GRADUATE ATTRIBUTES

1. **(KB) A knowledge base for Science**: Demonstrate competence in university level mathematics & natural science knowledge appropriate to the program.

2. **(PA) Problem analysis**: An ability to use appropriate knowledge and skills to identify, formulate, analyze, and solve complex problems in order to reach substantiated conclusions

3. **(Inv.) Investigation**: An ability to conduct investigations of complex problems by methods that include appropriate experiments, analysis and interpretation of data and synthesis of information in order to reach valid conclusions.

4. **(Des.) Design:** An ability to design solutions for complex, open–ended problems and to design systems, components or processes that meet specified needs with appropriate attention to health and safety risks, applicable standards, and economic, environmental, cultural and societal considerations.

5. **(Tools) Use of instruments:** An ability to create, select, apply, adapt, and extend appropriate techniques, resources, and modern instruments to a range of activities, from simple to complex, with an understanding of the associated limitations.

6. **(Team) Individual and teamwork**: An ability to work effectively as a member and leader in teams, preferably in a multi–disciplinary setting.

7. **(Impacts) Impact of Science on society and the environment**: An ability to analyze social and environmental aspects of science activities. Such ability includes an understanding of the interactions that science has with the economic, social, health, safety, legal, and cultural aspects of society, the uncertainties in the prediction of such interactions; and the concepts of sustainable design and development and environmental stewardship.

8. **(LL) Life–long learning**: An ability to identify and to address their own educational needs in a changing world in ways sufficient to maintain their competence and to allow them to contribute to the advancement of knowledge

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

The objectives of the **B.Sc. Chemistry programme** is to prepare/equip the students to

PEO 1	encourage the advancement of chemistry in all of its branches through education, research and service opportunities.
PEO2	provide students with community need based research and outreach opportunities.
PEO 3	strive for an ideal balance between creation and knowledge dissemination in the chemical sciences.
PEO 4	train our students to succeed in competitive examinations.
PEO 5	develop life–long learning skills and abilities.

UNDERGRADUATE (UG) PROGRAMME OUTCOMES (POs)

Undergraduate (B.A., **B.Sc.,** B.Com., B.C.A., B.B.A., etc.,) is a 3–year degree programme with 6 semesters consisting the following Programme Outcomes (POs) under various criteria including critical thinking, problem solving, effective communication, societal/ citizenship/ ethical credibility, sustainable growth and employable abilities.

PO 1	**Critical Thinking**: Intellectual exploration of knowledge towards actions in clear and rational manner by understanding the logical connections between ideas and decisions.
PO 2	**Problem Solving**: Understanding the task/ problem followed by planning and narrow execution strategy that effectively provides the solution.
PO 3	**Effective Communication**: Knowledge dissemination by oral and verbal mechanisms to the various components of our society.
PO 4	**Societal/ Citizenship/ Ethical Credibility**: Realization of various value systems/ moral dimensions and demonstrate the empathetic social concern as well as equity in all the decisions, executions and actions.
PO 5	**Environmental Concern and Sustainable Growth**: Understanding the emerging environmental challenges and provide the possible contribution in sustainable development that integrates environment, economy and employment.
PO 6	**Skill Development and Employable Abilities**: Adequate training in relevant skill sector and creating employable abilities among the under graduates.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

On completion of **B.Sc. Chemistry Programme**, the students are expected to

PSO 1	get a firm foundation in the fundamentals and applications of chemical and scientific theories including environmental and biological aspects in Chemistry.
PSO 2	make use of experiments by demonstration with the help of analytical instruments and analyze the outcomes.
PSO 3	develop skills in problem solving, critical thinking and analytical reasoning as applied to chemistry related problems.
PSO 4	find the solution for the ethical, historic, philosophical, economical and environmental dimensions of problems and issues facing chemists.
PSO 5	pursue post graduate program in higher educational institutions and also to get suitable employment opportunities in industries and academic institutions.

SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

B.Sc. CHEMISTRY – SYLLABUS

(Under CBCS based on OBE)(with effect from 2021 – 2022)

B.Sc. CHEMISTRY – II YEAR – COURSE STRUCTURE – III SEMESTER

S. No	Subject Code	Subject Title	Hrs./ Week	Exam (Hrs.)	CA	SE	Total	Credits
1.	21UACT31	**Part – I:Tamil** – காப்பியமும் நாடகமும்	6	3	25	75	100	3
	21UACH31	**Hindi** – Hindi – III						
	21UACS31	**Sanskrit** – Sanskrit – III						
2.	21UACE31	**Part – II: English** – English For Enrichment – III	6	3	25	75	100	3
3.	21UCYC31	**Part – III: Core – 6:** Organic Chemistry – I	5	3	25	75	100	5
4.	21UCYCP2	**Part – III: Core – 7: Practical:** Inorganic Qualitative Analysis*	3	–	–	–	–	–
5.	21UPSA31	**Part – III: Allied 2 – 1 T:** Properties of Matter, Thermal Physics, And Optics	4	3	25	75	100	4
6.	21UPSAP2	**Part – III: Allied 2 – 2 P:** Allied Practical –II*	2	–	–	–	–	–
7.	21UCYS31	**Part – IV: SBS – 1:** Laboratory Techniques	2	3	25	75	100	2
8.	21UCYN31	**Part – IV: NME– 1 :** Chemistry For Human Welfare – I	2	3	25	75	100	2
		TOTAL	**30**				**600**	**19**

*** Practical examination conducted at the end of the even semester**

COURSE STRUCTURE – IV SEMESTER

S. No.	Sub. Code	Subject Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.	21UACT41	**Part – I: Tamil** – சங்க இலக்கியமும் அற இலக்கியமும்	6	3	25	75	100	3
	21UACH41	**Hindi** – Hindi – IV						
	21UACS41	**Sanskrit** – Sanskrit – IV						
2.	21UACE41	**Part – II: English** – English For Enrichment – IV	6	3	25	75	100	3
3.	21UCYC41	**Part – III: Core – 8:** Inorganic Chemistry – II	5	3	25	75	100	5
4.	21UCYCP2	**Part – III: Core – 7: Practical:** Inorganic Qualitative Analysis	3	3	40	60	100	2
5.	21UPSA41/ 21UPSA21	**Part – III: Allied 2 – 3 T:** Electricity, Electronics, Atomic And Nuclear Physics	4	3	25	75	100	4
6.	21UPSAP2	**Part – III: Allied 2 – 2 P:** Allied Practical – II	2	3	40	60	100	2
7.	21UCYS41	**Part – IV: SBS – 2:** Dairy Chemistry	2	3	25	75	100	2
8.	21UCYN41	**Part – IV: NME – 2:** Chemistry For Human Welfare –II	2	3	25	75	100	2
9.		**Part –V:** Extension Activities	–	–	–	–	100	1
		TOTAL	**30**				**900**	**24**

Passed in the BOS Meeting held on 19/03/2022 **Signature of the Chairman**

COURSE STRUCTURE – III SEMESTER

S. No.	Subject Code	Subject Title	Hrs./ Week	Exam (Hrs.)	CA	SE	Total	Credits
1.	21UACT31	**Part – I: Tamil** – காப்பியமும் நாடகமும்	6	3	25	75	100	3
	21UACH31	**Hindi** – Hindi – III						
	21UACS31	**Sanskrit** – Sanskrit – III						
2.	21UACE31	**Part – II: English** – English For Enrichment – III	6	3	25	75	100	3
3.	21UCYC31	**Part – III: Core – 6:** Organic Chemistry – I	5	3	25	75	100	5
4.	21UCYCP2	**Part – III: Core – 7: Practical:** Inorganic Qualitative Analysis*	3	–	–	–	–	–
5.	21UPSA31	**Part – III: Allied 2 – 1 T:** Properties of Matter, Thermal Physics, And Optics	4	3	25	75	100	4
6.	21UPSAP2	**Part – III: Allied 2 – 2 P:** Allied Practical –II*	2	–	–	–	–	–
7.	21UCYS31	**Part – IV: SBS – 1:** Laboratory Techniques	2	3	25	75	100	2
8.	21UCYN31	**Part – IV: NME– 1 :** Chemistry For Human Welfare – I	2	3	25	75	100	2
		TOTAL	**30**				**600**	**19**

*** Practical examination conducted at the end of the even semester**

CA – Class Assessment (Internal)

SE – Summative Examination

SBS – Skill Based Subject

NME – Non –Major Elective

T – Theory

P – Practical

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCYC31	ORGANIC CHEMISTRY – I	CORE – 6	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	III	25	75	100

NATURE OF COURSE	Employability	Skill Oriented	Entrepreneurship
	✓	✓	

COURSE DESCRIPTION:

This course imparts detailed knowledge in aliphatic saturated, unsaturated hydrocarbons and aromatic hydrocarbon. It also helps to know the synthesis and characteristics of organo halogen, organohydroxy compounds.

COURSE OBJECTIVES:

- To make the students study about the synthesis and general characteristics of alkanes and cycloalkanes.
- To make them gain information about the alkenes, alkadienes and alkynes.
- To make them study the basic concepts and rules involve in aromatic compounds.
- To help them understand the general preparation, properties and uses of alkyl halides, aryl halides and aralkyl halides.
- To give the knowledge about synthesis and characteristics of alcohols, phenols and aromatic alcohols.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	explain the chemistry of alkanes, cycloalkanes and conformations of cycloalkanes	Upto K3
CO 2	spell the chemistry of alkenes, alkadienes, alkynes	Upto K3
CO 3	apply the rules of aromatic compounds	Upto K3
CO 4	explain the preparation and chemical properties of aliphatic and aromatic halogen compounds	Upto K3
CO 5	comprehend the preparation and properties of alcohols, phenols and benzyl alcohol	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY

ORGANIC CHEMISTRY – I

UNIT – I: Aliphatic Saturated hydrocarbons (15 hrs.)

a) **Alkanes:** Preparation by Sabatier–Senderen, Wurtz, Corey–House, Kolbe, Duma and reduction methods – general properties.

b) **Cycloalkanes**: Preparation by Freund, Perkin, Wislicenus, Dieckmann, Thorpe–Zeigler and Diels –Alder methods – general properties – stability – Baeyer's strain theory – its modification.

c) **Conformation**: Definition – conformational analysis of ethane, n–butane, cyclohexane and 1, 2 – dimethyl cyclohexane (Analytical problems are not required).

UNIT – II: Aliphatic Unsaturated hydrocarbons (15 hrs.)

a) **Alkenes**: General methods of preparation – general properties – regioselectivity in addition reactions. Markovinikov rule and Kharasch effect.

b) **Alkadienes**: Classification – general methods of preparation and properties of 1,3–butadiene, isoprene and chloroprene.

c) **Alkynes**: General methods of preparation – properties – acidic character of acetylene.

UNIT – III: Aromatic compounds (15 hrs.)

a) **Introduction** – sources – characteristics. Benzene – structure – Kekule and Molecular orbital models. Aromaticity – Huckel's rule : statement – applications.

b) **Aromatic electrophilic substitution reactions** – mechanisms, orientation effect and reactivity – Disubstitution: directive influence of substituents – Trisubstitution: rules and steric hindrance.

c) **Aromatic nucleophilic substitution** – unimolecular, bimolecular and benzyne mechanisms.

UNIT – IV: Organo halogen compounds (15 hrs.)

a) **Alkyl halides**: General methods of preparation – general properties – mechanisms of nucleophilic substitution reactions – proof of S_N^1 and S_N^2 mechanisms – mechanisms of elimination reactions – substitution versus elimination. Fluorocarbons: Westron and Freon – preparation and uses.

b) **Aryl halides**: Preparation by halogenation, Sandmeyer and Hunsdiecker reactions – general properties – halogenated insecticides: preparation, uses of BHC and DDT.

c) **Aralkylhalides**: Benzyl chloride – preparation and properties – comparison between aryl halides and aralkyl halides.

UNIT – V: Organohydroxy compounds (15 hrs.)

a) **Alcohols**: Preparation from alkenes by hydration, hydroboration–oxidation and oxymercuration – demercuration methods – general properties. Ethylene glycols: preparation, properties and uses – Glycerol: preparation, properties and uses.

b) **Phenols**: General methods of preparation – properties (acidity, electrophilic substitution reactions and oxidation) – effect of substituents on the acidity of phenol.

c) **Aromatic alcohol**: Benzyl alcohol – preparation and properties – comparison with phenols.

TEXT BOOKS:

1. *A Text book of Organic chemistry* by K.S. Tewari and N. K. Vishnoi, 4th Edn. Vikas Publishing House Pvt. Ltd. (2017).
2. *Text Book of Organic Chemistry* by P. L. Soni and H. M. Chawla, Sultan Chand & sons
   29th Edn. (2012).

REFERENCE BOOKS:

1. *Organic Chemistry* R. T. Morrison, R. N. Boyd and S. K. Bhattacharjee, 7th Edn. (2016).
2. *Modern Organic Chemistry* by M. K. Jain and S. C. Sharma, Vishal Publishing co. Golden Jubilee Edn. (2020).
3. *Advanced Organic Chemistry* by Arun Bahl and B. S. Bahl, S. Chand Publishing (2017).

DIGITAL TOOLS:

1. **https://www.britannica.com/science/aliphatic–compound**
2. **https://byjus.com/chemistry/aliphatic–hydrocarbons/**
3. **https://www.sciencedirect.com/topics/chemical–engineering/aromatic–compound**
4. **https://www.youtube.com/watch?v=MBcGuX8bsxw (IIT Kharagpur)**
5. **https://www.youtube.com/watch?v=cgGcPV27dcU**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	1	2	1	3
CO2	3	2	1	2	3
CO3	3	1	1	2	3
CO4	2	1	3	1	3
CO5	2	1	1	1	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. V. SATHIYENDIRAN

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCYCP2	INORGANIC QUALITATIVE ANALYSIS	CORE – 7 PRACTICAL	–	3	–

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	III	–	–	–

NATURE OF COURSE	Employability	Skill Oriented	Entrepreneurship
	✓	✓	

COURSE DESCRIPTION:

This course updates skill of students from the theoretical knowledge of semi–micro qualitative analysis to practical knowledge.

COURSE OBJECTIVES:

- To practise the complete analysis of inorganic salt mixtures with its principles.
- Analysis of salt mixture containing two anions of which one is an interfering ion and two cations by semi–micro method.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	analyze the acid radicals present in any given inorganic salt mixture	Upto K3
CO 2	eliminate the interfering acid radicals	Upto K3
CO 3	identify the basic radicals and its groups in the mixture of salt.	Upto K3
CO 4	analyze the basic radical systematically	Upto K3
CO 5	develop their qualitative analytical skill of any given inorganic salt mixtures	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY

INORGANIC QUALITATIVE ANALYSIS

List of ions to be analysed:

Anions: Carbonate, nitrate, bromide, chloride, sulphate, phosphate, borate, oxalate, fluoride and chromate

Cations: Lead, bismuth, copper, cadmium, ferrous, ferric, aluminium, zinc, manganese, cobalt, nickel, calcium, barium, strontium, magnesium and ammonium

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Distribution of Marks: Internal – 40 Marks

External – 60 Marks

Internal examination		**External examination**	
Class Experiments	: 30 marks	Record Notebook	: 10 marks
Viva–voce	: 10 marks	Procedure writing	: 10 marks
Total	: 40 marks	Experiment	: 40 marks
		Total	: 60 marks

TEXT BOOK:
Vogel's *Textbook of Quantitative Inorganic Analysis*, Pearson Education, 6th Edn. (2009).

REFERENCE BOOK:
Basic Principles of Practical Chemistry by V. Venkateswaran, R. Veeraswamy and A. R. Kulandaivelu, S. Chand and Co. Ltd. (2017).

DIGITAL TOOLS:

1. **https://www.youtube.com/watch?v=V9tAQl2XcHw**
2. **https://www.youtube.com/watch?v=cEOvj6jkdDw**

COURSE DESIGNER: Dr. V. SATHIYENDIRAN

SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

B.Sc. CHEMISTRY – SYLLABUS

(Under CBCS based on OBE)(with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UPSA31	PROPERTIES OF MATTER, THERMAL PHYSICS, AND OPTICS	ALLIED – 1	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	III	25	75	100

NATURE OF COURSE	Employability		Skill Oriented	✓	Entrepreneurship	

COURSE DESCRIPTION:

This course helps to develop an understanding of the various concepts in different areas of physics. This course covers elastic properties of materials to know the strength of materials, viscous properties of liquid, heat transfer processes, basic properties of light.

COURSE OBJECTIVE:

The main objective of this course is to give the essence of basic concepts, laws, and phenomena in areas of properties of matter, thermal physics, and optics in physics.

COURSE OUTCOMES (COs):

On successful completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	**understand** the basic concepts of the elastic behavior of solids and the bending behavior of beams and **determine** the expressions for young's modulus and rigidity modulus.	Upto K3
CO 2	**explain** the physics of the flow of liquid in terms of viscosity, **derive** the equation of Bernoulli's theorem in hydrodynamics and its applications.	Upto K3
CO 3	**identify** modes of heat transfer in solids, liquids, and gases and **explain** laws governing radiations.	Upto K3
CO 4	**define** fundamental laws of thermodynamics and **explain** their application to thermodynamic processes – Carnot cycle, entropy change in a reversible and irreversible process.	Upto K3
CO 5	**describe** the phenomena in wave optics like interference, diffraction, and polarization, **identify** the differences in them and **demonstrate** the experiments based on these phenomena.	Upto K3

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY

PROPERTIES OF MATTER, THERMAL PHYSICS, AND OPTICS

UNIT – I: Elasticity

Introduction – stress, strain, Hooke's law – Poisson's ratio (definition alone) – Torsion – Expression for Couple per unit twist – work done in twisting a wire – Torsional oscillations of a body– Rigidity modulus of a wire and M.I. of a disc by torsion pendulum(dynamic torsion method) – Bending of beams – definitions – Expression for bending moment – determination of young's modulus – uniform and non – uniform bending (pin and microscope method).

UNIT – II: Viscosity

Definition – Viscous force – Co – efficient of viscosity – Poiseuille's formula for coefficient of viscosity of a liquid – determination of co – efficient of viscosity using burette and comparison of Viscosities – Equation of continuity – the energy of liquid – Bernoulli's theorem **:** Statement and proof – application: Venturimeter.

UNIT – III: Conduction, Convection, and Radiation

Conduction**:** Thermal conductivity – coefficient of thermal conductivity – Lee's disc method – Convection: Convection in atmosphere – Lapse rate – greenhouse effect –

Radiation**:** Black body radiation – Planck's radiation law –Wien's displacement law – Stefan's law of radiation (No derivations) – Newton's law of cooling.

UNIT – IV: Thermodynamics

Zeroth and 1^{st} Law of thermodynamics – specific heat capacity – adiabatic and isothermal process – Entropy – Change in entropy in reversible and irreversible process – change in entropy of a perfect gas – change in entropy when ice is converted into steam – 2^{nd} law of thermodynamics – Carnot's engine and Carnot's cycle – Efficiency of a Carnot's engine.

UNIT – V: Optics

Interference **:**Interference in thin films(reflected ray) – Air wedge – thickness of a thin wire – Newton's rings – determination of wavelength using Newton's rings – Diffraction**:** –Theory of plane transmission grating – normal incidence – Polarization**:** Production of polarized light by Nicol Prism – optical activity – Biot's laws – Specific rotatory power – Determination of specific rotatory power using Laurent's half shade polarimeter.

TEXT BOOKS:

1. *Properties of matter* – Brijlal and Subramanyam – Eurasia Publishing co., New Delhi, III Edition 1983
2. *Heat and Thermodynamics* – Brijlal & Subramanyam, S.Chand & Co, 16th Edition 2005

REFERENCE BOOKS:

1. *The element of properties of matter* – D. S. Mathur – S.Chand& Company Ltd, New Delhi, 10th Edition 1976
2. *Heat and Thermodynamics* – D. S. Mathur, Sultan Chand& Sons, 5th Edition 2014.
3. *A textbook of Optics* – Subramanyam and Brijlal, S. Chand and co. New Delhi, 22nd Edition 2004.
4. *Optics and Spectroscopy* – R.Murugeshan, S.Chand and co., New Delhi, 6th Edition 2008.

DIGITAL TOOLS:

http://galileo.phys.virginia.edu/classes/152.mf1i.spring02/HeatLectures.pdf

https://spiderimg.amarujala.com/assets/applications/safalta.com/2020/08/18/12_–_properties_–of_–_matter_–_physics_–_18_–_08_–_2020_5f3b60f445146.pdf

https://www.freebookcentre.net/physics_–_books_–_download/Lecture_–_Notes_–_Optics_–(PDF_–_57P).html

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	2	3	2		
CO2		3	3	1	1	
CO3	3	2	2	1	1	
CO4	3	2	2	1	1	
CO5	3	3	3	1	1	

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UPSAP2	ALLIED PRACTICAL – II	ALLIED	–	2	–

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	III	–	–	–

ALLIED PRACTICAL – II

LIST OF EXPERIMENTS

Any Fourteen experiments:

1. Young's Modulus of Elasticity by Uniform Bending (Pin & Microscope)
2. Young's Modulus of Elasticity by Non – Uniform Bending (Optic Lever)
3. Rigidity Modulus of a wire – Torsion Pendulum
4. Acceleration due to Gravity – Compound Pendulum
5. Calibration of Low range Voltmeter by Potentiometer
6. Calibration of Ammeter by Potentiometer
7. Determination of Thermal Conductivity of bad conductor by Lee's disc method
8. Grating N and λ by Normal incidence method
9. Refractive index of the Prism using spectrometer.
10. LCR Series Circuit – Determination of resonant frequency and L of the coil
11. Bridge Rectifier
12. Construction of Logic gates OR, AND and NOT using discrete components
13. Air – Wedge – Determination of thickness of the given material.
14. Newton's Rings – Radius of Curvature
15. Carey – Foster's Bridge – Resistance and Resistivity
16. Comparison of Capacities of the given two capacitors.
17. Comparison of emf's of the given two cells.

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCYS31	LABORATORY TECHNIQUES	SBS – 1	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	III	25	75	100

NATURE OF COURSE	Employability	Skill Oriented	Entrepreneurship
	✓	✓	

COURSE DESCRIPTION:

This course instructs the basic awareness about laboratory chemicals, basic norms of inorganic qualitative analysis, principles of titrimetry, chromatography, separation and purification techniques.

COURSE OBJECTIVES:

- To get awareness on laboratory chemicals and safety
- To acquire the thorough knowledge about solutions
- To know the principles of inorganic qualitative analysis and knowledge about volumetric titrimetry principles.
- To learn about the basic principles of various chromatographic techniques
- To understand principles of separation and purification techniques.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	explain the knowledge about lab safety methods include safe handling of toxic and poisonous chemicals and provide knowledge about first aid in case of small lab accidents.	Upto K3
CO 2	understand and analyse the acid radicals and eliminate the interfering acid radicals	Upto K3
CO 3	apply acidimetric, alkali metric and redox method for the quantitative volumetric estimation.	Upto K3
CO 4	remember application of chromatographic techniques	Upto K3
CO 5	do the lab techniques on purification methods such as sublimation, distillation and crystallization	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY

LABORATORY TECHNIQUES

UNIT – I: LABORATORY HYGIENE AND SAFETY (6 hrs.)

Storage and handling of chemicals – carcinogenic chemicals – toxic and poisonous chemicals – waste disposal – fume disposal – general precautions for avoiding accidents – first aid techniques – poisoning – methods to avoid poisoning – treatment for specific poison–antidotes – laboratory safety measures

UNIT – II: INORGANIC QUALITATIVE ANALYSIS (6 hrs.)

Aims of semi micro methods – types of reactions – dry reactions – precipitation reactions – complexation reactions – oxidation and reduction reactions – flame test, borax bead test, charcoal cavity test and cobalt nitrate test – chemistry of interfering anions and their removal in the analysis of cations: oxalate, borate, fluoride, phosphate and chromate.

UNIT – III: VOLUMETRIC ANALYSIS (6 hrs.)

TITRIMETRY**:** Titration – analyte and titrant – equivalence point – standard solutions: primary and secondary standards – volumetric titrations: types – acid–base titrations (choice of indicator and its theory) – redox titrations (permanganometry, iodometry and iodimetry) and complexometric titrations (EDTA only).

UNIT – IV: CHROMATOGRAPHY (6 hrs.)

Definition – principle, working and applications of following chromatographic techniques – paper chromatography – column chromatography –thin layer chromatography (TLC) – superiority of TLC over other techniques.

UNIT – V: PURIFICATION TECHNIQUES (6 hrs.)

Purification methods: Types – criteria of purity – principle – detailed study of crystallisation – sublimation – distillation and its types (steam, fractional and reduced pressure distillations) – extraction techniques.

TEXT BOOKS:

1. *Elements of Analytical Chemistry* by R. Gopalan, P.S. Subramanian and K. Rengarajan, Sultan Chand & Sons, (2003).

2. *Principles of Inorganic Chemistry* by Puri, Sharma & K.C. Kalia, Milestone Publisher and distributer ,48th Edn. (2019).

REFERENCE BOOKS:

1. Vogel's *Text book of Quantitative Inorganic Analysis,* Pearson Education , 6th Edn. (2009).

2. *Essentials of Physical Chemistry* by B. S. Bahl, Arun Bahl and G. T. Tuli – S. Chand and Co. Ltd., (2012).

3. *Basic Principles of Practical Chemistry* by V. Venkateswaran, R. Veerasamy & A. R. Kulandaivelu, Sultan Chand & sons, (2002).

DIGITAL TOOLS:

1. **https://www.wpi.edu/offices/environmental–health–safety/laboratory/hygiene**
2. **https://en.wikipedia.org/wiki/Qualitative_inorganic_analysis**
3. **https://www.britannica.com/science/volumetric–analysis**
4. **https://www.khanacademy.org/science/class–11–chemistry–india/xfbb6cb8fc2bd00c8:in–in–organic–chemistry–some–basic–principles–and–techniques/xfbb6cb8fc2bd00c8:in–in–methods–of–purification–of–organic–compounds/v/basics–of–chromatography**
5. **https://www.youtube.com/watch?v=_CXlmtfxuzQ**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	1	3	3
CO2	2	2	3	2	3
CO3	1	3	2	1	3
CO4	2	3	2	1	3
CO5	2	2	3	1	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. V. SATHIYENDIRAN

SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

B.Sc. CHEMISTRY – SYLLABUS

(Under CBCS based on OBE)(with effect from 2021 – 2022)

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCYN31	CHEMISTRY FOR HUMAN WELFARE – I	NME – 1	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	III	25	75	100

NATURE OF COURSE	Employability	Skill Oriented	Entrepreneurship
	✓	✓	✓

COURSE DESCRIPTION:

This course will enable the students to get exposure about industries of agriculture, polymers and food products. Further students will know the basic ideas of water technology and gain the basic knowledge about house hold products and how to know the preparation techniques for the various house hold products and their basic ill effects.

COURSE OBJECTIVES:

The objectives of this course are to make the student

- Study about the hardness of water and their removal& sewage treatment.
- Be aware of the basic knowledge about food products.
- Know the need of plant growth using fertilizers,
- Study the fundamental aspects of day-to-day application of polymers.
- Know the preparation methods of various house hold products

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	learn the sources & classification of types of water, acidity, alkalinity, BOD, COD, RO method & sewage treatment.	Upto K3
CO 2	get an awareness of food, carbohydrates, proteins, vitamins, milk & milk products.	Upto K3
CO 3	study the different kinds of fertilizers, insecticides & pesticides.	Upto K3
CO 4	gain the basic knowledge of polymers, rubbers & resins	Upto K3
CO 5	understand the preparation of various house hold products methods and their ill effects.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY

CHEMISTRY FOR HUMAN WELFARE –I

UNIT – I: Water Quality analysis and Sewage treatment (6 hrs.)

Water : types – soft and hard water – an elementary idea about the parameters viz., : pH, acidity, alkalinity, total dissolved solids (TDS), hardness, Dissolved oxygen (DO), Biochemical oxygen demand (BOD), Chemical oxygen demand (COD) – Sea water as a source of drinking water: RO method

Sewage treatment: An outline of stages involved – Methods of treatment: Imhoff tanks and Anaerobic lagoons.

UNIT – II: Food Chemistry (6 hrs.)

The meaning of Food – nutrients – classification of food –functions of food – Nutritional sources and examples of carbohydrates, proteins, lipids and vitamins – malnutrition and good nutrition. Milk: composition – effect of heat – Pasteurization– homogenized milk– milk powder.

UNIT – III: Agricultural Chemistry (6 hrs.)

Fertilizers: Definition – micro and macro nutrients – their roles in plant growth – requirements of a good fertilizer – natural fertilizer: manures – chemical fertilizer: urea, super phosphate and mixed fertilizer (No preparation, only applications).

Insecticides and Pesticides: Definition – examples viz., DDT, Paris green, BHC, Bordeaux mixture and carbamates (No preparation, applications only).

UNIT – IV: Polymer Chemistry (6 hrs.)

Polymer: Definition – types – Rubber: types and its uses – synthetic polymers: PE, PVC, polyester, Dacron, Nylon and Teflon (No preparation, applications only). Resins and Plastics: Definition, examples and distinction between them.

UNIT – V: House hold products (6 hrs.)

Preparation of the following house hold products and their ill effects: washing powder, cleaning powder, phenoyls, fountain pen inks, soap oil, shampoo, pain balm, incense sticks and candles.

TEXT BOOK:

Fundamental Concepts of Applied Chemistry by Jayashree Ghosh, S. Chand & Co. Ltd, (2013).

REFERENCE BOOKS:

1. *Engineering Chemistry* by Jain and Jain, Dhanpat Raj Publishing Co. Pvt. Ltd. (2007).
2. *Industrial Chemistry* by B.K. Sharma, Goel Publishing House, 17th Edition (2014).
3. *Food Chemistry* by Alex V Ramani, MJP Publishers, (2009).

DIGITAL TOOLS:

1. **https://www.britannica.com/technology/wastewater–treatment**
2. **https://onlinecourses.swayam2.ac.in/cec19_ag04/preview**
3. **https://byjus.com/chemistry/agricultural–chemistry/**
4. **https://nptel.ac.in/courses/104/105/104105039/**
5. **https://www.washingtonpost.com/lifestyle/home/the–14–most–useful–household–productsand– what–you–can–do–with–them/**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	1	2	1	2
CO2	1	2	1	2	2
CO3	2	2	1	1	1
CO4	1	2	1	2	3
CO5	2	1	2	1	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Dr. N. P. KRISHNAN

Passed in the BOS Meeting held on 19/03/2022 Signature of the Chairman

SOURASHTRA COLLEGE, MADURAI – 625004

(An Autonomous Institution Re-accredited with 'B+' grade by NAAC)

B.Sc. CHEMISTRY – SYLLABUS

(Under CBCS based on OBE)(with effect from 2021 – 2022)

COURSE STRUCTURE – IV SEMESTER

S. No.	Sub. Code	Subject Title	Hrs. / Week	Exam (Hrs.)	CA	SE	Total Marks	Credits
1.	21UACT41	**Part – I: Tamil** – சங்க இலக்கியமும் அற இலக்கியமும்	6	3	25	75	100	3
	21UACH41	**Hindi** – Hindi – IV						
	21UACS41	**Sanskrit** – Sanskrit – IV						
2.	21UACE41	**Part – II: English** – English For Enrichment – IV	6	3	25	75	100	3
3.	21UCYC41	**Part – III: Core – 8:** Inorganic Chemistry – II	5	3	25	75	100	5
4.	21UCYCP2	**Part – III: Core – 7: Practical:** Inorganic Qualitative Analysis	3	3	40	60	100	2
5.	21UPSA41/ 21UPSA21	**Part – III: Allied 2 – 3 T:** Electricity, Electronics, Atomic And Nuclear Physics	4	3	25	75	100	4
6.	21UPSAP2	**Part – III: Allied 2 – 2 P:** Allied Practical – II	2	3	40	60	100	2
7.	21UCYS41	**Part – IV: SBS – 2:** Dairy Chemistry	2	3	25	75	100	2
8.	21UCYN41	**Part – IV: NME – 2:** Chemistry For Human Welfare –II	2	3	25	75	100	2
9.		**Part –V:** Extension Activities	–	–	–	–	100	1
		TOTAL	**30**				**900**	**24**

CA – Class Assessment (Internal)

SE – Summative Examination

SBS – Skill Based Subject

NME – Non –Major Elective

T – Theory

P – Practical

Passed in the BOS Meeting held on 19/03/2022 **Signature of the Chairman**

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCYC41	INORGANIC CHEMISTRY – II	CORE – 8	5	–	5

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	IV	25	75	100

NATURE OF COURSE	Employability	Skill Oriented	Entrepreneurship
	✓	✓	

COURSE DESCRIPTION:

To acquire the knowledge of chemistry of p –block elements for their general characteristics with comparative studies among group elements and applications of the industrially important compounds. To have an idea about the d –block & learn about f–block elements.

COURSE OBJECTIVES:

- To learn about the group 16 elements
- To gain information about the halogen compounds.
- To study the isolation and separation of inert gases and its properties
- To discuss the transitions series elements in periodic table.
- To deal with the inner transitions elements

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	gain the importance of group 16 elements in industrial purpose	Upto K3
CO 2	understand the behaviour of halogen compounds with other elements	Upto K3
CO 3	realize the significance of noble gases in chemistry	Upto K3
CO 4	know the numerous properties of d–block elements in chemistry	Upto K3
CO 5	understand the preparation and properties of f–block elements.	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY

INORGANIC CHEMISTRY – II

UNIT – I: Group 16 Elements (15 hrs.)

General characteristics : Electronic configuration, metallic and non–metallic character, atomicity, polymorphism, catenation and oxidation states – hydrides : preparation – properties– physical state– volatility – thermal stability– reducing power – covalent character – acidic character– oxides: monoxides– dioxides – trioxides – heptoxides – anomalous behaviour of oxygen – comparison of oxygen and sulphur – allotropes of sulphur – preparation and properties of Caro's acid, Marshall's acid, polythionic acids, thionyl chloride and sulphonyl chloride – distinction between hydrogen peroxide and peroxysulphuric acid.

UNIT – II: Group 17 Elements (15 hrs.)

General characteristics : Electronic configuration, colour, oxidation states, non–metallic character, electronegativity and electron affinity – comparison of fluorine and oxygen – comparison of chemical properties of halogens – oxoacids : preparation, properties and uses of HClO and bleaching powder – interhalogen compounds: preparation, properties and uses of ICl_3, IBr, ClF_3, BrF_5 and IF_7 – pseudo halides and pseudo halogens: comparison between halide ions and pseudo halogen ions, halogens and pseudo halogens. electropositive character of Iodine.

UNIT – III: Group 18 Elements (15 hrs.)

Occurrence – isolation of noble gases from dry air – separation by Dewar's method and Rayleigh's method – general characteristics – electronic configuration– melting and boiling point – liquefaction – solubility in water – ionization energy and electron affinity – atomicity – characteristic spectra – uses of noble gases – study of compounds of noble gases: preparation, properties and structure of XeF_4,$XeOF_4$ and KrF_2 – study of clathrates.

UNIT – IV: Transition elements (d – Block Elements) (15 hrs.)

a) The Transition Elements: Definition– metallic character–ionic and atomic radii – oxidation states– reducing properties – formation of coloured compounds and complexes – magnetic properties– catalytic properties.

b) First Transition Series: Preparation, properties and uses of $TiCl_4$, V_2O_5, chromyl chloride (CrO_2Cl_2), $KMnO_4$, $K_3[Fe(CN)_6]$, $Na_3[Co(NO_2)_6]$, blue vitriol and nickel tetra carbonyl – Alloys of Nickel.

c) Second Transition Series: Preparation, properties and uses of Mo_2O_5, molybdenum blues, pertechnic acid and pertechnetates, RuO_4, Wilkinson's catalyst.

d) Third Transition Series: Preparation and uses of Tungsten bronzes, chloroplatinic acid, cis–platin, colloidal gold and purple of cassius – fulminating gold – distinction between AgCl&Hg_2Cl_2.

UNIT – V: Inner–transition elements (f–block Elements) (15 hrs.)

a) The Lanthanide Series : occurrence – electronic configuration – position in periodic table – oxidation states – magnetic properties – lanthanide contraction – causes and its consequences – colour – complex formation – extraction and uses of lanthanides.

b) The Actinide Series : trans–uranic elements : definition, sources and preparation – position in periodic table – electronic configuration – oxidation states – ionic radii – actinide contraction – colour – formation of complexes – properties – comparison with lanthanides – extraction and uses of thorium.

TEXT BOOKS:

1. *Principles of Inorganic Chemistry* by B.R.Puri, L.R. Sharma and K.C.Kalia – Milestone Publishers, 48th Edn. (2019).
2. *Modern Inorganic Chemistry* by R. D. Madan and Satya Prakash – S. Chand and Co, 3rd Edn. (2014).

REFERENCE BOOKS:

1. *Inorganic Chemistry* by J.E. Huheey et.al.,– Pearson Education Pvt. Ltd., 4th Edn. (2004).
2. *Bioinorganic Chemistry* by K. HussainReddy, New age international, (2007).
3. *Concise Coordination Chemistry* by R.Gopalan and V. Ramalingam – Vikas publishing House Pvt. Ltd. Revised Edn. (2012).

DIGITAL TOOLS:

1. **https://www.youtube.com/watch?v=OnpmdFpyziY**
2. **https://www.youtube.com/watch?v=nbaSHL_SQMc**
3. **https://www.britannica.com/science/noble–gas**
4. **https://byjus.com/jee/d–block–elements/**
5. **https://www.youtube.com/watch?v=WB_UF1pgHPE**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	2	2	3
CO2	3	3	2	2	3
CO3	1	2	3	3	3
CO4	2	1	2	3	3
CO5	3	2	3	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. K. VASUKI

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCYCP2	INORGANIC QUALITATIVE ANALYSIS	CORE – 7 PRACTICAL	–	3	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	IV	40	60	100

NATURE OF COURSE	Employability	Skill Oriented	Entrepreneurship
	✓	✓	

COURSE DESCRIPTION:

This course updates skill of students from the theoretical knowledge of semi–micro qualitative analysis to practical knowledge.

COURSE OBJECTIVES:

- To practise the complete analysis of inorganic salt mixtures with its principles.
- Analysis of salt mixture containing two anions of which one is an interfering ion and two cations by semi–micro method.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	analyze the acid radicals present in any given inorganic salt mixture	Upto K3
CO 2	eliminate the interfering acid radicals	Upto K3
CO 3	identify the basic radicals and its groups in the mixture of salt.	Upto K3
CO 4	analyze the basic radical systematically	Upto K3
CO 5	develop their qualitative analytical skill of any given inorganic salt mixtures	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY

INORGANIC QUALITATIVE ANALYSIS

List of ions to be analysed:

Anions: carbonate, nitrate, bromide, chloride, sulphate, phosphate, borate, oxalate, fluoride, arsenite, arsenate and chromate

Cations : lead, bismuth, copper, cadmium, antimony, ferrous, ferric, aluminium, zinc, manganese, cobalt, nickel, calcium, barium, strontium, magnesium and ammonium

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Distribution of Marks: Internal – 40 Marks

External – 60 Marks

Internal examination		**External examination**	
Class Experiments	: 30 marks	Record Notebook	: 10 marks
Viva–voce	: 10 marks	Procedure writing	: 10 marks
Total	: 40 marks	Experiment	: 40 marks
		Total	: 60 marks

BOOKS RECOMMENDED:

TEXT BOOK:

Vogel's *Text book of Quantitative Inorganic Analysis*, Pearson education 6th Edn. (2009)

REFERENCE BOOK:

Basic Principles of Practical Chemistry by V. Venkateswaran, R. Veeraswamy and A. R. Kulandaivelu, S. Chand and Co. Ltd. (2017).

DIGITAL TOOLS:

1. **https://www.youtube.com/watch?v=V9tAQl2XcHw**
2. **https://www.youtube.com/watch?v=cEOvj6jkdDw**

COURSE DESIGNER: Dr. V. SATHIYENDIRAN

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UPSA41/ 21UPSA21	ELECTRICITY, ELECTRONICS, ATOMIC AND NUCLEAR PHYSICS	ALLIED – 2	4	–	4

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	IV	25	75	100

NATURE OF COURSE	Employability		Skill Oriented	✓	Entrepreneurship	

COURSE DESCRIPTION:

This course helps to understand the concept of basic concepts of electricity and electronics, the effect of the magnetic field due to the passage of current and to acquire the basics of atomic and nuclear physics.

COURSE OBJECTIVE:

This course helps to understand the fundamental laws of electricity and magnetism, to gain knowledge about the effect of magnetic field due to the passage of current, to gain the basic idea about semiconductor diodes transistors and logic gates, and to acquire knowledge atomic models, nuclear fission and fusion.

COURSE OUTCOMES (COs):

On successful completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	gain the knowledge of different laws of electrostatics.	Upto K3
CO 2	understand the concepts and laws of current electricity and demonstrate the experiment to determine the resistivity of the material of wire and calibrate voltmeter and ammeter.	Upto K3
CO 3	distinguish moving coil galvanometers dead beat ballistic and demonstrate the experiments for voltage and current sensitiveness	Upto K3
CO 4	understand the basics of diodes and transistors and solve the problems in the binary number system and analyze the logic circuits	Upto K3
CO 5	acquire the basic knowledge in atomic and nuclear physics	Upto K3

K1 – KNOWLEDGE (REMEMBERING), K2 – UNDERSTANDING, K3 – APPLY

ELECTRICITY, ELECTRONICS, ATOMIC AND NUCLEAR PHYSICS

UNIT – I: ELECTROSTATICS

Coulomb's law – Electric field and flux – Gauss law – applications of gauss law – Field due to a charged sphere – Electric potential –Relation between electric field and electric potential.

Capacitors – Principle of a capacitor – Capacitance of a spherical capacitor – Energy stored in a capacitor.

UNIT – II: CURRENT ELECTRICITY

Kirchoff's laws – Application of Kirchhoff's laws to Wheatstone's network – Carey foster's bridge – Determination of resistivity and temperature coefficient of resistance – Potentiometer – Principle – Calibration of ammeter – Calibration of low range voltmeter.

UNIT – III: MAGNETIC EFFECT OF ELECTRIC CURRENT

Force on a current – carrying conductor in a magnetic field – Torque on a current loop in a uniform magnetic field – Mirror galvanometer – current and voltage sensitiveness of a moving coil galvanometer – Moving coil Ballistic galvanometer – Correction for damping – Difference between Dead beat and Ballistic galvanometer – Measurement of charge sensitiveness.

UNIT – IV: ELECTRONICS

PN junction diode – Forward and reverse biasing – VI Characteristics of a junction diode – Bridge rectifier using junction diodes –Transistor – Transistor Characteristics (CE mode only)

Number system – Decimal – Binary – conversion of decimal to binary – Conversion of binary to decimal – Binary addition – Binary subtraction – Boolean algebra – De morgan's theorem – Basic logic gates (AND, OR, NOT) – NAND and NOR as universal gates.

UNIT – V: ATOMIC AND NUCLEAR PHYSICS

Bohr's atom model – radius energy – Atomic excitation – Ionization potential – Frank and Hertz Method – Nucleus – Nuclear properties – Mass defect – Binding energy.

Nuclear fusion and Nuclear fission – X – rays – Production – Properties –Derivation of Bragg's law – Uses in industrial and medical fields.

TEXT BOOKS:

1. *Electricity and Magnetism* – R. Murugesan, S. Chand & co, 2001.
2. *Modern Physics* – R. Murugesan, S. Chand & co, 1998.

REFERENCE BOOKS:

1. *Electricity and Magnetism* – D.N.Vasudeva (Twelfth revised edition)
2. BrijLal & Subramanyam, *Electricity and Magnetism*, (2005)
3. M.Narayanamurthy&N.Nagarathnam, *Electricity & Magnetism*, NPC pub., Revised edition.
4. *Electricity and Magnetism* – K.K.Tiwari (S.Chand&Co.)
5. *Electricity and Electronics* – R. Murugesan, First edition, 2011.
6. *Basic Electronics* – B.L. Theraja, S. Chand & co, 2003.

DIGITAL TOOLS:

http://engineering.nyu.edu/gk12/amps – cbri/pdf/Intro%20to%20Electricity.pdf
https://www2.physics.ox.ac.uk/sites/default/files/2011–06–08/optics_notes_and_slides_part_1_pdf_12721.pdf
http://www.gvp.cz/~vinkle/mafynet/fyz_5_6lete/vlnova_optika/WaveOptics.pdf

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	2	2	3	3	2
CO2	2	3	2	3	2	2
CO3	2	2	3	2	2	
CO4	2	2	3	2	3	2
CO5	2	1	1	2	2	3

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UPSAP2	ALLIED PRACTICAL – II	ALLIED	–	2	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	IV	40	60	100

LIST OF EXPERIMENTS

Any Fourteen experiments:

1. Young's Modulus of Elasticity by Uniform Bending (Pin & Microscope)
2. Young's Modulus of Elasticity by Non – Uniform Bending (Optic Lever)
3. Rigidity Modulus of a wire – Torsion Pendulum
4. Acceleration due to Gravity – Compound Pendulum
5. Calibration of Low range Voltmeter by Potentiometer
6. Calibration of Ammeter by Potentiometer
7. Determination of Thermal Conductivity of bad conductor by Lee's disc method
8. Grating N and λ by Normal incidence method
9. Refractive index of the Prism using spectrometer.
10. LCR Series Circuit – Determination of resonant frequency and L of the coil
11. Bridge Rectifier
12. Construction of Logic gates OR, AND and NOT using discrete components
13. Air – Wedge – Determination of thickness of the given material.
14. Newton's Rings – Radius of Curvature
15. Carey – Foster's Bridge – Resistance and Resistivity
16. Comparison of Capacities of the given two capacitors.
17. Comparison of emf's of the given two cells.

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCYS41	DAIRY CHEMISTRY	SBS – 2	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	IV	25	75	100

NATURE OF COURSE	Employability	Skill Oriented	Entrepreneurship
	✓	✓	✓

COURSE DESCRIPTION:

To know the chemistry of milk with the milk products.

COURSE OBJECTIVES:

- To give an preliminary idea about composition of milk
- To gain information about the processing of milk
- To learn the various type of milk products
- To study about the special milk products
- To discussed the ice cream and milk powder products.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the physical properties of milk and it composition	Upto K3
CO 2	infer the various processes of milk	Upto K3
CO 3	know about the milk products	Upto K3
CO 4	recognize the various types of milks	Upto K3
CO 5	understand the ice–cream products and milk products	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY

DAIRY CHEMISTRY

UNIT – I: COMPOSITION OFMILK **(6 hrs.)**

Milk – definition – general composition of milk – constituents of milk – physical properties of milk – colour, odour, acidity, specific gravity, viscosity and effects of heating

UNIT – II: PROCESSING OF MILK **(6 hrs.)**

Physico–chemical changes during processing –pasteurization – definition–types of pasteurization – HTST and UHT –vaccum pasteurization – effects of pasteurization.

UNIT – III: MILK PRODUCTS – I **(6 hrs.)**

Cream – composition – estimation of fat in cream.

Butter – composition – desi butter – salted butter – estimation of acidity and moisture content in butter.

Ghee – major constituents – common adulterants added to ghee and their detection – rancidity – definition – prevention.

UNIT – IV: MILK PRODUCTS – II **(6 hrs.)**

Special milk–homogenized milk – flavoured milk – vitaminised milk – toned milk – vegetable toned milk – condensed milk – cultured milk – cultured butter milk – acidophilous milk.

UNIT – V: MILK PRODUCTS – III **(6 hrs.)**

Ice cream – definition – percentage – composition– types –manufacture of ice–cream – sweeteners – stabilizers – emulsifiers and their role.

Milk powder – definition – making milk powder.

TEXT BOOK:

Industrial Chemistry by B. K. Sharma, Goel publishing House (2014).

REFERENCE BOOKS:

1. *Applied Chemistry* by K. Bagavathi Sundari, MJP publishers (2019).
2. *Fundamental Concepts of Applied Chemistry* by Jeyashree Ghosh, S. Chand and Co. Ltd. (2010).

DIGITAL TOOLS:

1. **https://ndc.ie/health–professionals/the–nutritional–composition–of–dairy/**
2. **https://www.youtube.com/watch?v=–FHll993x9A**
3. **https://www.youtube.com/watch?v=21L3LABPqZg**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	2	1	3
CO2	1	1	1	2	1
CO3	2	1	2	2	2
CO4	2	2	1	1	1
CO5	2	1	2	2	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

COURSE DESIGNER: Prof. K. VASUKI

Passed in the BOS Meeting held on 19/03/2022 **Signature of the Chairman**

COURSE CODE	COURSE TITLE	CATEGORY	T	P	CREDITS
21UCYN41	CHEMISTRY FOR HUMAN WELFARE –II	NME – 2	2	–	2

YEAR	SEMESTER	INTERNAL	EXTERNAL	TOTAL
II	IV	25	75	100

NATURE OF COURSE	Employability	✓	Skill Oriented	✓	Entrepreneurship	✓

COURSE DESCRIPTION:

This course will enable the students to get exposure about industries of Silicates and Paints. Further students will know about the principles and ideas of pharmaceutical chemistry and gain the basic knowledge about Fireworks, Explosives and know about the various types of cosmetics and their basic preparation techniques.

COURSE OBJECTIVES:

- To understand the basic principle of fireworks and explosives.
- ❖ To get exposure about industries of Silicates, refractories and abrasives.
- ❖ To discuss the characteristics & manufacture of paint & varnish.
- ❖ To know the fundamental concepts of pharmaceutical chemistry.
- ❖ To study the preparation of various cosmetics.

COURSE OUTCOMES (COs):

After the completion of the course, the students will be able to

No.	Course Outcomes	Knowledge Level (According to Bloom's Taxonomy)
CO 1	understand the basic principle and applications of fireworks, pyrotechny and explosives.	Upto K3
CO 2	get exposure about the basic knowledge of cement, glass, refractories & abrasives.	Upto K3
CO 3	learn the basic methods for the manufacture of paint, pigments, varnishes, enamels and lacquers.	Upto K3
CO 4	study the basic ideas of drugs and their applications	Upto K3
CO 5	know the simple methods for the preparation of various cosmetics	Upto K3

K1– KNOWLEDGE (REMEMBERING), K2–UNDERSTANDING, K3–APPLY

CHEMISTRY FOR HUMAN WELFARE –II

UNIT – I: Match Industry and explosives (6 hrs.)

Safety matches: definition – raw materials – outline of the manufacture. Pyrotechny: composition of fireworks – coloured smokes – coloured matches. Explosives: definition – classification, examples with their applications.

UNIT – II: Silicate Industry (6 hrs.)

Cement: raw materials – outline of the manufacture – setting of cement – curing. Glass: raw materials – outline of the manufacture – varieties of glass with their uses. Refractories: definition and classification with their uses. Abrasives: definition, classification, examples with their uses.

UNIT – III: Paint Industry (6 hrs.)

Paints: Ingredients – characteristics of good paint – outline of the manufacture – setting of paints – paint failure. Pigments: white, yellow, red, blue, green and black pigments. Varnishes, enamels and lacquers.

UNIT – IV: Pharmaceutical Chemistry (6 hrs.)

Drugs : definition and its sources – explanation and any two examples of the following drugs : antibiotics, antiseptics, anaesthetics, antipyretic analgesics, anti–inflammatory agents , sedatives and hypnotics, anticonvulsants, muscle relaxants, diuretics, expectorants and antitussives, cardio vascular drugs, steroids and antineoplastic agents.

UNIT – V: Cosmetics (6 hrs.)

Explanation and necessity– classification – skin care: Make–ups: face powder, lipsticks, rouge, mascara and hair cosmetics.

TEXT BOOK:

Fundamental Concepts of Applied Chemistry by Jayashree Ghosh, S. Chand & Co. Ltd, (2013).

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3. *Medicinal Chemistry* by Ashutouh Kar, New Age International (P) Ltd. 7th Edn. (2018).

DIGITAL TOOLS:

1. **http://www.dgciskol.gov.in/writereaddata/Downloads/20170601174023CHP36.pdf**
2. **https://www.slideshare.net/NandanPomal/cement–glass–refractories**
3. **https://www.scribd.com/document/428872009/02–Paint–Industry–Notes–1–docx**
4. **https://www.tutorialsduniya.com/notes/pharmaceutical–chemistry–notes/**
5. **https://pharmawiki.in/cosmeticology**

Mapping of CO with PSO

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	2	2	2	2
CO2	1	2	1	1	2
CO3	2	2	1	2	2
CO4	1	2	2	1	2
CO5	2	2	1	1	2

3. Advanced Application 2. Intermediate Development 1. Introductory Level

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