழகம், முதற்பதிப்பு, 2008.

2. வைரமுத்து. இரா., "சிற்பியே உன்னைச் செதுக்குகிறேன்", திருமகள் நிலையம், பதினேழாம் பதிப்பு, 2007.

பார்வை நூல்கள்:

1. பாலச்சந்திரன்.சு., "இலக்கியத் திறனாய்வு", நியூ செஞ்சுரி புக் ஹவுஸ், பத்தாம் பதிப்பு, 2007.

2. மாதையன்.பெ., "தமிழ்ச் செவ்வியல் படைப்புகள்", நியூ செஞ்சுரி புக் ஹவுஸ், முதல் பதிப்பு, 2009.

3. வரதராசன்.மு., "குறள் காட்டும் காதலர்", பாரி நிலையம், மறுபதிப்பு, 2005.

18LHIN21 **HINDI - II** **5 0 0 5**

kahani,Ekanki&Translation

Course objective: To enable the students to have the knowledge in contemporary literature of the modern era. It also provides an idea how translation to be effected.

Unit I - ' Pus ki raath'(kahani), Translation **15**

Aim This story explains the problems faced by the farmers
'Upanyas samrat Premchand' describes the life of a
poor farmer who represents present day's situation

Aim **'Das hazar'(ekanki),Translation**
Author 'Uday Shankar bhatt' criticized the rich&stingy person's behaviour and explains the importance of humanvalues in a humorous mannner
By translating the English passage into Hindi,students learn the rules which should be followed while translation.

Unit II - 'vaapasi'(kahani), Translation **15**

Aim Female writer'Usha priyamvada 'describes the mentality of a retired person in a beautiful manner

Aim **'Akhbaari vijnapan'(ekanki), Translation**
This humorous story written by 'chiranchith'points out the problems occur due to Carelessness&lack of communication.

Unit III - 'Akeli'(kahani), Translation **15**

Aim Writer 'Mannu bhandari'describes the condition of middle aged woman left lonely who longs only for love &affection&nothing else.

Aim '**Raat ke raahi', (ekanki), Translation**
'Vrajabhushan' shows the clear picture of cunning woman and creates Awareness

Unit IV - 'Parda'(kahani), Translation **15**

Aim Written by 'Yashpal',this story brings the clear picture of problems Faced by a poor muslim family.

Aim '**Maim bhi maanav huum'(ekanki), Translation**
Author 'vishnu prabhakar' describes the kalinga war&reasons behind samrat Ashok's change of mind.

Unit V - 'Sharandata'(kahani), Translation **15**

Aim This story written by 'Anjeya explains the situation of Indian people who lived in Pakistan region after separation .

Aim **'Yah meri janma bhumi hai''(ekanki), Translation**

'Harikrishna premi' points out the patriotism of a british girl who Was born in India &also the country's condition at that time.

Total: 75 Hrs

Course Outcome

- This story explains the problems faced by the farmers 'Upanyas samrat Premchand' describes the life of a poor farmer who represents present day's situation
- **'Das hazar'(ekanki),Translation** Author 'Uday Shankar bhatt' criticized the rich&stingy person's behaviour and explains the importance of humanvalues in a humorous manner. By translating the English passage into Hindi,students learn the rules which should be followed while translation.
- Female writer'Usha priyamvada 'describes the mentality of a retired person in a beautiful manner
- **'Akhbaari vijnapan'(ekanki), Translation** This humorous story written by 'chiranchith'points out the problems occur due to Carelessness&lack of communication.
- Writer 'Mannu bhandari'describes the condition of middle aged woman left lonely who longs only for love &affection&nothing else.

Text Book

1. Sankalan Kahani evam Ekankied by Dr. N. Lavanya, Mayura Publishers, edition **2010**

18LFRE21 **FRENCH II** **5 0 0 5**

Course objective: To fortify the grammar and vocabulary skills of the students. Enable the students have an idea of the French Culture and Civilization.

UNIT I Leçons 10 – 11 **15**

Leçons : 10. Les affaires marchent,- 11. Un après midi à problemes- Réponses aux questions tirés de la leçon - Grammaire : Présent progressif, passé récent ou future proche – Complément d'objet directe – Complément d'objet indirecte.

UNIT II Leçons 12 – 13 **15**

Leçons : 12. Tout est bien qui fini bien,- 13. Aux armes citoyens – Réponses aux questions tirés de la leçon - Grammaire : Les pronoms « en ou y » rapporter des paroles - Les pronoms relatifs que, qui, ou où,

UNIT III Leçons 14 – 15 **15**

Leçons 14. Qui ne risqué rien n'a rien,- 15. La fortune sourit aux audacieux –Réponses aux questions tirés de la leçon – Grammaire : Comparaison – Les phrases au passé composé

UNIT IV Leçons 16 – 18 **15**

Leçons16 La publicite et nos reves 17 La france le monde 18 Campagne publicitaire Réponses aux questions tirés de la leçon - Grammaire :- Les phrases à l' Imparfait – Les phrases au Future

UNIT V Composition **15**

A écrire une lettre de regret// refus à un ami concernant l'invitation d'une célébration reçue- A écrire un essaie sur un sujet générale - A lire le passage et répondre aux questions

TOTAL : 75 Hrs

Course outcome

- This enable students to learn the language without any grammatical errors.
- As a result of the content makes the students to known about the types of pronouns and their useage.
- This imparts the students in order to develop their basic writing skills.
- Enable students for framing the basics sentence.
- Making the students community to know the french format of letter writing and essay writing.

Text Book

1. Jacky GIRARDER & Jean Marie GRIDLIG, « Méthode de Français PANORAMA », Clé Intérnationale , Goyal Publication, New Delhi., Edition 2004.

Reference Books

1. DONDO Mathurin, " Modern French Course", Oxford University Press, New Delhi., Edition 1997.
2. Paul Chinnappane " Grammaire Française Facile" , Saraswathi House Pvt.Ltd, New Delhi, Edition 2010.

18LENG21 **ENGLISH- II** **5 0 0 5**

COURSE OBJECTIVE

- To enable students to develop their communication skills effectively
- To make students familiar with various sentence patterns of the English Language
- To enrich their vocabulary in English
- To develop communicative competency

UNIT-I Prose **15**

1. TheWords of Wisdom
   Chetan Bhagat

2. Forgetting
   Robert Lynd

3. My Early Days
   Dr. A.P.J. Abdul Kalam

UNIT II –Poetry **15**

1. Ozymandias
   Percy Bysshe Shelley

2. Mending Wall
   Robert Frost

3. Where the Mind is Without Fear
   Rabindranath Tagore

UNIT III –Short Story **15**

1. Am I Blue?
   Alice Walker

2. The Last Leaf
   O' Henry

3. The Selfish Giant
   Oscar Wilde

UNIT IV – One Act Play **15**

1. Soul Gone Home

   Langston Hughes

UNIT V **15**

1. Lexical Skills
2. Vocabulary
3. Communication and Grammar at the end of all lessons

Total: 75 Hours

Course outcome

- To construct sentences owing to advanced grammar skills taught.
- To prove better communicative ability because of illustrations from fundamental grammar.
- To prove their skill in writing sentences after the modals of American, British and Indian English writers.
- To develop different sensibilities in approaching life.
- To solve life's problems as highlighted in the selections.

Books Prescribed

- Radiance - Emerald Publications

18LTAM31 **தமிழ் –III** 5 0 0 5

பயன்பாட்டுத் தமிழ்

நோக்கம்

தற்கால அன்றாடத்தேவைக்குரிய வகையில் தமிழ்மொழியைச் செம்மையாகப் பயன்படுத்த வேண்டும் என்னும் நோக்கில் இப்பாடம் உருவாக்கப்பட்டுள்ளது. மாணாக்கரின் வேலைவாய்ப்பு நேர்காணல்கள் மற்றும் குழு உரையாடல்களை எதிர்கொள்வதற்கேற்ற பேச்சுத்திறன் மேம்பாடு, செய்தித்தாள்களை நுட்பமாக அணுகும்விதம், சிறந்த கடிதங்களை எழுதுவதற்கான பயிற்சி போன்ற பயன்பாடு சார்ந்த மொழிப்பயிற்சியை இப்பாடம் அளிக்கின்றது.

அலகு I மொழி

15

பிழை நீக்கி எழுதுதல் – ஒற்றுப்பிழை நீக்கி எழுதுதல் – தொடர்பிழை நீக்கி எழுதுதல் – ஒற்று மிகும் இடங்கள் – ஒற்று மிகா இடங்கள் – பிற மொழிச் சொற்களை நீக்கி எழுதுதல் – பயிற்சிகள்.

அலகு II பேச்சு

15

பேச்சுத்திறன் – விளக்கம் – பேச்சுத்திறனின் அடிப்படைகள் - வகைகள் – மேடைப்பேச்சு – உரையாடல் – குழுவாக உரையாடல் – பயிற்சிகள்.

தலைவர்களின் மேடைப் பேச்சுகள் – பெரியார் – அண்ணா – கலைஞர்.

அலகு III எழுதுதிறன்

15

கலைச்சொல்லாக்கம் – தேவைகள் – கலைச்சொற்களின் பண்புகள் – கலைச்சொல்லாக்கத்தில் தவிர்க்க வேண்டியவை – அறிவியல் கலைச்சொற்கள்.

கடிதம் – வகைகள் - அலுவலகக் கடிதங்கள் – பயிற்சி – அறிஞர்களின் கடிதங்கள் – கடிதங்களின் வழி கற்பித்தல் – சில அறிஞர்களின் கடிதங்கள் – நேரு...,

அலகு IV மொழிபெயர்ப்பு

15

மொழிபெயர்ப்பு அடிப்படைக் கோட்பாடுகள் – மொழிபெயர்ப்பு முறைகள் – மொழிபெயர்ப்பாளரின் தகுதிகள்.

மொழிபெயர்ப்பு வகைகள் – சொல்லுக்குச் சொல் மொழிபெயர்த்தல் – தழுவல் – கட்டற்ற மொழிபெயர்ப்பு – மொழியாக்கப்படைப்பு – இயந்திர மொழிபெயர்ப்பு – கருத்துப்பெயர்ப்பு – மொழிபெயர்ப்பு நடை – மொழிபெயர்ப்பு சிக்கல்களும் தீர்வுகளும்.

பயிற்சி: அலுவலகக் கடிதங்களை மொழிபெயர்த்தல் (ஆங்கிலத்திலிருந்து தமிழுக்கு).

அலகு V இதழியல் பயிற்சி

15

இதழ்களுக்குத் தலையங்கம் எழுதுதல் – நூல் மதிப்புரை எழுதுதல் – சாதனையாளரை நேர்காணல் – நிகழ்ச்சியைச் செய்தியாக மாற்றுதல்.

மொத்தம்: 75 மணி நேரம்

கல்வித்திட்டப் பயன்கள்

நவீனக் காலத்திற்கும் தேவைக்கும் ஏற்றவாறு மொழியின் தேவையை மாணவர்கள் சரிவர அறிந்து கொள்ள வேண்டும் என்ற நோக்கில் பயன்பாட்டுத் தமிழ் என்ற பாடப்பகுதி அமைக்கப்பட்டுள்ளது. தவறின்றித் தமிழ் எழுதவும் அறிவியல் கலைச் சொற்களை உருவாக்கவும் பேச்சுத் திறனை வளர்ப்பதற்காகவும் மொழிபெயர்ப்பு , இதழியல் சார்ந்த அறிவினைப் பெறுவதற்கும் அந்தந்த துறை சார்ந்த பணிகளில் வேலை வாய்ப்பு பெறுவதற்கும் இப்பாடத்திட்டம் பயன்படுகிறது.

பார்வை நூல்கள்

1. ஈஸ்வரன்.ச., சபாபதி.இரா., "இதழியல்", பாவை பப்ளிகேஷன்ஸ், முதற்பதிப்பு, 2004.

2. ஈஸ்வரன்.ச., "மொழிபெயர்ப்பியல்", பாவை பப்ளிகேஷன்ஸ், முதற்பதிப்பு, 2005.

3. எட்கர் தார்ப், ஷோவிக் தார்ப், “நேர்முகத் தேர்வில் வெற்றிபெற”, கிழக்குப் பதிப்பகம், இரண்டாம் பதிப்பு, 2009.

4. சுப்பிரமணியன்.பா.ரா., ஞானசுந்தரம்.வ., (ப. ஆ) “தமிழ்நடைக் கையேடு”, இந்தியமொழிகளின் நடுவண் நிறுவனம், மைசூர் மொழி அறக்கட்டளை மற்றும் தஞ்சைத் தமிழ்ப் பல்கலைக்கழகம் – வெளியீடு, நான்காம் மீள்பதிப்பு, 2010.

5. சுப்புரெட்டியார்.ந., “தமிழ் பயிற்றும் முறை”, மெய்யப்பன் பதிப்பகம், ஐந்தாம் பதிப்பு, 2006.

18LHIN31 **HINDI - III** **5 0 0 5**

Ancient poetry,Hindi sahitya ka Ithihas

Course objective

To help the students to have in depth knowledge of Literature. It makes the students to acquire more about the medieval period through the literary works.

Unit I - 'Kabir ke pad', Hindi Sahitya ka ithihas **15**

Aim - Students can understand the writing style of Kabir& also learn valuable messages.

Unit II - 'Sur ke pad', Hindi Sahitya ka ithihas **15**

Aim - To learn the precious poems of Surdas&SriKrishna Leela.

Unit III - Thulsi ke pad, Hindi Sahitya ka ithihas **15**

Aim - Students get the opportunity to learn the poems of Ram bhakthi poet Thulssi das

Unit IV - Rahim ke pad, Hindi Sahitya ka ithihas **15**

Aim - The poems of Rahim are different &valuable and students will get confidence &ideas to tackle the problems ahead.

Unit V - Bihari ke pad, Hindi Sahitya ka ithihas **15**

Aim - Students will understand the writing style of Bihari & the important messages .

The aim of teaching 'Hindi Sahitya ka ithihas' is to make them understand the different periods of growth of Hindi Literture & the remarkable literary works in Hindi literature.

Total : 75 Hrs

Course Outcome

- To understand the writing style of Kabir& also learn valuable messages
- To learn the precious poems of Surdas&SriKrishna Leela.
- To get the opportunity to learn the poems of Ram bhakthi poet Thulssi das .
- The poems of Rahim are different &valuable and students will get confidence &ideas to tackle the problems ahead.
- To understand the writing style of Bihari & the important messages

Text Book

1. Prachin evam Aadhunik Kavya Sankalan ed by Dr.N.Lavanya, Mayura Publishers, edition 2011

Reference Book

1. Hindi Sahitya kaa Itihas, By Dr.Nagendra, Raj kamal Prakashan, 1997

18LFRE31 **FRENCH - III** **5 0 0 5**

Course objective: To strengthen the Grammar and Composition in French language. To train the students to enhance his skill in French language for communication

UNIT I **15**

Leçon 16 - La famille Vincent (Page 44) - Grammaire :Passé composé' Leçon 29 - Vers l'hôtel (page 80) Grammaire : Impératif, A mettre les phrases du singulier au pluriel

UNIT II **15**

Leçon 40 - L'épicerie, les légumes et les fruits (page 112) – Grammaire : Présent de l'indicatif Leçon 44 - La poste (page 124) – l Grammaire : A mettre les phrases à l'imparfait

UNIT III **15**

Leçon 51 - Le café et tabac (page 142) – Grammaire : A changer les phrases en Interrogatif Leçon 58 - La Chasse et la pèche (160) – Grammaire : Le plus que parfait

UNIT IV **15**

Leçon 61 Un mariage à la campagne (page 170) – Grammaire –A changer au participe présent

UNIT V **15**

Composition : A écrire une lettre à un ami l'invitant à une celebration differente ex : mariage –

A faire un essaie sur un sujet générale - A lire le passage et répondre aux questions

Total : 75 Hrs

Course outcome

- Student could differentiate between the past imperfect and past tense in a phrase.
- Students will learn about vocabularies related to content and will use it during conversations.
- Learners will frame sentences based on the grammar topics as mentioned.
- Students will learn the differences between present tense and present continuous tense.
- Students will write French letter based on relative subject as mentioned in content.

Text Book

1. Les leçons ont été choisi et tiré de I & II degré de G .MAUGER « Cours de Langue et de Civilisation Française » The Millenium, Publication Hachette, Edition 2002

Reference Books :

1. DONDO Mathurin, “Modern French Course”, Oxford University Press, New Delhi., Edition 1997.
2. Paul Chinnapan, « Saraswati Grammaire Française facile », Saraswathi House Pvt. Ltd., New Delhi., Edition 2010.
3. Larouse, “Larouse French Grammar”, Goyal Publication, New Delhi., Edition. 1995

18LENG31 **ENGLISH – III** **5 0 0 5**

COURSE OBJECTIVE

To train students in the use of English language in varied literary and non-literary context.
To teach them soft skills and strengthen their foundation in grammar and composition.
To evaluate their comprehension skills.

UNIT - I- Prose **15**

1.Two Gentleman of Verona - A.J. Cronin

2.Judas Iscariot - Bonnie Chamberlain

3. Dangers of Drug Abuse - J. V. S. Henbane

UNIT II - Short Stories **15**

1.Journey by Night - Norah Burke

2.The 2000-Mile Turtle - Henry Edward Fox

3.Fools Paradise - Isaac Bashevis Singer

UNIT III – Fiction **15**

1. R. L. Stevenson - Dr. Jekyll & Mr. Hyde (Retold by Kennet) – S. Chand & company Ltd.

UNIT IV - Functional English **15**

1. Paragraph Writing
2. Comprehension
3. Letter Writing
4. Report writing
   a News Paper Report
   b Reports for Government Official Attention
   c Definition

UNIT V – Conversation In Situations & Conversation Practice **15**

1. Conversation in Situations

a) At the Airport
b) In a Bank
c) On the Beach
d) At the Customs
e) At the Doctors'
f) In a Flight
g) In a Hotel
h) In a Restaurant
i) In a Shop
j) Tea Time

k) On the Telephone
l) In a Travel Agency
m) On a Country Walk
n) At the theatre
o) In a Street

2. **Conversation Practice**

a) Daily Activities
b) Asking Directions
c) Travel plans
d) Living in an Apartment
e) Money Problems
f) Weather Conditions
g) Dinner Conversations
h) Common Health Problems
i) Tag Questions
j) Office Conversations

3. **Expansion of Hints**

Total: 75 Hours

Course outcome

- To estimate the essays in the light of appeal of values based essays
- To prioritize pragmatic day to day communication through letter and comprehension.
- To develop narrative skill after reading the short stories.
- To improve their own style of writing after an expose to the prescribed prose pieces.
- To adapt themselves to life context wherein soft skill learning is a must.

Books Prescribed

1. Effective English Communications for You – V. Syamala, Emerald Publishers, Chennai.
2. English Conversation Practice by D. H. Spencer, Oxford University Press
3. English Conversation Practice by Grant Taylor, Tata McCraw-Hill, Publishing Company Limited, New Delhi.

18LTAM41 **தமிழ் - IV** 5 0 0 5

தமிழர் நாகரிகமும் பண்பாடும்

நோக்கம்: பண்டைத் தமிழரின் வாழ்வியல் நெறிகள் இயல்பானதும் இயற்கையோடு இணங்கிச் செல்வதுமாகும்; மிகவும் பழமையானதும் பண்பட்டதுமாகும். அன்பான அக வாழ்க்கையைக்கூட செம்மையாகத் திட்டமிட்டுள்ளனர். பொழுதுபோக்கு, போர்முறைகள், கலை, சமயம், அரசியல், அறிவியல் என அனைத்திலும் தமிழர் சிறந்து விளங்குவதை விளக்கும் பாடமாக இது அமைந்துள்ளது. அரசு வேலை வாய்ப்பிற்கான போட்டித் தேர்வுகளுக்குப் பயன்படும் வகையிலும் இப்பாடம் அமைந்துள்ளது.

அலகு I நாகரிகம், பண்பாடு

15

சொற்பொருள் விளக்கம் – பண்டைத் தமிழர் வாழ்வியல் – அகம் – களவு – கற்பு – குடும்பம் – விருந்தோம்பல் – உறவு முறைகள் – சடங்குகள் – நம்பிக்கைகள் – பொழுதுபோக்கு – புறம் – போர் முறைகள் – நடுகல் வழிபாடு – கொடைப்பண்பு.

அலகு II கலைகள்

15

சிற்பம் – ஓவியம் – இசை – கூத்து – ஒப்பனை – ஆடை அணிகலன்கள்.

அலகு III சமயம்

15

சைவம் – வைணவம் – சமணம், பௌத்தம் வெளிப்படுத்தும் பண்பாடு.

அலகு IV அரசியல்

15

அரசு அமைப்பு – ஆட்சி முறை – உள்நாட்டு வணிகம் – வெளிநாட்டு வணிகம் – வரி வகைகள் – நாணயங்கள் – நீதி முறை.

அலகு V அறிவியல்

15

கல்வி – வேளாண்மை – வானியல் அறிவு – மருத்துவம் – கட்டிடக்கலை.

மொத்தம்: 75 மணி நேரம்

கல்வித்திட்டப் பயன்கள்

தமிழர்களின் வாழ்வியல் முறைகள் , தொன்மை, நாகரிகம், பண்பாட்டு முறைகளைப் பற்றி இலக்கியங்களின் வழித் தெரிந்துகொள்ளும் நோக்கில் இப்பாடத்திட்டம் உருவாக்கப்பட்டுள்ளது . அரசுப் பணி சார்ந்த தேர்வுகளுக்கும் , போட்டித் தேர்வுகளுக்கும் இப்பாடப்பகுதி உறுதுணையாக அமையும்.

பார்வை நூல்கள்

1. கே.கே. பிள்ளை, "தமிழக வரலாறு: மக்களும் பண்பாடும்", உலகத் தமிழாராய்ச்சி நிறுவனம், மீள்பதிப்பு, 2009.

2. பக்தவச்சல பாரதி, "தமிழர் மானிடவியல்", அடையாளம், இரண்டாம் பதிப்பு, 2008.

3. தட்சிணாமூர்த்தி. அ., "தமிழர் நாகரிகமும் பண்பாடும்", யாழ் வெளியீடு, மறுபதிப்பு, 2011.

4. தேவநேயப்பாவாணர். ஞா., "பழந்தமிழர் நாகரிகமும் பண்பாடும்", தமிழ்மண் பதிப்பகம், சென்னை.

5. வானமாமலை.நா., "தமிழர் வரலாறும் பண்பாடும்", நியூ செஞ்சுரி புக் ஹவுஸ், ஆறாம் பதிப்பு, 2007.

18LHIN41 **HINDI - IV** **5 0 0 5**

Modern Poetry, Journalism

Course objective

To enable the students to acquire knowledge in journalism so as to enhance his skill in effective communication pertaining to Hindi language.

Unit I - 'Adhunik kavitha(Apna sansar), Journalism **15**

Aim Rashtra kavi'Maithili sharan gupta' dreams about his life in a beautiful manner &describes how his world should be.

Journalism plays a great role in the development of a country .Through this , students get an opportunity to know about Hindi journalism & the developments took place gradually

Unit II - 'Adhunik kavitha(Chintha), Journalism **15**

Aim Taken from 'Jayashankar prasad' 's Kamayani ,this poem explains the condition of human beings at different situations.

Unit III - 'Adhunik kavitha('Thum logom se duur'), Journalism **15**

Aim 'Shri Gajanan madhav mukthi bodh' describes the present day's thought of a common man & expectations

Unit IV - 'Adhunik kavitha('Sneh shapath'), Journalism **15**

Aim - Poet 'Bhavani Prasad mishra ' points out the importance of love & affection and also the bad effects of enmity.

Unit V - 'Adhunik kavitha('Nimna Madhya varg'& Bharath ki aarthi''), Journalism **15**

Aim 'Prabhakar machve' explains the condition of the middle class in 'Nimna Madhya varg 'Shamsher bahadur singh' 's poem 'Bharat ki aarthi' points out the importance of patriotism & our desires.

Total: 75 Hrs

Course Outcome

- Rashtra kavi'Maithili sharan gupta' dreams about his life in a beautiful manner &describes how is world should be. Journalism plays a great role in the development of a country .Through this students get an opportunity to know about Hindi journalism & the developments took place gradually

- Taken from ‘Jayashankar prasad’ ‘s Kamayani ,this poem explains the condition of human beings at different situations.
- ‘Shri Gajanan madhav mukthi bodh’ describes the present day’s thought of a common man & expectations
- Poet ‘Bhavani Prasad mishra ‘ points out the importance of love & affection and also the bad effects of enmity.
- ‘Prabhakar machve’ explains the condition of the middle class in ‘Nimna Madhya varg ‘Shamsher bahadur singh’ ‘s poem ‘Bharat ki aarthi’ points out the importance of patriotism &our desires.

Text Book

1. Prachin evam Aadhunik Kavya Sankalan ed by Dr. N. Lavanya, Mayura Publishers, edition 2011

Reference Book

1. Patrakaritha Ek Paricahy by Dr.Madhu Dhawan, Bodh Prakashan, edition 1997

18LFRE41 **FRENCH - IV** **5 0 0 5**

Course objective: To enable the students to strengthen their knowledge of grammar/composition. To make the students to develop their skills of communication in French language

UNIT I **15**

Leçon 20 - Une grande Nouvelle (page 56) – Grammaire : A mettre les phrases au Future Leçon 46. – Le métro ; l'autobus (page 130) – Grammaire : A former ou à changer l'adjectif masculin ou féminin à l'adverbe – A trouver les noms qui correspondent aux verbes

UNIT II **15**

Leçon 48. – A la Préfecture de police (page 132) – Grammaire : Les Pronoms relatifs Leçon 63 - Les sports (page 174) Grammaire : Le conditionnel présent

UNIT III **15**

Leçon 56 - A Biarritz, la plage (page 156) - Grammaire : Le future antérieure Leçon 57 - Dans les Pyrénées (page 158) - Grammaire : Le future antérieure suite)

UNIT IV **15**

Leçons 65 - A fin des vacances (page 178) Grammaire : A changer les phrases du pluriel – au singulier – Le présent du subjonctif

UNIT V **15**

Composition : A écrire une lettre de regret / refus à un ami concernant l'invitation d'une célébration reçue- A écrire un essaie sur un sujet générale - A lire le passage et répondre aux questions

Total : 75 hrs

Course outcome

- Learners group will able to make sentences related to the content and its vocabulary.
- Learners group will able to make conversation based on the vocabularies related to content.
- Students will be doing comprehension d'ecrit based on the content.
- Learners group will be able to transform sentences from singular to plural or vice-versa.
- learners group will able to do basic translations .

Text Book

1. Les leçons ont été choisi et tiré de I &II degré de G .MAUGER « Cours de Langue et de Civilisation Française » The Millenium, Publication Hachette, Edition 2002

Reference Books

1. DONDO Mathurin, “Modern French Course”, Oxford University Press, New Delhi., Edition 1997.
2. Paul Chinnapan, « Saraswati Grammaire Française facile », Saraswathi House Pvt. Ltd., New Delhi., Edition 2010
3. Larouse, “Larouse French Grammar”, Goyal Publication, New Delhi., Edition. 1995

18LENG41 **ENGLISH – IV** **5 0 0 5**

UNIT I – Prose **15**

1.Walking Tours - R. L. Stevenson

2.All About a Dog - A. G. Gardinar

3.No Man is an Island - Minno Masani

UNIT II - Short Stories **15**

1. The Man Who Likes Dickens - Evelyn Waugh
2. Lamb to the Slaughter - Roald Dahl
3. Buck Hears the Call - Jack London

UNIT III – Drama **15**

1.Selected Scenes from Shakespeare's Plays – Book I, Emerald Publishers

a) Funeral Oration (Julius Caesar)
b) Trial for a Pound of Flesh (The Merchant of Venice)
c) Patterns of Love (As You Like It)

UNIT IV **15**

1. General Essay Writing & Group Discussion
2. Persuasive Writing and Role Play

UNIT V **15**

1.Notice, Agenda, Minutes.

Total: 75 Hours

Course outcome

- To prioritize power of understanding and aids assimilation of vocables. Vocabulary to charge communication with educated words
- To develop comprehensive knowledge through listening leading to answering questions
- To build observation power and infuse self-confidence through group discussions
- To identify methodology for befitting constructional ability
- To experiments with inward looking and visualization of the 'otherness' of situations

Books Prescribed

1.Invitation to English Prose – A. E. Varadarajan & S. Jagadisan, Orient Black Swan, Chennai

ABILITY ENHANCEMENT COMPULSORY COURSES (AECC)

SYLLABUS

ENVIRONMENTAL STUDIES 2 0 0 2

Course Objective

To inculcate the importance of environmental pollution, preservation of nature and environmental management for human welfare.

Unit-I Multidisciplinary nature of environmental studies, Natural Resources 06

Definition, scope and importance, need for public awareness.

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

Unit-II Ecosystems, Biodiversity and its conservation 06

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

Introduction–Definition,genetic, species and ecosystem diversity. Biogeographical classification of India, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - Biodiversity at global, National and local levels. Inida as a mega-diversity nation. Hot-sports of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit-III Environmental Pollution 06

Definition, Cause, effects and control measures of a) Air pollution b) Water pollution c) Soil pollution d) Marine pollution e) Noise pollution f) Thermal pollution g) Nuclear hazards. Solid waste Management. Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Diaster management- floods, earthquake, cyclone and landslides.

Unit-IV Social Issues and the Environment 06

From Unsustainable to Sustainable development, Urban problems related to energy - Water conservation, rain water harvesting, watershed management- Resettlement and rahabilitation of people; its problems and concerns. Case Studies - Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. Wasteland reclamation. Consumerism and waste products. Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act - Issues involved in enforcement of environmental legislation. Public awareness.

Unit-V Human Population and the Environment 06

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

Field work - Visit to a local area to document environmental assetsriver/forest/grassland/hill/mountain, Visit to a local polluted site-Urban/Rural/Industrial/Agricultural, Study of common plants, insects, birds, Study of simple ecosystems-pond, river, hill slopes, etc.

Total: 30 hrs

Course Outcome

- To understand the nature and facts about environment.
- To find and implement scientific, technological, economic solutions to environmental problems.
- To know about the interrelationship between living organisms and environment.
- To understand the integrated themes and biodiversity, natural resources, pollution control and waste management.
- To appreciate the importance of environment by assessing its impact on the human world.

Text Books

1. De AK, Environmental Chemistry, Wiley Eastern Ltd.

2. Bharucha Erach, 2003. The Biodiversity of India, Mapin Publishing Pvt. Ltd, India.

3. Brunner RC, 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480pgs.

4. Clark RS, Marine Pollution, Clanderson Press, Oxofrd (TB).

Reference Books

1. Agarwal KC, 2001. Environmental Biology, Nidi Publishers Ltd. Bikaner.

2. Gleick HP, 1993. Water in Crisis, Pacific Institute for Studies in Development, Environment and Security. Stockholm Environmental Institute, Oxford University Press, 473pgs.

3. Heywood VH, and Watson RT, 1995. global Biodiversity Assessment. Cambridge University Press 1140pgs.

4. Jadhav H and Bhosale VM, 1995. Environmental Protection and Laws. Himalaya Publishing House, Delhi 284pgs.

5. Miller TG, Jr. Environmental Science, Wadsworth Publishing CO. (TB)

SKILL ENHANCEMENT ELECTIVE COURSES (SEC) SYLLABUS

SOFT SKILLS - I 2 0 0 2

Course Objective

- The ability to create an open environment for communication
- An understanding of other people communication styles and needs
- To create an environment for open discussion and ongoing dialogue for communication success.

Unit I Reading Comprehension and Vocabulary 06

Definitions of reading – types of reading – oral reading – silent reading – reading process – classification of reading – nature of reading – Filling in the blanks – Cloze Exercises –Vocabulary building – Reading and answering question.

Unit II Listening and Answering Question 06

Listening process – speaker – hearer – types of listening – transitional listening – critical listening – recreational listening – listening for appreciation – selective listening – intensive listening- extensive listening – listening and sequencing sentences – filling in the blanks – listening and answering questions.

Unit III Group Discussion 06

Introduction – Why GD Part of a selection process – Structure of a GD-Strategies in GD – Team work – body language – Debating various points of views – interaction with peers.

Unit IV Conversations 06

Introducing oneself and others, narrating events – making telephonic conversation – Giving instruction – Giving instruction- Expressing purposes and functions- obligation and preferences, Accepting offers and Counseling Face to face Conversations

Unit V Self – Introduction and Role Play 06

Introduction self and greetings- asking for information- offerings- requisitions- inviting – vocabulary building- asking for description.

Total: 30 hrs

Course Outcome:

- Cloze exercises provide support to build vocabulary
- Sense of logic develops from sequencing sentences
- Group discussion infuses team spirit and sense of competition
- Face to face and telephone conversation builds up self confidence
- Self introduction and role play facilitate cultivation firmness of mind and empathy

Text Books

1. Barun K. Mitra, “Personality Development and Soft Skills”. Oxford University Press. New Delhi. 2011.
2. S.P. Sharma, “Personalilty Development”, Pustaq Mahal. New Delhi. 2010.

Reference Books

1. Meenakshi Raman and Sangeetha Sharma, “Technical Communication”, Oxford University Press. New Delhi, 2009.
2. A.S. Hornby: “Oxford Advanced Learner’s Dictionary of Current English”, Oxford University Press, 2007

SOFT SKILLS II **2 0 0 2**

Course Objective

- To provide basic information about presentation skill and train the students for letter writing, creation of resume and develop the interview skills.
- To provide information about the Process, types and patterns of communication

Unit I Presentation Skills **06**

General presentation methods and developing presentation skill

Unit II Soft skills (Time Management, Stress Management and Body Language) **06**

Time management: Importance, Plan and Execution, Default reason and rectification methods. Stress Management: Stress Impacts over Efficiency and how to manage. Body Language: Its importance and need

Unit III Resume / Report / Letter Writing **06**

Resume: Basic components of a resume, Preparation of a resume, Types of resume Report: How to prepare reports, reports components and structure Letter writing: types of letters, framing letters, basic structure, how to draft a letter

Unit IV Frequently asked Questions **06**

Unit V Interview Skills **06**

Aims of Interview expectations and how to fulfill, developing skills

Total: 30 hrs

Course Outcome

- Self introduction and role play facilitate cultivation firmness of mind and empathy
- Group discussion infuses team spirit and sense of competition
- Listening regenerates transformation empathetically
- Cloze exercises provide support to build vocabulary
- Implementation of assertive thoughts can be acquired through writing skills

Text Books

1. Barun K. Mitra, “Personality Development and Soft Skills”. Oxford University Press. New Delhi. 2011.
2. S.P. Sharma, “Personalilty Development”, Pustaq Mahal. New Delhi. 2010.

Reference Books

1. Meenakshi Raman and Sangeetha Sharma, “Technical Communication”, Oxford University Press. New Delhi, 2009.
2. A.S. Hornby: “Oxford Advanced Learner’s Dictionary of Current English” Oxford University Press, 2007

PERSONALITY DEVELOPMENT – I **2 0 0 2**

UNIT I SOFT SKILLS I **06**

Introduction to Personality Development – Meaning-Features of personality=Dimensions of Personality=Determinants of Personality-Features and Traits- Components of self concept-Barriers-Self analysis.

UNIT II SOFT SKILLS II **06**

Importance of Soft Skills – First impression-Work Place requirements-Discipline-Cleanliness-Hygiene-general Appearance--Building Confidence—Concept of Thinking and Usage-Value of Time-Focus & Commitment.

UNIT III SOFT SKILLS IN ACTION 0**6**

Grooming – Attire – Understanding others- – Stability & Maturity Development – Strength s – Weakness – Opportunities-threats -Merits of SWOT Analysis-Components-how to convert weakness into strengths-Goal settings.

UNIT IV SELF AWARENESS AND SELF ESTEEM 0**6**

Definitions-Components of self awareness-Developing Self awareness-Self esteem-meaning-Steps to improve self esteem

UNIT V SELF MOTIVATION 0**6**

Motivation –Meaning-Techniques of self motivation-Motivation & goal setting – Motivation and emotion – Motivation at work.

Total: 30 hrs

Course outcome

- To apply knowledge of mathematics, science, and engineering fundamentals.
- To identify, formulate, and solve engineering problems.
- to design a system, component, or process to meet the desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- To design and conduct experiments, as well as to analyze and interpret data.
- To use the techniques, skills, and modern engineering tools necessary for engineering practice

REFERENCES

1. Personality Development And Soft Skills---Barun K Mitra, Oxford Publication
2. Seven habits of Higly Effective people – Stephen R. covey
3. Emotion, motivation and Self regulation - Nathan C. Hall , McGill University, Canada, Thomas Goetz, University of Konstanz, Germany
4. http://www.emeraldgrouppublishing.com/
5. Psychology of Selfesteem – Nathaniel Branden, Nash (1st edition), Jossey-Bass (32nd anniversary edition

PERSONALITY DEVELOPMENT – II **2 0 0 2**

UNIT I SOFT SKILLS I **06**

Basic Etiquette – Email etiquette – Business etiquette – Telephone etiquette – Meeting etiquette – Adjustment of Role & Leadership – Team Management & Development

UNIT II QUANTITATIVE APTITUDE I **06**

Percentage – Profit Loss -Discount – Ratio Proportion – Time & Work – Time, Speed &Distancel. Problems relating to ages- Permutation &Combination-Probability

UNIT III ANTITATIVE APTITUDE II **06**

Mensuration – Clocks and Calendars- Boats-Simple Interest –Compound Interest- Fractions and Decimals – Square roots – Functions.

UNIT IV ANALYTICAL PROBLEMS **06**

Introduction – Linear Sequencing – Seating Arrangements – Distribution/Double Line Up – Selection – Ordering and Sequencing – Binary Logic – Venn Diagrams –Directions.

UNIT V LOGICAL PROBLEMS **06**

Introduction to Logical problems – Cause and Effect – Course of Action – Statement and Assumption – Letter and Symbol series – Analogies.

TOTAL: 30Hrs

Course Outcome

At the end of this course, the Student will be able to

- Develop the confidence & skills to interact with the business environment and at networking events & client functions in a manner that enhances the Company Brand.
- Engage with clients & colleagues in a polished and professional manner, ensuring positive first & last impressions.
- Recognize a variety of leadership theories.
- Communicate effectively in a range of group sizes and across multiple media types.
- To use the techniques, skills, and modern engineering tools necessary for engineering practice

REFERENCE BOOKS

1. Personality Development --Dr V M SelvarajBhavani Publications

2. Quantitative Aptitude – R. S Aggarwal
3. Logical and Analytical Reasoning (English) 30th Edition – A.K Gupta

PERSONALITY DEVELOPMENT – III **2 0 0 2**

UNIT I VERBAL APPTITUDE I 06

Phonetics/Neutral Accent/Pronunciation – Speech Mechanism/Mouth & Face Exercise – Vowels & Consonants – Sounds – Syllable and Syllable Stress/ Word Stress – Sentence Stress & Intonation – Articulation Exercise – Rate of Speech / Flow of Speech / Idiomatic Phrases.

UNIT II VERBAL APTITUDE II 0**6**

Singular/plural-present tense/past tense—genders - Prepositions-conjunctions-Choice of words—simple sentences—compound sentences-summarisingphrases—Synonyms—Antonyms—Analogies—Similar Words

UNIT III SOFT SKILLS IV 0**6**

Attitude—Meaning-Features of attitude-Formation-Personality Factors-Types of attitude-change in attitude-Developing Positive attitude.

UNIT IV TIME MANAGEMENT 0**6**

Definition –Meaning-Importance, Value of time as an important resource- comparison of Time and Money-Circle of influence and circle of control—Definition of URGENT and IMPORTANT—Time Wasters and how to reduce— Procrastination—meaning and impact- 4 Quadrants.

UNIT V TEAM BUILDING 0**6**

Meaning—Aspects of team building—Process of team building—Types of Teams-Team ethics and Understanding-Team trust and commitment

TOTAL: 30hrs

Course Outcome

At the end of this course, the Student will be able to

- Collect and analyze data for the purpose of resolving an issue(s) directly related to organizational behavior.
- Undertake complete and submit a project using appropriate planning, methodological, evaluative and presentation techniques.
- Create a mission statement to identify their long term goals.
- Identify characteristics of successful people.

Reference books

1. Managing Soft Skills And Personality--B N GhoshMcgraw Hill Publications
2. Principles and Practices of Management Shejwalkar and Ghanekar McGraw Hill Latest
3. Time management for Busy people – Roberta roesch, TatamcGraw-Hill Edition

NSS PAPER – I **2 0 0 2**

Unit -I Introduction and Basic Concepts of NSS **0 6**

a) History, philosophy ,aims & objectives of NSS
b) Emblem, flag motto, song, badge etc.,
c) Organizational structure, roles and responsibilities of various NSS Functionaries

Unit-II NSS Programmes and Activities **06**

a) Concept of regular activities, special camping, Day Camps
b) Basis of adoption of village/slums, Methodology of conducting Survey
c) Financial pattern of the scheme
d) Other youth prog./schemes of GOI
e) Coordination with different agencies
f) Maintenance of Diary

Unit-III Understanding Youth **06**

a) Definition, profile of youth, categories of youth
b) Issues, challenges and opportunities for youth
c) Youth as an agent of social change

Unit-IV Community Mobilization **06**

a) Mapping of community stakeholders
b) Designing the message in the context of the problem and culture of the community
c) Identifying methods of mobilization
d) Youth – adult partnership

Unit -V Volunteerism and Shramdan **06**

a) Indian Tradition of volunteerism
b) Needs &Importance of volunteerism
c) Motivation and Constraints of Volunteerism
d) Shramdan as a part of volunteerism

Total: 30 hrs

Project work /Practical

Conducting Surveys on special theme and preparing a report thereof.

Course Outcome:

- To learn the phscology of the youth, their issues, challenges, social responsibilities and oppurtunities
- To learn the basic concepts of NSS, its history, philosophy, aim, growth, emblem, flag moto, batch and form.
- To understand what is volunteerism and selfless service.
- To know various activites under NSS.
- To learn different programs that could be conducted under NSS.

NSS PAPER – II **2 0 0 2**

Unit-I Importance and Role of Youth Leadership **06**

a) Meaning and types of leadership
b) Qualities of good leaders; traits of leadership
c) Importance and role of youth leadership

Unit-II Life Competencies **06**

a) Definition and importance of life competencies
b) Communication
c) Inter Personal
d) Problem – solving and decision-making

Unit-III Social Harmony and National Intergration **06**

a) Indian history and culture
b) Role of youth in peace-building and conflict resolution
c) Role of youth in Nation building

Unit-IV Youth Development Programmes in India **06**

a) National Youth Policy
b) Youth development Programmes at the National level, State Level and Voluntary sector
c) Youth-focused and Youth –led organizations

Unit -V Environment Issues **06**

a) Environment conservation, enrichment and Sustainability
b) Climate change
c) Waste management
d) Natural resource management (Rain water harvesting, energy conservation, waste land development, soil conservations and afforestation)

Total: 30 hrs

Project work /Practical

Conducting Surveys on special theme and preparing a report thereof.

Course Outcome:

- To know what is national youth policy.
- To practice the approach of problem solving and decision making in a critical situation for an issue.
- To understand the importance of social harmony and nation integration.
- To practice about youth leadership.
- To learn the importance of life competencies.

NSS PAPER – III **2 0 0 2**

Unit – I Citizenship **06**

a) Basic Features of constitution of India
b) Fundamental Rights and Duties
c) Human Rights
d) Consumer awareness and the legal rights of the consumer RTI

Unit – II Family and Society **06**

a) Concept of family, community,(PRIs and other community-based Organizations and society
b) Growing up in the family – dynamics and impact
c) Human Values
d) IV Gender justice

Unit – III Health, Hygiene & sanitation **06**

a) Definition, needs and scope of health education
b) Food and Nutrition
c) Safe drinking water, waterborne diseases and sanitation (swatch Bharat Abhiyan)
d) National Health Programme
e) Reproductive Health

Unit – IV Youth Health **06**

a) Healthy lifestyles
b) HIV AIDS, Drugs and substance abuse
c) Home Nursing
d) First Aid

Unit – V Youth and Yoga **06**

a) History, Philosophy and concept of yoga
b) Myths and misconceptions about yoga
c) Yoga as a preventive, Primitive and curative method
e) Yoga as a tool for healthy; lifestyle

Total: 30 hrs

Project work / practical 40 marks

Preparation of research project report.

Course Outcome:

- To learn the basic definitions of components of health, hygiene and sanitation.
- To know about HIV, AIDS and their cause, treatment.
- To learn the basic rights of citizen and consumer awareness.
- To understand human values and about gender justice.
- To learn what is yoga and its support for healthy life.

NSS PAPER – IV **2 0 0 2**

Unit -I Vocational Skill Development **10**

This unit will aim to enhance the employment potential of the NSS volunteers or, alternately, to help them to set up small business enterprises. For this purpose, a list of 12 to 15 vocational skills will be drawn up, based on the local conditions and opportunities. Each volunteer will have the option to select two skill areas out of this list- one such skill in each Semester. The education institution (or the university) will make a arrangements for developing these skills in collaboration with establishment agencies that possess the necessary expertise in the related vocational skills

Unit-II Entrepreneurship Development **10**

a) Definition & Meaning
b) Qualities of good entrepreneur
c) Steps / ways in opening an enterprise
d) Role of financial and support service Institutions

Unit-III Youth and Crime **10**

a) Sociological and Psychological Factors influencing Youth Crime
b) Peer Mentoring in preventing crimes
c) Awareness about anti -Ragging
d) Cyber Crime and its Prevention
e) Juvenile Justice

Total: 30 hrs

Project work /Practical **40 Marks**

Outcome

- To learn the definition and meaning of entrepreneurship.
- To know the qualities and role of a good entrepreneur.
- To understand the procedure of business service and management.
- To practice condition oriented vocational skill training in atleast 12 to 15 objectives.
- To learn how to establish various vocational skills.

NSS PAPER – V **2 0 0 2**

Unit -I Vocational Skill Development **15**

This unit will aim to enhance the employment potential of the NSS volunteers or, alternately, to help them to set up small business enterprises. For this purpose, a list of 12 to 15 vocational skill will be drawn up, based on the local conditions and opportunities. Each volunteer will have the option to select two skill areas out of this list- one such skill in each Semester. The education institution (or the university) will make a arrangements for developing these skills in collaboration with established agencies that possess the necessary expertise in the related vocational skills

Unit-II Civil /Self Defense **05**

a) Civil defense services, aims and Objectives of civil defense
b) Needs for Self defense training

Unit-III Resource Mobilization **03**

a) Writing a Project Proposal
b) Establishment of SFUs

Unit-IV Additional life Skills **07**

a) Positive Thinking
b) Self Confidence and Self Esteem
c) Setting life Goals and working to achieve them
d) Management of Stress including time management

Total: 30 hrs

Project work /Practical **40 Marks**

Outcome

- To learn the definition and meaning of entrepreneurship.
- To know the qualities and role of a good entrepreneur.
- To understand the procedure of business service and management.
- To practice condition oriented vocational skill training in atleast 12 to 15 objectives.
- To learn how to establish various vocational skills.

18RBHC61 **PROJECT WORK/REVIEW** **0 0 12 6**

Course Objective

- To learn about the basic concept of project work. To know about designing new experiments and carry out the experiments. To know about the various characterization techniques used to characterize the synthesized compounds. To know about the necessities of literature survey and to learn about writing dissertation of project work.

Course Outcomes:

- To identify the topic with the consideration feasibility.
- To learn the procedure of literature survey of the concered topic.
- To derive a plan for executing the work in the stipulated time with maximum efficiency and success.
- The intensive exposure to industry as a first time experience.
- Understanding different sectors of an industry and the functionaries of each sector.

NOTE

1. Review of Chemical literature and documentation.

2. The project work may be carried out either in industries/ National laboratories/R & D centers/in the university lab.

TOTAL: 12 hrs