VIRUDHUNAGAR HINDU NADARS' SENTHIKUMARA NADAR COLLEGE

(An Autonomous Institution Affiliated to Madurai Kamaraj University)

Virudhunagar – 626 001.

Course Name : **Bachelor of Science**
Discipline : **Physics**
CHOICE BASED CREDIT SYSTEM
(For those who join in June 2023 and after)

II year B.Sc. PHYSICS

Semester	Part	Subject Name	Hours	Credit	Int + Ext =Total	Local	Regional	National	Global	Professional Ethics	Gender	Human Values	Environment & Sustainability	Employability	Entrepreneurship	Skill Development	Subject Code	Revised / New / No Change / Interchanged & Percentage of Revision
III	Part I	**Tamil**	6	3	25+75=100												**U24PT31**	**Interchanged from II semester**
	Part II	**English**	6	3	25+75=100												**U24PE31**	**New**
	Core 3	Electrostatics and Current Electricity	4	4	25+75=100				✔					✔			**U24PHC31**	**Mark Change**
	Core Lab	**LAB**: General Physics II	2	--	40+60=100				✔					✔	✔	✔	--	--
	Allied	**Ancillary Mathematics-III Differential Equations and Laplace Transform**	6	4	25+75=100												**U24MAAX31**	**New**
	Allied	General Chemistry-I	4	4	25+75=100												**U24CHAX11**	**Mark Change**
	Allied Lab	**LAB**: Volumetric Analysis	2	--	40+60=100												--	--
	SLC	**Value Education**	-	3	25+75=100				✔		✔	✔					**U24VE31**	**New**
		Total	**30**	**21**														
IV	Part I	**Tamil**	6	3	25+75=100												**U24PT41**	**Interchanged from III semester**
	Part II	**English**	6	3	25+75=100												**U24PE41**	**New**
	Core 4	Electromagnetism	4	4	25+75=100				✔					✔			**U24PHC41**	**Mark Change**
	Core Lab	**LAB**: General Physics II	2	2	40+60=100				✔					✔	✔	✔	U22PHCP41	No Change
	Allied	**Ancillary Mathematics-III Statistics, Groups and Fourier Series**	6	4	25+75=100												**U24MAAX41**	**New**

Allied	**General Chemistry-II**	4	4	25+75=100													**U24CHAX21**	**Revised 5%**
Allied	**LAB**: Volumetric Analysis	2	2	40+60=100													U23CHAXP21	No Change
SLC	**Environmental Science**	--	2				✔			✔						**U24ES41**	**New**
	Total	**30**	**24**															

Year	Part	Subject	Credit	Int=Total	Code
I & II	Part V	NSS/ NCC/ Physical Education – Sports/YRC/RRC	3	100=100	U24NS4/ U24NC4/ U24PS4/ U24YR4/ U24RR4

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I Year
I Semester - TANSCHE

Part	List of Courses	Credit	No. of Hours
Part-1	Tamil Paper - I	3	6
Part-2	English Paper - I	3	4
Part-3	Core Course 1– PropertiesofMatter&Sound	4	5
Part-3	Core Lab 1 – General Physics Practical I	3	3
Part-3	Allied Mathematics - I	4	6
Part-4	Skill Enhancement Course SEC-1 (NME) Physics For Everyday Life	2	2
	Foundation Course - Introductory Physics	2	2
	Ability Enhancement Compulsory Course (AECC) Soft Skill-1	2	2
	Total	23	30

II Semester

Part	List of Courses	Credit	No. of Hours
Part-1	Tamil Paper – II	3	6
Part-2	English Paper - II	3	6
Part-3	Core Course 2– Mechanics	3	3
Part-3	Core Course 3– Heat and Thermodynamics	4	4
Part-3	Core Lab 2 – General Physics Practical II	3	3
Part-3	Allied Mathematics - II	3	6
Part-4	Skill Enhancement Course SEC-1 (NME) - Astrophysics	2	2
		21	30

III Year

Sem	Subject	Hrs	Credit	Int. + Ext. = Total	Subject Code
V	Core 6 - Analog Electronics	4	4		
	Core 7 - Physical Optics & Spectroscopy	4	4		
	SBS 3 - Electrical Wiring	2	2		
	SBS 4 - Physics of Human Anatomy	2	2		
	Core (Major) Lab 3 – General Physics	3	-		
	Core (Major) Lab 4 – Electronics	3	-		
	Core (Major) - Project & Area Study	2	-		
	Ancillary Chemistry III	4	4		
	Ancillary Chemistry Lab	2	2		
	Employability Skills	2	2		
	Total	30	20		

Sem	Subject	Hrs	Credit	Int. + Ext. = Total	Subject Code
VI	Core 8 - Atomic & Nuclear Physics	4	4		
	Core 9 - Digital Electronics	4	4		
	Core 10 - Classical & Statistical Mechanics	4	4		
	SBS 6 - Biomedical Instrumentation	2	2		
	Core (Major) Lab 3 – General Physics	3	3		
	Core (Major) Lab 4 – Electronics	3	3		
	Core (Major) - Project & Area Study	2	5		
	Ancillary Chemistry IV	4	4		
	Ancillary Chemistry Lab	2	2		
	Total	30	31		

SEMESTER - III

SEMESTER : III	ELECTROSTATICS AND CURRENT ELECTRICITY CORE PAPER	Hours : 4 Credit : 4

Subject Code: U24PHC31

Course Outcomes:

- To understand the fundamentals electrostatic parameters Electric Field, Gauss's law and its application Electric Dipole.
- To study about Electric Potential, Capacitances different types Capacitor and Energy Stored in Capacitor.
- To learn about Ohm's law, Kirchhoff's Laws and its applications.
- To impart knowledge about Thermoelectricity, Chemical Effect of Current and different types of Cells.
- To study the Theory of Dielectric, Applications of Laplace's equation and experimental method to find dielectric constants.

UNIT – I   **12 Hours**

Basic Concepts – Coulomb's law – Superposition Principle – Electric Field – Electric Field due to a Point Charge – Electric Dipole – Potential Energy of a Dipole in Uniform Electric Field - Lines of Force. Flux of the Electric Field – Gauss's Law (with proof) – Differential form of Gauss Law – Application of Gauss's Law – An Insulated Conductor – Electric Field due to a Uniformly Charged Sphere – Electric field due to an isolated uniformly charged Conducting Sphere.

UNIT – II   **12 Hours**

Potential Difference – Electric Potential as line Integral of Electric Field – Potential at a point due to a Point Charge – Relation between Electric Field and Electric Potential – Potential at a point due to a uniformly charged Conducting Sphere – Potential due to a uniformly charged non conducting solid sphere. Capacitors: Introduction – Capacitance of a Spherical Capacitor (outer sphere earthed) - Capacitance of a Spherical Capacitor (inner sphere earthed) - Capacitance of a Cylindrical Capacitor – capacitance of a Parallel plate capacitor – Effect of a Dielectric - capacitance of a Parallel plate capacitor partly filled with a Dielectric Slab – Capacitors in Series and Parallel – Energy stored in a charged capacitor – Loss of energy on sharing of charges between two capacitors.

UNIT – III   **12 Hours**

Theory of Dielectrics: Introduction – Relation between Polarisation Vector and Density of Polarisation Charge – Gauss's Law in Dielectrics – Electric Displacement D – Electric Susceptibility – Dielectric in an Electric Field – Uniqueness theorem regarding electric potential – Applications of Laplace's Equation – Dielectric Sphere in a Uniform Field – Dielectric Constant of a solid- Hopkinson's Null Method.

UNIT – IV   **12 Hours**

Current and Current density – Expression for current density – Equation of Continuity – Ohm's law and Electrical Conductivity – Kirchhoff's laws – Wheatstone's network and sensitiveness - Carey Foster Bridge – Potentiometer- Meacurement of low resistance: Kelvin double bridge method- Comparison of Capacitances of Two Capacitors – capacitance of a capacitor (Kelvin's Null Method).

UNIT – V   **12 Hours**

Seebeck effect – Laws of thermo e.m.f – Measurement of thermo EMF using potentiometer- Peltier Effect– Thomson Effect – Thermodynamics of Thermocouple – Thermo-Electric Diagrams – Uses of Thermo Electric Diagrams. Chemical Effect of Electric Current: Introduction – Electrical Conductivity of an Electrolyte – Determination of Specific Conductivity of Electrolytes (Kohlrausch Bridge) – Arrhenius theory of Electrolyte Dissociation – Secondary Cells – Standard Cells – Gibbs-Helmholtz Equation for the emf of a Reversible Cell – Calculation of emf of Daniel Cell

Text Book:

* R.Murugeshan. *Electricity and Magnetism*. New Delhi: S.Chand& Company Pvt. Ltd; Reprint 2015. VII Edition.

> UNIT - I: 1.1-1.7, 1.11, 2.1- 2.6
> UNIT - II: 3.1-3.6, 4.1 – 4.9, 4.11.
> UNIT - III: 17.1 – 17.5, 17.8 – 17.10, 17.14
> UNIT - IV: 6.1 – 6.4, 6.6, 7.1 – 7.5
> UNIT - V: 8.1- 8.8, 9.1 – 9.8

Reference Books:

1. D. Halliday, Resnick and J. Walker. *Fundamentals of Physics*, New York: Wiley; 2010. 6th Edition.
2. K.K. Tewari. *Electricity and Magnetism*. New Delhi: S. Chand & Co Ltd; 1996.

ANCILLARY MATHEMATICS

Ancillary Mathematics III – Differential Equations and Laplace Transforms

Contact Hours per Semester: 90Hrs   **Subject Code: U24MAAX31**

Contact Hours per week: 6 Hrs   **Credit: 4**

Objectives:

* To enable the students to know the methods of solving differential equations and Partial differential equations

* To understand the Laplace transform, inverse Laplace transform and its applications.

Course Outcomes:

On completing this course, Students can/are

Cos	CO Statements
CO1:	Solve the first order linear differential equations of different types
CO2:	Derive the complementary function and particular integral of higher order linear equations
CO3:	Get skills in the concept of Laplace transform of a function f(x)
CO4:	Capable of finding the inverse Laplace transform and solve the differential equations using the transforms

CO5:	Understand the formation and solve the problems on first order partial differential equations

Unit I: (15 Hours)

Differential Equations of First Order: Differential equations- Equations of first order and first degree (Type A, Type B, Type C) –Exact differential equations – Integrating factors - Linear equations.
  Chapter I: Sections: 1.1, 1.2, 1.3, 1.4,1.5

Unit II: (15 Hours)
Linear Equations of Higher Order: Introduction - Linear equations with constants coefficients–Methods of finding complementary functions - Methods of finding particular integrals.
  Chapter II: Sections: 2.0, 2.1, 2.2, 2.3.

Unit III: (15 Hours)
Laplace Transform- Introduction **-** Laplace transform - **The Inverse Laplace Transforms –** Inverse Laplace transforms– Solution of differential equations using Laplace transform.

Unit IV: (15Hours)
Partial Differential Equations: Introduction - Formation of partial differential equations - First order partial differential equations-Methods of solving first order partial differential equations.
  Chapter IV: Sections: 4.0,4.1, 4.2, 4.3.

Unit V: (15 Hours)
Partial Differential Equations: Some standard forms (Types 1 to 4) – Charpit's method
  Chapter IV: Sections: 4.4, 4.5.

Text Book:
 1. S.Arumugam, Issac, Allied Mathematics, Paper III MKU, June 2012, New Gamma Publishing House, Palayamkottai.

Reference Books:
 1. S. Narayanan and T.K. Manicavachagom Pillay, Differential Equations and its Applications, Reprint October 2014, S.Viswanathan (Printers & Publishers) Pvt Ltd.,

 2. S. Arumugam, A. Thangapandi Isacc, A.Somasundaram, Differential Equations and Applications, Yes Dee Publishing Pvt Ltd.

Part III – Allied Subject – General Chemistry-I

Hours per week: 4   **Subject Code: U24CHAX11**   **Credits: 4**

Course Outcome:
CO1: To get a knowledge on organic chemistry
CO2: To understand the basic concepts of detection and estimation of elements
CO3: To know the details about periodic table and its periodic properties.
CO4: To learn Chemical equilibrium and its importance, and the basic concepts of acids and bases
CO5: To acquire knowledge on petroleum and fertilizers

Unit I: Basic concepts of organic chemistry   **12 Hours**
        Organic compounds – general properties and classification of organic compounds – functional groups – homologous series. IUPAC Nomenclature for simple acyclic compounds (Aliphatic compounds). Isomerism – types of structural isomers and stereoisomerism – R-S configuration of one asymmetric carbon and cis-trans isomerism with examples.

Unit II: Detection and estimation of elements   **12 Hours**
        Detection of nitrogen, halogens and sulphur – Estimation of carbon and hydrogen by Liebig's combustion method – estimation of nitrogen by Dumas method – estimation of halogens by Carius method.Determination of empirical and molecular formula – structural formula.Types of reactions – addition, elimination and substitution reactions.

Unit III: Periodic table, periodic properties and Hydrogen   **12 Hours**
Periodic table
        Long form of the periodic table – general characteristics of groups and periods – classification of elements on the basis of electronic configuration.
Periodic properties
        Atomic and ionic radii – electron affinity – ionization energy – electronegativity.
Hydrogen
        Isotopes of hydrogen – preparation, properties and uses of Deuterium-ortho and para hydrogen.

Unit IV: Chemical equilibrium and Ionic equilibrium   **12 Hours**
        Characteristic of Chemical equilibrium– Reversible reaction – Equilibrium law - Equilibrium constant- Equilibrium constant in terms of partial pressures- Kc and Kp relationship – Le Chatelier's principle-Synthesis of Ammonia by Haber process.
        Acids, bases and salts – pH – Buffer solution – Henderson equation and its significance. Electrolyte: Classification and example – Ostwald's dilution law.

Unit V: Petroleum and fertilizers   **12 Hours**
Petroleum: Refining– composition and uses of petroleum fractions - thermal and catalytic cracking – Rating of fuels- octane number, cetane number - antiknock agents- unleaded petroleum – synthetic petrol.
Fertilizers: Role of micro and macro nutrients in plant growth - important manures – manufacture of urea - super phosphate - ammonium fertilizers, mixed fertilizers and biofertilizers.

Reference books
Unit- I & II
1. B.S.Bahl and ArunBahl, Advanced Organic Chemistry, S.Chand& Co., Ltd., 2008.
2. M.K.Jain and S.C Sharama., Modern Organic Chemistry, Vishal publishing Co.., 2016

Unit – III
1.R.D.Madan, SatyaPrakash's Modern Inorganic Chemistry, S.Chand& Co., Ltd., 2008.
2. P.L.Soni and Mohan Katiyal, Textbook of Inorganic Chemistry, Sultan Chand & Sons, 2008.

Unit – IV
1. B.R.Puri, L.R.Sharma and S.Pathania, Principles of Physical Chemistry, Vishal Publishing Co., 2004.
2. ArunBahl ,B.S. Bahl and G.D.TuliEssntials of Physical Chemistry, S.Chand& Co., Ltd., 2008.

Unit – V
1. K.S.Tewari, N.K.Vishnoi and S.N.Mehrota, A Text book of Organic Chemistry, 2nd revised edition, Vikas publishing house PVT LTD, New Delhi, 2005.
2. B.N. Chakrabarty Industrial Chemistry Oxford & IBH Oxford & IBH Publishing Company& Co, 1981.

SEMESTER - IV
CORE PAPER – ELECTROMAGNETISM

Hours : 4
Subject Code: U24PHC41   **Credit : 4**

Objectives:
- To study about laws of induction and methods to find self and mutual inductance of coils.
- To study about the nature of transient currents in LR and CR circuits.
- To learn about the current variation in series and parallel resonance circuits and AC Bridges.
- To learn about the properties of magnetic materials.
- To impart knowledge about importance of Maxwell's equations in electromagnetism.

UNIT - I: **12 Hours**
        Electromagnetic Induction: Faraday's law of Electromagnetic Induction – Faraday's law of Electromagnetic Induction in Vector form – Self-induction – Self-inductance of a long Solenoid – Determination of Self-inductance by Rayleigh's Method – Determination of Self-inductance by Anderson's Bridge Method – Mutual Induction – Mutual inductance between two Coaxial Solenoids – Experimental determination of Mutual Inductance – Coefficient of Coupling – Eddy Currents – Energy stored in magnetic field.

UNIT - II: **12 Hours**
        Transient currents: Growth of Current in a circuit containing a Resistance and Inductance – Decay of Current in a circuit containing L and R – Charge and Discharge of a Capacitor through a Resistor – Measurement of high resistance by leakage – Growth of Charge in a circuit with Inductance, Capacitance and Resistance – Decay of Charge in LCR circuit.

UNIT - III: **12 Hours**

      Alternating current: EMF induced in a Coil rotating in a magnetic field – Series Resonance Circuit – Parallel Resonance Circuit – Power in ac Circuit containing L, C &R – Wattless Current – Choke Coil –Skin Effect – A.C bridges introduction – Maxwell's Bridge – Owen's Bridge – De Sauty's Bridge – Wien's Bridge.

UNIT - IV: **12 Hours**

      Magnetic Properties of Materials: Magnetic Induction, Magnetization – Relation between the three magnetic vectors B, H and M – Magnetic Susceptibility – Magnetic Permeability – Properties of Dia, Para and Ferro Magnetic Materials – Anti-ferromagnetism and Ferrimagnetism – The Electron Theory of Magnetism – Langevin's Theory of Diamagnetism and Paramagnetism – Weiss's Theory of Ferromagnetism – Experimental to draw M-H curve (Horizontal model) – Experiment to draw B-H curve (Ballistic method) – Energy loss due to hysteresis – The importance of hysteresis curves.

UNIT - V: **12 Hours**

      Maxwell's Equations and Electromagnetic Waves: Introduction – Displacement current – Maxwell's equations in material media – Plane Electromagnetic waves in free space – Poynting Vector – Derivation of Maxwell's Equations – Physical Significance of Maxwell's Equations – Plane of Electromagnetic waves through Conducting media.

Text Book:

R.Murugeshan. *Electricity and Magnetism*. New Delhi: S.Chand& Company Pvt. Ltd; Reprint 2015. VII Edition

      Unit – I   : 11.1 - 11.10, 11.16 and 21.7
      Unit - II   : 12.1 - 12.6
      Unit - III   : 13.1 - 13.6, 13.8 and 19.1 - 19.5
      Unit - IV   : 15.1 - 15.17
      Unit - V   : 16.1 - 16.6, 37.1, 37.2 and 37.5

Reference Books:

1. N.K.Sehgal, K.L.Chopra and D.L.Sehgal. *Electricity and Electromagnetism*. New Delhi: Sultan Chand and Sons; 2009.
2. BrijLal& N. Subramaniyam. *Electricity and Magnetism*. New Delhi: S. Chand & Co. Pvt. Ltd; Revised Edition 2007.
3. K.K.Tiwari. *Electricity and Magnetism.* New Delhi: S.Chand& Co Pvt. Ltd; 2006. Revised Edition

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LAB: GENERAL PHYSICS II

Hour : 2
Subject Code : U22PHCP41   **Credit: 2**

1. Determination of number of lines per meter of the grating (N) and wavelength of prominent lines of the mercury spectrum (λ) using Spectrometer.
2. Determination of refractive index of the prism by i-d curve method using Spectrometer.
3. Determination of dispersive power of a prism using Spectrometer
4. Comparison of Capacitances of Capacitors using De Sauty's Bridge.
5. Comparison of Capacitances of Capacitors using Owen's Bridge.

6. Determination of Self inductance of the coil using Anderson's Bridge.
7. Determination of Thickness of hair using Air wedge
8. Determination of Radius of curvature of convex lens using Newton's rings.
9. Comparison of Capacitances of Capacitors using Spot galvanometer.
10. Comparison of Charge sensitiveness using Spot galvanometer.
11. Comparison of EMF's using Spot galvanometer.
12. Comparison of EMF's using Potentiometer.
13. Determination of Figure of merit using Table Galvanometer.
14. Determination of M and B_H using Tan C method.
15. Determination of M and B_H using Axial method.

Ancillary Mathematics IV – STATISTICS, GROUPS AND FOURIER SERIES

Contact Hours per Semester: 90 Hrs   Subject Code: **U24MAAX41**
Contact Hours per Week: 6 Hrs   Credit: 4

Objectives:
*   To know the statistical methods
*   To introduce the abstract systems and Fourier series

Course Outcomes:
 On completing this course, Students can/are

Cos	CO Statements
CO1:	To apply the knowledge of statistics to find the relation between the variables involved in a data set.
CO2:	To understand the use of index number in the real life problems.
CO3:	Able to find the missing terms in a pattern of sequence of numbers or data value.
CO4:	Able to demonstrate the application of abstract structures in real life problems.
CO5:	Understand the use of Fourier series to the real life problems.

Unit I: Correlation and Regression: Definition of Correlation, Usefulness, Types of correlation – Coefficient of correlation: Karl Pearson's coefficient of correlation (excluding grouped bi-variate data) – Rank correlation coefficient: Spearman's rank correlation coefficient, merits and demerits of Rank correlation. Regression: Definition – Use of Regression analysis - Significance of regression study - difference between correlation and regression - Regression equations: Regression equation of X on Y and Regression equation of Y on X (excluding regression equation in a bi-variate grouped distribution) .
Text Book 1 - Chapter 12: Pages: 363, 364, 365, 366, 369-380,389-393, 431-434, 437-440, 445-449..

Unit II: Index Numbers: Definition – Characteristics of index numbers – Uses – Types of index numbers – Weighted Index number – Weighted average of Price relative – Quantity Index number – Consumer Price Index number.

Text Book 1 - Chapter 14: Pages: 487-491, 498-505, 519-528 and appropriate miscellaneous illustrative problems.

Unit III: Interpolation and Extrapolation: Meaning – Uses – Assumptions - Method of Interpolation: Algebraic method (1. Binomial Expansion method, Interpolating two or more missing values, 2. Newton's method of advancing Differences, 3. Newton-Gauss forward method, 4. Newton-Gauss backward method and 7. Lagrange's method).
Text Book 1 - Chapter: 16 - Pages: 611 – 627, 630 – 633 and appropriate miscellaneous illustrative problems.

Unit IV: Groups: Introduction – Definition and Examples - Elementary properties of a group – Permutation groups - Subgroups - Cyclic groups.
Text Book 2 - Chapter 3: Sections: 3.0, 3.1, 3.2, 3.4, 3.5, 3.6.

Unit V: Fourier Series: Fourier series – Cosine and Sine series – Half range Fourier Sine series – Half range Fourier Cosine series.
Text Book 3 - Chapter 6: Full

Text Books:
1. R.S.N. Pillai and V. Bagavathi, Statistics, Seventeenth Edition (Reprints 2005), S. Chand & Company Ltd, India.
2. S. Arumugam and A. Thangapandi Isaac, Modern Algebra, Reprint July 2008, Scitech Publications (India) Pvt Ltd, Chennai.
3. S. Arumugam and A. Thangapandi Isaac, Sequences and Series and Fourier Series, August 2006, New Gamma Publishing House, Palayamkottai.

Reference Books:
1. Arumugam, Isaac, Statistics, New Gamma Publishing House, Palayamkottai.
   Arumugam, Issac, Ancillary Mathematics, Paper III, August 2006, New Gamma Publishing House, Palayamkottai.

Allied – General Chemistry-II

Hours per week: 4   **Subject Code: U24CHAX21**
                                                                                        Credits: 4
Course Outcome:
CO1: To learn the basics of gaseous state
CO2: To search out an idea on colloids.
CO3: To get adequate knowledge on nuclear chemistry
CO4: To study fundamental ideas on organic chemistry
CO5: To know the ideas about the polymer and its applications.

Unit I: Gaseous state   **12 Hours**
        Postulates of kinetic theory of gases – derivation of expression for pressure of an ideal gas on the basis of kinetic theory – deducing the basic gas laws. Deviation of real gases from

ideal behavior – reasons for deviation. Derivation of van der Waals gas equation – explanation of behavior of real gases on the basis of van der Waals gas equation.Liquefaction of gases –Joule-Thomson effect – inversion temperature.

Unit II: Colloids   12 Hours

Colloidal state of matter – various types – classification.Sols – dialysis – electro osmosis-electrophorosis – stability of colloids – protective action – Hardy Schulze law – gold number.
Emulsion: types of emulsion – emulsifier.
Gels : Classification, preparation – application of colloids.

Unit III: Nuclear Chemistry   12 Hours

Composition of the nucleus – Nuclear forces – mass defect – binding energy – Nuclear stability – Soddy's displacement law – law of radioactive disintegration.Nuclear fission – fusion –theory – application – principle of atom bomb and hydrogen bomb. Application of radioactive isotopes – medicinal field – agriculture – industry – analytical field – carbon dating.

Unit IV: Basic concepts of organic chemistry   12 Hours

Nature of valency of carbon in organic compounds – tetrahedral arrangement of carbon – bond breaking and bond forming in organic reaction – homolytic and heterolytic cleavage – reaction intermediates – formation, stability and reactions of carbocation, carbanion and free radicals. Electrophiles and nucleophiles – definition and examples.Hybridization – definition – sp, sp^2 and sp^3 with examples.

Unit V: Polymers   12 Hours

Polymers – general characteristics – plastics, elastomers, and fibres – thermoplastics and thermosetting plastics - methods of polymerization – bulk, suspension and solution polymerization. Uses of polycarbonates, polyurethanes, epoxy resins and teflons.

Reference Books
1. B.R.Puri, L.R.Sharma and S.Pathania, Principles of Physical Chemistry, Vishal Publishing Co., 2004.
2. P.L.Soni and Mohan Katiyal, Textbook of Inorganic Chemistry, Sultan Chand & Sons, 2008.
3. P.L.Soni, Textbook of Organic Chemistry, Sultan Chand & Sons, 2008.
4. B.S.Bahl and ArunBahl, Advanced Organic Chemistry, S.Chand& Co., Ltd., 2008.

Allied - LAB: Volumetric Analysis

Hours per week: 2   **Subject Code: U23CHAXP21**
                                                   Credits: 2

(Exam to be conducted at the end of even Semester)

Course Outcome:
CO1: To acquire the basic principles of volumetric titration,
CO2: To understand the basic knowledge on standard solution, molar and the indicator
CO3: To get the knowledge on the titration between acidimetry and alkalimetry
CO4: To develop the basic knowledge on permanganometry
CO5: To know the fundamental knowledge on iodometry

A double titration involving making up of the solution to be estimated or single titrationinvolving making up of the solution to be estimated and the preparation of standard solution.

(a) Acidimetry and alkalimetry

1. Titration between a strong acid and strong base.
2. Titration between a strong acid and weak base.
3. Titration between a weak acid and strong base.

(b) Permanganimetry

1. Titrations between potassium permanganate and oxalic acid, ferrous sulphate and ferrous ammonium sulphate.

(c) Iodometry

1. Titrations between sodium thiosulphate with potassium permanganate and potassium dichromate (demonstration only)