SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

(AFFILIATED TO MADURAI KAMARAJ UNIVERSITY, MADURAI.
RE-ACCREDITED WITH 'A' GRADE (THIRD CYCLE) BY NAAC WITH CGPA 3.11)

Programme Scheme, Scheme of Examination and Syllabi

(From 2023-2024 Batch onwards)

Department of Chemistry

UG Programme

Approved in the Academic Council – XIV held on 31/07/2023

Curriculum Design and Development Cell
Annexure L

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
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Curriculum Design and Development Cell

HOD	Dean of Pure Science	Dean of Academic Affairs	Principal

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
MEMBERS OF BOARD OF STUDIES

S.No.	Board Members	Name and Designation
1.	Chairman of the Board	**Dr.L.T.Parvathi,** Head & Assistant Professor, Department of Chemistry, Sri Kaliswari College (Autonomous), Sivakasi.
2.	University Nominee	**Dr.M.Rajan,** Assistant Professor, Department of Natural Products Chemistry, School of Chemistry, Madurai Kamaraj University,Madurai – 625021 Phone : 9488014084 Mail id: rajanm153@gmail.com
3.	Academic Expert 1.	**Dr.P.Gajendran,** Associate Professor, Department of Chemistry, The Madura College, Madurai-11 Phone: 9865777350. Mail id: haigaja78@yahoo.com
4.	Academic Expert 2.	**Dr. A. J.Sunija,** Assistant Professor, Department of Chemistry, Mannar Thirumalai Naicker College,Pasumalai, Madurai. Phone: 6382277809 Mail id: sunijaaj@gmail.com
5.	Industrialist	**Mr.R. Kumar,** Sujitha Chemicals, Mettur Dam, Salem Phone: 0427 – 2332242, Mobile: 9443238489 Mail id: sujichem@yahoo.co.in
6.	Alumnus	**Mr.R.Thangapandi** Junior Officer, Quality Control and Environment Department, Tuticorin alkali chemical and fertilizers limited, Tuticorin-628005. Phone: 7339036096 Mail id:thangapandi161298@gmail.com
Members		
7.	Mr. S. Alagappan	Guest Faculty in Chemistry
8.	Dr. M. Murugalakshmi	Assistant Professor of Chemistry
9.	Mrs. M. Sankareswari	Assistant Professor of Chemistry
10.	Mr. M. Nazeer	Assistant Professor of Chemistry
11.	Dr. J. Sherin	Assistant Professor of Chemistry
12.	Dr. R. Deepa	Assistant Professor of Chemistry

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

(Affiliated to Madurai Kamaraj University, Re-accredited with A Grade (CGPA 3.11) by NAAC)

DEPARTMENT OF CHEMISTRY

UG Programme - B.Sc. Chemistry

GUIDELINES FOR OUTCOME-BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM

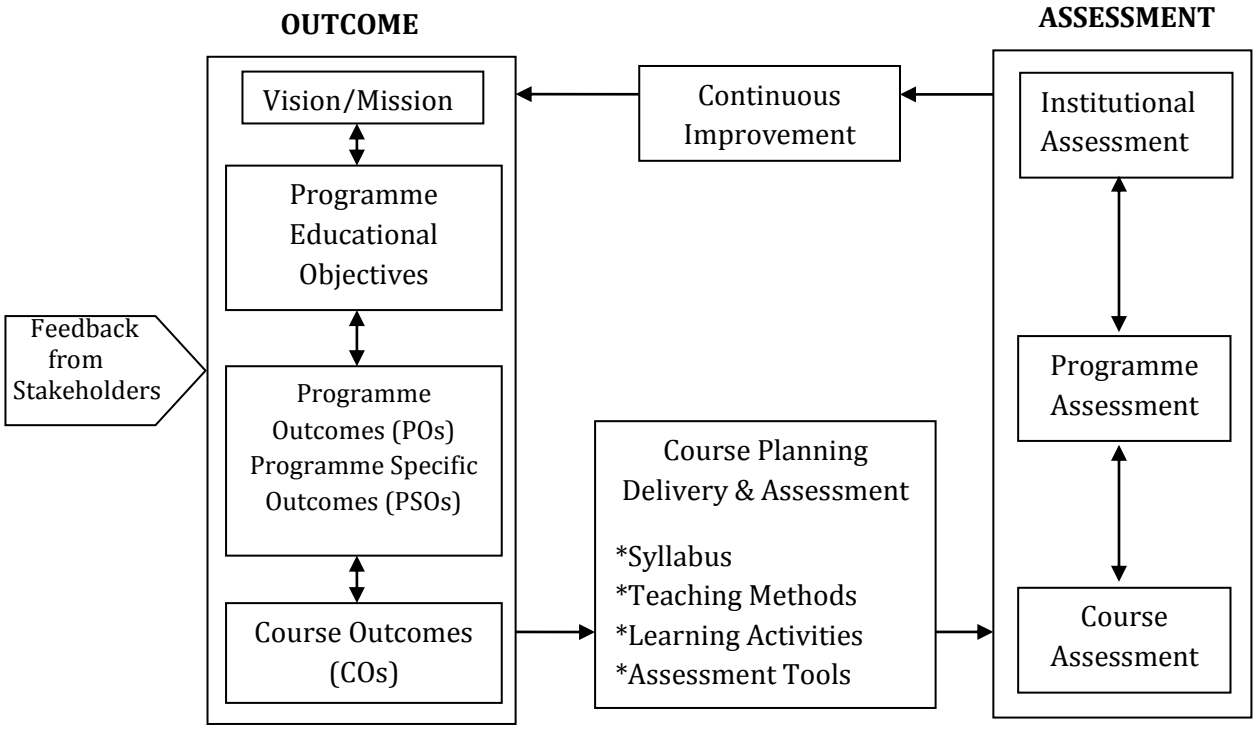
(From 2023-2024 Batch onwards)

INTRODUCTION

Sri Kaliswari College in its pursuit of imparting quality education has marked a remarkable growth in terms of academic excellence, infrastructure, student strength, ICT facilities, library and placement records since its establishment in 2000-2001. This institution constitutes an academic community that is committed to encourage the student community to experience and share knowledge, identify their potential, enhance the employability skills and enable them to pursue their goals. After the conferment of autonomous status in the year 2012, the college has so far gone for revision of the syllabi three times and is continually updating the syllabi to meet the needs and demands of the student community.

The institution in its success journey of imparting quality education has been Re-Accredited with A grade with (CGPA 3.11) in its third cycle of accreditation by NAAC. As an added feather to its cap, the institution has taken a giant leap to embrace the Outcome-Based Education system to enable the student community to develop their knowledge, skill and attitude simultaneously through a focused learning and help the graduates to compete with their global counterparts and prepare them for life.

I. OUTCOME-BASED EDUCATION (OBE) FRAMEWORK



II. VISION OF THE INSTITUTION

- To impart quality higher education to produce highly talented youth capable of developing the nation

III. MISSION OF THE INSTITUTION

- Ensuring quality in all aspects of the activities
- Developing the latent skills of the rural youth
- Providing value - based education to instill courage and confidence
- Nurturing the entrepreneurial skills of the rural youth
- Creating competency to meet global challenges
- Imbibing social awareness and social responsibilities

IV. VISION OF THE DEPARTMENT

- To produce quality chemistry professional with technical skill and applied knowledge to pursue higher education and research and to fulfill the jobs/employment opportunities in industries, scientific projects and allied sectors at regional and national levels.

V. MISSION OF THE DEPARTMENT

- To provide an academically sound environment that ensures understanding of key chemical concepts, principles and theories and cognitive development of students in a holistic manner.
- To provide knowledge and skills to the students thus enabling them to undertake further studies in chemistry related areas or multidisciplinary areas that can be helpful for self-employment/entrepreneurship.
- To mould a responsible citizen who is aware of most basic domain-independent knowledge, including critical thinking and communication.

VI. PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

The Graduates will

PEO1: demonstrate a broad knowledge in fundamental principles and concepts of organic, inorganic, physical and analytical chemistry.

PEO2: develop critical understanding of the established theories, principles and concepts in the field of chemistry for the development and management of industry, manufacturing of fine chemicals, etc.

PEO3: possess knowledge of moral and research ethics, including fair Benefit Sharing, Plagiarism, Scientific Misconduct and so on.

PEO4: obtain ability to work constructively, cooperatively and effectively as part of a team with good communication skills in chemical, petrochemical and allied industries.

PEO5: acquire knowledge and aptitude skills to face the competitive exams and pursue further studies and succeed in academic and research careers through self-directed and life-long learning.

VII. PROGRAMME OUTCOMES (POs)

PO1: Disciplinary knowledge

Acquire comprehensive and scientific knowledge in the field of science.

PO2: Critical thinking, Problem solving and Analytical reasoning

Develop students' ability of critical observation and capacity to apply the principles/facts of science to identify, analyse, evaluate and solve problems in order to draw realistic conclusions.

PO3: Scientific reasoning and Research related skills

Capability to involve in planning and conducting experiments, analyze the scientific research field, interpret and draw conclusions from experiments and investigate practically.

PO4: Communication skills and Digital literacy

Communicate effectively and articulate clearly the scientific ideas in written and oral form and make use of appropriate software for scientific computations and gain ICT skills to disseminate knowledge.

PO5: Ethics, Values and Multicultural competence

Embrace moral and ethical values and apply it with a sense of responsibility in the workplace and community and adopt objective, unbiased and truthful actions in all aspects of work.

PO6: Team Work, Leadership and Employability skills

Work effectively and respectfully in groups with enhanced inter-personal skills and exhibit qualities associated with leadership to build a team and achieve the vision and show proficiency in professional, employability and soft skills required for placements and higher education.

PO7: Self-directed and Life-long learning

Recognize the need and have the ability to engage in independent learning and be self-motivated and acquire knowledge through lifelong learning in the broadest context of technological change.

VIII. PROGRAMME SPECIFIC OUTCOMES (PSOs) – B.Sc. CHEMISTRY

On successful completion of B.Sc. Chemistry, the students will

PSO1: acquire coherent understanding of the fundamental concepts in Physical Chemistry, Organic Chemistry, Inorganic Chemistry, Analytical Chemistry and all other related allied chemistry subjects.

PSO2: develop critical thinking ability and identify, analysis and solve problems using basic chemistry knowledge and concepts.

PSO3: solve societal problems related to application of chemistry in day to day life with defined solutions through appropriate questions, planning and reporting experimental investigation.

PSO4: communicate the results of studies in the academic field of Chemistry both in oral and written form using ICT tools.

PSO5: act as a team player by contributing in laboratory, field based situation and industry with effective communication, skilful execution and good leadership qualities.

PSO6: embrace moral and ethical baseline of the country and the world in the workplace and community.

PSO7: undertake further studies in chemistry in related areas or multidisciplinary areas that can be helpful for self-employment/ entrepreneurship and face competitive examinations through self-directed and life-long learning.

IX. PO-PSO Mapping Matrix – B.Sc. Chemistry

PO / PSO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
PO1	✓						
PO2		✓					
PO3			✓				
PO4				✓			
PO5					✓		
PO6						✓	
PO7							✓

X. PO-PEO Mapping Matrix – B.Sc. Chemistry

PO / PEO	PEO1	PEO2	PEO3	PEO4	PEO5
PO1	✓	✓			✓
PO2		✓	✓		
PO3		✓	✓		✓
PO4	✓	✓		✓	
PO5		✓	✓	✓	✓
PO6		✓	✓	✓	
PO7				✓	✓

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
(Affiliated to Madurai Kamaraj University, Re-accredited with A Grade (CGPA 3.11) by NAAC)
DEPARTMENT OF CHEMISTRY
UG Programme - B.Sc. Chemistry

REGULATIONS

Duration of the Programme **:** Three years (equivalent to six semesters)

Eligibility

Candidate should have passed the Higher Secondary Examinations conducted by the Board of Higher Secondary Education, Government of Tamil Nadu or any other examination accepted as Equivalent thereto by the Syndicate of the Madurai Kamaraj University, Madurai subject to such conditions.

a) Biology or Mathematics/ Physics/ Chemistry as subjects in the higher secondary education

b) Candidate should have secured atleast 60 % in the above subjects and above aggregates

c) A relaxation of 10 % marks in the aggregate will given to SC/ST candidates

Medium of Instruction : English

Age Limit

Maximum age limit : 21 Years

Age Relaxation

SC/ SCA/ST/BC/BCM/MBC/DNC & Women : 3 years age relaxation
Differently-Abled Students : 5 years age relaxation

Transitory Permission

Students joined from 2023 - 2024 may be permitted to write their examinations in this pattern up to April 2031.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme - B.Sc. Chemistry
SCHEME OF EXAMINATION

For both UG Programmes, the internal and external marks are distributed as follows:

For all Theory Courses (Part I, II, III): Internal Marks: 25; External Marks: 75

For Courses with both Theory and Practical, it will be considered as practical course and assessment will be for both Theory and Practical.

For Part-IV Courses : Internal Marks:25; External Marks: 50(Converted to 75)

For all Practical Courses, Project and Internship : Internal Marks: 25; External Marks: 75

Internal Mark Distribution for Theory Courses

Assessment Type	Marks	Scheme of Assessment
Internal Test	10 marks	Two Internal Tests and 1 Model Exam will be conducted and average of the best two will be considered
Written Assignment /E-Assignment/ Case Studies/ Reviews/ Field Assignments/ Poster Presentations/ Portfolios	5 marks	Any two of the Assignments will be given and the average of the two will be considered
Quiz	5 marks	One Quiz Test will be conducted
Viva/ Oral Exam/ Group Discussion/ Role Play	5 marks	Test will be conducted in any one of the Oral Mode

Internal Mark Distribution for Practical Courses

Assessment Type	Marks	Scheme of Assessment
Lab work / Program Execution	15 marks	Two Internal Tests will be conducted and the average of the two will be considered
Observation/Record Notebook	5 marks	Assessment will be done during every practical class
Viva –Voce / Lab Quiz	5 marks	Two Lab Quiz Tests/viva-voce will be conducted and the average of the two will be considered

External Mark Distribution for Practical Courses

Assessment Type	Marks	Scheme of Assessment
Lab work / Program Execution	65 marks	End result of the Practical
Viva –Voce	10 marks	Oral Mode Test

Internal Mark Distribution for Courses with both Theory and Practical

Assessment Type	Marks	Scheme of Assessment
Internal Test	10 marks	Two Internal Tests and 1 Model Exam will be conducted and average of the best two will be considered
Written Assignment E-Assignment/ Case Studies/ Reviews/ Field Assignments/ Poster Presentations/ Portfolios	5 marks	Any two of the Assignments will be given and the average of the two will be considered
Lab work /Program Execution	10 marks	Two Internal Tests will be conducted and the average of the two will be considered

External Mark Distribution for Courses with both Theory and Practical

Assessment Type	Marks	Scheme of Assessment
External Written Test	50 marks	Two hours External Exam will be conducted for 50 marks
Lab work /Program Execution	20 marks	End result of the Practical
Viva –Voce	05 marks	Oral Mode Test

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme - B.Sc. Chemistry
QUESTION PAPER PATTERN FOR PART- I, PART- II & PART-III COURSES

Internal Test – 30 Marks – 1 hr Duration

S. No.	Type of Questions	Marks
1.	Objectives type Questions: Multiple Choice – 3 questions Answer in a Word/Sentence – 3 questions	 03 03
2.	Short Answer –2 questions –either or type	2x7=14
3.	Long Answer –1 question – either or type	1x10=10

Summative Examinations – For Part- I, Part- II & Part-III Courses
75 Marks -3 hrs Duration

S.No	Type of Questions	Marks
1.	Objective type Questions: Multiple Choice – 5 questions Answer in a Word/Sentence – 5 questions	 05 05
2.	Short Answer - 5 questions – either or type	5x7=35
3.	Long Answer - 3 questions – either or type	3x10=30

QUESTION PAPER PATTERN FOR PART -IV COURSES
Internal Test- 30 Marks – 1 hr Duration

S.No	Type of Questions	Marks
1.	Objective type Questions: Multiple Choice – 5 questions	 05
2.	Short Answer - 3 questions – either or type	3x5=15
3.	Long Answer - 1 question – either or type	01x10=10

Summative Examinations – For Part-IV Courses 50 Marks (converted to 75)
-2 hrs Duration

S.No	Type of Questions	Marks
1.	Objective type Questions: Multiple Choice – 10 questions	 10
2.	Short Answer - 4 questions – either or type	4x5=20
3.	Long Answer - 2 questions – either or type	02x10=20

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme - B.Sc. Chemistry

Attainment of Course outcomes

Attainment of Course outcomes is computed using Direct and Indirect assessment methods. Direct Method of Assessment is based on performance of the students in the Continuous Internal Assessment Tests, Summative Examinations and supporting activities such as Seminar, Assignment, Case study, Group Discussion, Quiz, etc., and Indirect Method of Assessment is based on periodical feedback from the students at the end of each course.

Weightage of Direct and Indirect Assessment in computation of attainment of each course is 70 % for Direct Assessment and 30 % for Indirect Assessment.

Direct Assessment of Course outcome attainment

i) Rubrics:

Internal Assessment contributes 60 % and Summative Examinations Assessment contributes 40 % to the Direct Assessment of a course outcome for Theory Courses. For the Practical Courses, Internal Assessment contributes 70 % and Summative Examinations Assessment contributes 30 % to the Direct Assessment of a course outcome.

ii) Setting of Target:

50 % of the maximum mark is set as target of Internal Assessment tools and the average mark of the class is set as target of Summative Examinations Assessment.

Formula for calculating percentage attainment of each course outcome

Based on the result of Summative Examinations and Internal Assessment tools, the number of students scoring more than the target is found out.

For each Internal Assessment Tools,

$$\text{Percentage attainment of each course outcome} = \frac{\text{No. of Students who scored more than the target in the concerned course outcome}}{\text{Total Number of Students}} \times 100$$

Percentage attainment of each Course outcome for Internal Assessment tools = Average of percentage attainment of all Internal Assessment tools

For Summative Examinations,

$$\text{Percentage attainment of each Course outcome} = \frac{\text{No. of. Students who scored more than the target in the concerned co}}{\text{Total Number of Students}} \times 100$$

Formula for calculating Attainment Percentage of Course outcome of a course

Percentage Attainment of Course outcome for Internal Assessment tools	=	Average of percentage attainment of all COs
Percentage Attainment of Course outcome for Summative Examinations	=	Average of percentage attainment of all COs

Final Direct Assessment of Course outcome Attainment

For Theory Courses

Percentage Attainment of Course outcome through Direct Assessment	=	(0.6 x percentage attainment of CO for internal assessment tool) + (0.4 x percentage attainment of CO for summative examinations)

For Practical Courses

Percentage Attainment of Course outcome through Direct Assessment	=	0.7 x percentage attainment of CO for Internal Assessment tools + 0.3 x percentage attainment of CO for Summative Examinations

Indirect Assessment of CO Attainment

The course outcome feedback is conducted at the end of every semester by distributing structured feedback questionnaire to the students. The analysis of this feedback questionnaire is done on the following score. The feedback forms will be sorted with various scores and feedbacks with a score more than 5.5 are considered as satisfactory level for calculations for indirect attainment.

A : 10-8.5 **B :** 8.4-7.0 **C :** 6.9-5.5 **D :** 5.4-4.0 **E :** 3.9-0

Percentage attainment for each CO = $\frac{\text{Satisfaction Number}}{\text{Response Received}} \times 100$

Percentage Attainment of CO of a course = Average of percentage attainment of all COs

Final Assessment of CO attainment

Average Course attainment = 0.7 x Direct assessment of CO attainment + 0.3 x Indirect assessment of CO attainment

Expected Level of Attainment for each of the Course Outcomes

Percentage of CO Attainment	Level of Attainment
=70% and above	Excellent
= 60% - <70 %	Very good
= 50% - <60 %	Good
= 40% - <50 %	Satisfactory
Below 40%	Not Satisfactory

Assessment of PO attainment

At the end of the each programme, the Direct PO Assessment is done from the CO Attainment of all courses. The Direct PO Attainment for a particular course is determined from the attainment values obtained for each course outcome related to that PO and the CO-PO mapping values.

Weighted contribution of the course in attainment of each PO = $\frac{\text{Weighted Percentage of contribution of the course in attainment of each PO x average course attainment}}{100}$

Percentage attainment for each PO = $\frac{\text{Total weightage of all courses contributed to each PO}}{\text{Total weightage of all courses contributed to all POs}} \times 100$ x weighted contribution of the course in the attainment of each PO

Percentage Attainment of PO = Average of Percentage attainment of all POs

Expected Level of Attainment for each of the Programme Outcomes

Percentage of PO Attainment	Level of Attainment
=70% and above	Excellent
= 60% - <70 %	Very good
= 50% - <60 %	Good
= 40% - <50 %	Satisfactory
Below 40%	Not Satisfactory

Attainment of Programme Educational Objectives (PEO)

PEOs are assessed after 3 to 4 years of graduation. Attainment is measured based on the Feedback from Stakeholders

1. Alumni
2. Parents
3. Employer

The analysis of this feedback questionnaire is done on the following score. The feedback forms will be sorted with various scores and feedbacks with a score more than 5.5 are considered as satisfactory level for calculations for Indirect Attainment.

A : 10-8.5 **B :** 8.4-7.0 **C :** 6.9-5.5 **D :** 5.4-4.0 **E :** 3.9-0

$$\text{Percentage attainment of PEOs} = \frac{\text{Satisfaction number}}{\text{Response Received}} \times 100$$

Expected Level of Attainment for each of the Programme Educational Objectives

Percentage of PEO Attainment	Level of Attainment
=70% and above	Excellent
= 60% - <70 %	Very good
= 50% - <60 %	Good
= 40% - <50 %	Satisfactory
Below 40%	Not Satisfactory

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DEPARTMENT OF CHEMISTRY

UG Programme - B.Sc. Chemistry

CURRICULUM STRUCTURE

OUTCOME-BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM

(From 2023-2024 Batch onwards)

Part	Courses	Sem I	Sem II	Sem III	Sem IV	Sem V	Sem VI	Credits
I	Tamil / Hindi	6 (3)	6 (3)	6 (3)	6 (3)	-	-	12
II	English	6 (3)	6 (3)	6 (3)	6 (3)	-	-	12
III	Core Courses	4 (4) 4P (4)	4 (4) 4P (4)	4 (4) 4P (4)	4 (4) 3P (3)	5 (4) 5 (4) 5(4) 5P (4)	6 (4) 6 (4) 6 (4) 5P (4)	63
	Elective Courses Generic/ Discipline Specific	6 (5)	6 (5)	4 (3) 2 (2)	4 (3) 2 (2)	4(3) 4(3)	5(3)	29
IV	Skill Enhancement Courses	2 (2) F 2 (2) NME	2(2) 2 (2) NME	1(1) E 2 (2)	2 (2) 2 (2)	-	2(2)	17
	Environmental Studies	-	-	1	1(2)	-	-	02
	Value Education	-	-	-	-	2(2)	-	02
	Internship/ Industrial Training	-	-	-	-	(2)	-	02
V	Extension Activity	-	-	-	-	-	(1)	01
Total Hours (Per week)/ Credits		30(23)	30(23)	30(22)	30(24)	30(26)	30(22)	140 180

Self-paced Learning (Swayam Course)	-	-	-	-	-	1 Credit	1 Credit

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DEPARTMENT OF CHEMISTRY

UG Programme - B.Sc. Chemistry

CURRICULUM PATTERN

OUTCOME-BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM

(From 2023-2024 Batch onwards)

PROGRAMME CODE – UCH

Semester	Part	Course Code	Course Name	Hours	Credits	Internal Marks	External Marks
I	I	23UTAG11	Podhu Tamil / Hindi – I	6	3	25	75
	II	23UENL11	General English – I	6	3	25	75
	III	23UCHC11	**Core Course – I:** General Chemistry – I	4	4	25	75
		23UCHC1P	**Core Course – II:** Practical: Quantitative Inorganic Estimation and Inorganic preparations	4	4	25	75
		23UCHA11	**Elective Course Generic/ Discipline Specific – I:** Mathematics – I	6	5	25	75
	IV	23UCHS11	**Skill Enhancement Course – I: Foundation Course –** Basic Concepts of Chemistry	2	2	25	75
		23UCHN11	**Skill Enhancement Course – II: Non Major Elective Course:** Food Chemistry	2	2	25	75
			Total	**30**	**23**		
II	I	23UTAG21	Podhu Tamil / Hindi – II	6	3	25	75
	II	23UENL21	General English – II	6	3	25	75
	III	23UCHC21	**Core Course – III :** General Chemistry – II	4	4	25	75
		23UCHC2P	**Core Course – IV :** Practical: Qualitative Organic Analysis and Preparation of Organic Compounds	4	4	25	75
		23UCHA21	**Elective Course Generic/ Discipline Specific – II:** Mathematics – II	6	5	25	75
	IV	23UCHS21	**Skill Enhancement Course – III**: Cosmetics and Personal Care Products	2	2	25	75
		23UCHN21	**Skill Enhancement Course – IV: Non Major Elective Course :** Diary Chemistry	2	2	25	75
			Total	**30**	**23**		
III	I	23UTAG31	Podhu Tamil / Hindi – III	6	3	25	75
	II	23UENL31	General English – III	6	3	25	75
	III	23UCHC31	**Core Course – V:** General Chemistry – III	4	4	25	75
		23UCHC3P	**Core Course – VI** : Practical: Qualitative Inorganic Analysis	4	4	25	75
		23UCHA31	**Elective Course Generic/ Discipline**	4	3	25	75

			Specific - III: Allied Physics - I				
		23UCHA3P	**Elective Course Generic/ Discipline Specific - III:** Practical : Allied Physics - I	2	2	25	75
	IV	23UCHS3P	**Skill Enhancement Course – V**: **(Entrepreneurial Skill)** - Entrepreneurial Skills in Chemistry	1	1	25	75
		23UCHS31	**Skill Enhancement Course – VI:** Pesticide Chemistry	2	2	25	75
		-	Environmental Studies	1	-	-	-
			Total	**30**	**22**		
IV	I	23UTAG41	Podhu Tamil / Hindi – IV	6	3	25	75
	II	23UENL41	General English – IV	6	3	25	75
	III	23UCHC41	**Core Course –VII :** General Chemistry – IV	4	4	25	75
		23UCHC4P	**Core Course – VIII** : Practical: Physical Chemistry – I	3	3	25	75
		23UCHA41	**Elective Course Generic/ Discipline Specific - IV:** Allied Physics – II	4	3	25	75
		23UCHA4P	**Elective Course Generic/ Discipline Specific - IV:** Practical: Allied Physics – II	2	2	25	75
	IV	23UCHS41	**Skill Enhancement Course – VII:** Instrumental Methods of Chemical Analysis	2	2	25	75
		23UCHS42	**Skill Enhancement Course – VIII:** Forensic Science	2	2	25	75
		23UESR41	Environmental Studies	1	2	25	75
			Total	**30**	**24**		
V	III	23UCHC51	**Core Course – IX :** Organic Chemistry – I	5	4	25	75
		23UCHC52	**Core Course – X:** Inorganic Chemistry – I	5	4	25	75
		23UCHC53	**Core Course – XI :** Physical Chemistry – I	5	4	25	75
		23UCHJ51	**Core Course – XII:** Project	5	4	25	75
		23UCHO51 23UCHO52 23UCHO53	**Elective Course Generic/ Discipline Specific - V:** 1. Biochemistry 2. Environmental Chemistry 3. Photochemistry	4	3	25	75
		23UCHO54 23UCHO55 23UCHO56	**Elective Course Generic/ Discipline Specific - VI:** 1. Industrial Chemistry 2. Geo Chemistry 3. Analytical Chemistry	4	3	25	75
	IV	23UVED51	Value Education	2	2	25	75
		23UCHJ52	Internship/Industrial Training	-	2	25	75
			Total	**30**	**26**		
VI	III	23UCHC61	**Core Course – XIII :** Organic Chemistry – II	6	4	25	75
		23UCHC62	**Core Course – XIV :** Inorganic Chemistry – II	6	4	25	75
		23UCHC63	**Core Course – XV:** Physical Chemistry -II	6	4	25	75
		23UCHC6P	**Core Course - XVI:** Practical: Physical Chemistry – II	5	4	25	75

		23UCHO61 23UCHO62 23UCHO63	**Elective Course Generic/ Discipline Specific - VII:** 1. Fundamentals of Spectroscopy 2. Medicinal Chemistry 3. Green Chemistry	5	3	25	75
	IV	23UCHS61	**Skill Enhancement Course – IX: Professional Competency Skill:** Chemistry for Competitive Examination	2	2	25	75
	V	-	Extension Activity	-	1	100	-
			Total	**30**	**22**		

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DEPARTMENT OF CHEMISTRY

UG Programme - B.Sc. Chemistry

OUTCOME-BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM

(From 2023-2024 Batch onwards)

PROGRAMME ARTICULATION MATRIX (PAM)

Semester	Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
I	23UTAG11	Podhu Tamil / Hindi – I	10	07	02	08	02	02	03
	23UENL11	General English – I	10	07	02	08	02	02	03
	23UCHC11	**Core Course – I:** General Chemistry – I	15	12	10	07	03	04	03
	23UCHC1P	**Core Course – II:** Practical: Quantitative Inorganic Estimation and Inorganic preparations	15	13	11	07	05	04	05
	23UCHA11	**Elective Course Generic/ Discipline Specific – I:** Mathematics – I	14	08	05	05	0	05	04
	23UCHS11	**Skill Enhancement Course – I: Foundation Course –** Basic Concepts of Chemistry	12	10	06	07	03	07	07
	23UCHN11	**Skill Enhancement Course – II: Non Major Elective Course:** Food Chemistry	09	05	03	08	02	05	05
II	23UTAG21	Podhu Tamil / Hindi – II	10	08	02	08	02	02	03
	23UENL21	General English – II	10	08	02	08	02	02	03
	23UCHC21	**Core Course – III :** General Chemistry – II	15	12	10	06	03	04	04
	23UCHC2P	**Core Course – IV :** Practical: Qualitative Organic Analysis and Preparation of Organic Compounds	15	13	11	08	06	07	05
	23UCHA21	**Elective Course Generic/ Discipline Specific – II:** Mathematics – II	14	08	05	05		05	04
	23UCHS21	**Skill Enhancement Course – III**: Cosmetics and Personal Care Products	10	07	04	04	03	06	05
	23UCHN21	**Skill Enhancement Course – IV: Non Major Elective Course :** Diary Chemistry	10	07	04	05	05	04	06

III	23UTAG31	Podhu Tamil / Hindi – III	10	08	02	08	02	02	02
	23UENL31	General English – III	10	08	03	09	03	03	02
	23UCHC31	**Core Course – V:** General Chemistry – III	15	13	09	06	03	04	05
	23UCHC3P	**Core Course – VI** : Practical: Qualitative Inorganic Analysis	15	14	11	07	03	04	05
	23UCHA31	**Elective Course Generic/ Discipline Specific - III:** Allied Physics - I	13	11	03	06	03	03	03
	23UCHA3P	**Elective Course Generic/ Discipline Specific - III:** Practical : Allied Physics - I	10	10	03	04	04	03	03
	23UCHS3P	**Skill Enhancement Course – V**: **(Entrepreneurial Skill)** - Entrepreneurial Skills in Chemistry	09	08	04	04	03	04	05
	23UCHS31	**Skill Enhancement Course – VI:** Pesticide Chemistry	10	08	06	04	05	04	05
	-	Environmental Studies							
IV	23UTAG41	Podhu Tamil / Hindi – IV	10	08	02	09	02	02	02
	23UENL41	General English – IV	10	09	03	08	02	03	03
	23UCHC41	**Core Course –VII :** General Chemistry – IV	15	13	11	07	03	05	04
	23UCHC4P	**Core Course – VIII** : Practical: Physical Chemistry – I	15	13	12	07	04	05	05
	23UCHA41	**Elective Course Generic/ Discipline Specific - IV:** Allied Physics – II	13	11	05	06	03	03	03
	23UCHA4P	**Elective Course Generic/ Discipline Specific - IV:** Practical: Allied Physics – II	10	10	03	04	04	03	04
	23UCHS41	**Skill Enhancement Course – VII:** Instrumental Methods of Chemical Analysis	11	10	08	05	02	07	06
	23UCHS42	**Skill Enhancement Course – VIII:** Forensic Science	11	09	05	04	03	03	04
	23UESR41	Environmental Studies	08	05	01	07	08	05	05
V	23UCHC51	**Core Course – IX :** Organic Chemistry – I	15	13	09	07	03	04	03
	23UCHC52	**Core Course – X:** Inorganic Chemistry – I	15	13	10	06	03	04	04
	23UCHC53	**Core Course – XI :** Physical Chemistry – I	15	12	09	06	04	04	05
	23UCHJ51	**Core Course – XII:** Project	13	10	10	11	04	05	03
	23UCHO51	**Elective Course Generic/ Discipline Specific - V:** 1. Biochemistry	12	10	06	07	04	04	05

	23UCHO52 23UCHO53	2. Environmental Chemistry 3. Photochemistry							
	23UCHO54 23UCHO55 23UCHO56	**Elective Course Generic/ Discipline Specific - VI:** 1. Industrial Chemistry 2. Geo Chemistry 3. Analytical Chemistry	11	10	08	06	03	04	05
	23UVED51	Value Education	08	05	01	05	09	04	07
	23UCHJ52	Internship/Industrial Training	8	12	04	07	01	05	08
VI	23UCHC61	**Core Course – XIII :** Organic Chemistry – II	15	13	10	07	03	04	04
	23UCHC62	**Core Course – XIV :** Inorganic Chemistry – II	15	13	09	07	03	04	04
	23UCHC63	**Core Course – XV:** Physical Chemistry -II	15	13	10	06	03	04	03
	23UCHC6P	**Core Course - XVI:** Practical: Physical Chemistry – II	15	13	11	06	03	04	05
	23UCHO61 23UCHO62 23UCHO63	**Elective Course Generic/ Discipline Specific - VII:** 1. Fundamentals of Spectroscopy 2. Medicinal Chemistry 3. Green Chemistry	12	10	06	06	02	05	04
	23UCHS61	**Skill Enhancement Course – IX: Professional Competency Skill:** Chemistry for Competitive Examination	10	10	07	06	06	07	07
	-	Extension Activity	08	02	01	07	09	08	05
Total Weightage of all Courses Contributing to PO			**543**	**450**	**278**	**292**	**146**	**184**	**198**

SRI KALISWARI COLLEGE (AUTONOMOUS), Sivakasi

(Affiliated to Madurai Kamaraj University, Re-accredited with A Grade (CGPA 3.11) by NAAC)

DEPARTMENT OF CHEMISTRY

UG Programme - B.Sc. Chemistry

OUTCOME-BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM

(From 2023-2024 Batch onwards)

PROGRAMME ARTICULATION MATRIX – WEIGHT PERCENTAGE

Semester	Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
I	23UTAG11	Podhu Tamil / Hindi – I	1.84	1.56	0.72	2.74	1.37	1.09	1.52
	23UENL11	General English – I	1.84	1.56	0.72	2.74	1.37	1.09	1.52
	23UCHC11	**Core Course – I:** General Chemistry – I	2.76	2.67	3.6	2.4	2.05	2.17	1.52
	23UCHC1P	**Core Course – II:** Practical: Quantitative Inorganic Estimation and Inorganic preparations	2.76	2.89	3.96	2.4	3.42	2.17	2.53
	23UCHA11	**Elective Course Generic/ Discipline Specific – I:** Mathematics **–** I	2.58	1.78	1.8	1.71	0	2.72	2.02
	23UCHS11	**Skill Enhancement Course – I: Foundation Course –** Basic Concepts of Chemistry	2.21	2.22	2.16	2.4	2.05	3.8	3.54
	23UCHN11	**Skill Enhancement Course – II: Non Major Elective Course:** Food Chemistry	1.66	1.11	1.08	2.74	1.37	2.72	2.53
II	23UTAG21	Podhu Tamil / Hindi – II	1.84	1.78	0.72	2.74	1.37	1.09	1.52
	23UENL21	General English – II	1.84	1.78	0.72	2.74	1.37	1.09	1.52
	23UCHC21	**Core Course – III :** General Chemistry – II	2.76	2.67	3.6	2.05	2.05	2.17	2.02
	23UCHC2P	**Core Course – IV :** Practical: Qualitative Organic Analysis and Preparation of Organic Compounds	2.76	2.89	3.96	2.74	4.11	3.8	2.53
	23UCHA21	**Elective Course Generic/ Discipline Specific – II:** Mathematics – II	2.58	1.78	1.8	1.71	0	2.72	2.02
	23UCHS21	**Skill Enhancement Course – III**: Cosmetics and Personal Care Products	1.84	1.56	1.44	1.37	2.05	3.26	2.53
	23UCHN21	**Skill Enhancement Course – IV: Non Major Elective Course :** Diary Chemistry	1.84	1.56	1.44	1.71	3.42	2.17	3.03
III	23UTAG31	Podhu Tamil / Hindi – III	1.84	1.78	0.72	2.74	1.37	1.09	1.01

	23UENL31	General English – III	1.84	1.78	1.08	3.08	2.05	1.63	1.01
	23UCHC31	**Core Course – V:** General Chemistry – III	2.76	2.89	3.24	2.05	2.05	2.17	2.53
	23UCHC3P	**Core Course – VI** : Practical: Qualitative Inorganic Analysis	2.76	3.11	3.96	2.4	2.05	2.17	2.53
	23UCHA31	**Elective Course Generic/ Discipline Specific - III:** Allied Physics - I	2.39	2.44	1.08	2.05	2.05	1.63	1.52
	23UCHA3P	**Elective Course Generic/ Discipline Specific - III:** Practical : Allied Physics - I	1.84	2.22	1.08	1.37	2.74	1.63	1.52
	23UCHS3P	**Skill Enhancement Course – V**: **(Entrepreneurial Skill)** - Entrepreneurial Skills in Chemistry	1.66	1.78	1.44	1.37	2.05	2.17	2.53
	23UCHS31	**Skill Enhancement Course – VI:** Pesticide Chemistry	1.84	1.78	2.16	1.37	3.42	2.17	2.53
	-	Environmental Studies							
IV	23UTAG41	Podhu Tamil / Hindi – IV	1.84	1.78	0.72	3.08	1.37	1.09	1.01
	23UENL41	General English – IV	1.84	2	1.08	2.74	1.37	1.63	1.52
	23UCHC41	**Core Course –VII :** General Chemistry – IV	2.76	2.89	3.96	2.4	2.05	2.72	2.02
	23UCHC4P	**Core Course – VIII** : Practical: Physical Chemistry – I	2.76	2.89	4.32	2.4	2.74	2.72	2.53
	23UCHA41	**Elective Course Generic/ Discipline Specific - IV:** Allied Physics – II	2.39	2.44	1.8	2.05	2.05	1.63	1.52
	23UCHA4P	**Elective Course Generic/ Discipline Specific - IV:** Practical: Allied Physics – II	1.84	2.22	1.08	1.37	2.74	1.63	2.02
	23UCHS41	**Skill Enhancement Course – VII:** Instrumental Methods of Chemical Analysis	2.03	2.22	2.88	1.71	1.37	3.8	3.03
	23UCHS42	**Skill Enhancement Course – VIII:** Forensic Science	2.03	2	1.8	1.37	2.05	1.63	2.02
	23UESR41	Environmental Studies	1.47	1.11	0.36	2.4	5.48	2.72	2.53
V	23UCHC51	**Core Course – IX :** Organic Chemistry – I	2.76	2.89	3.24	2.4	2.05	2.17	1.52
	23UCHC52	**Core Course – X:** Inorganic Chemistry – I	2.76	2.89	3.6	2.05	2.05	2.17	2.02
	23UCHC53	**Core Course – XI :** Physical Chemistry – I	2.76	2.67	3.24	2.05	2.74	2.17	2.53
	23UCHJ51	**Core Course – XII:** Project	2.39	2.22	3.6	3.77	2.74	2.72	1.52
		Elective Course Generic/ Discipline Specific - V:	2.21	2.22	2.16	2.4	2.74	2.17	2.53

	23UCHO51 23UCHO52 23UCHO53	1. Biochemistry 2. Environmental Chemistry 3. Photochemistry							
	23UCHO54 23UCHO55 23UCHO56	**Elective Course Generic/ Discipline Specific - VI:** 1. Industrial Chemistry 2. Geo Chemistry 3. Analytical Chemistry	2.03	2.22	2.88	2.05	2.05	2.17	2.53
	23UVED51	Value Education	1.47	1.11	0.36	1.71	6.16	2.17	3.54
	23UCHJ52	Internship/Industrial Training	1.47	2.67	1.44	2.4	0.68	2.72	4.04
VI	23UCHC61	**Core Course – XIII :** Organic Chemistry – II	2.76	2.89	3.6	2.4	2.05	2.17	2.02
	23UCHC62	**Core Course – XIV :** Inorganic Chemistry – II	2.76	2.89	3.24	2.4	2.05	2.17	2.02
	23UCHC63	**Core Course – XV:** Physical Chemistry -II	2.76	2.89	3.6	2.05	2.05	2.17	1.52
	23UCHC6P	**Core Course - XVI:** Practical: Physical Chemistry – II	2.76	2.89	3.96	2.05	2.05	2.17	2.53
	23UCHO61 23UCHO62 23UCHO63	**Elective Course Generic/ Discipline Specific - VII:** 1. Fundamentals of Spectroscopy 2. Medicinal Chemistry 3. Green Chemistry	2.21	2.22	2.16	2.05	1.37	2.72	2.02
	23UCHS61	**Skill Enhancement Course – IX: Professional Competency Skill:** Chemistry for Competitive Examination	1.84	2.22	2.52	2.05	4.11	3.8	3.54
	-	Extension Activity	1.47	0.44	0.36	2.4	6.16	4.35	2.72
Total Weightage of all Courses Contributing to PO			**100**	**100**	**100**	**100**	**100**	**100**	**100**

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF TAMIL
UG PROGRAMME - B.A./ B.COM/B.B.A./ B.SC./BCA
SEMESTER - I
(2023-2026)
பொதுத்தமிழ் - I (21UTAG11)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 6 **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 90 hrs **MAX. MARKS: 100**

நோக்கங்கள்

- முதலாமாண்டு பட்ட வகுப்பு மாணவர்களுக்குத் தமிழ் மொழி இலக்கியங்களை அறிமுகம் செய்தல்.
- தற்கால இலக்கியப் போக்குகளையும் இலக்கணங்களையும் மாணவர் அறியுமாறு செய்து அவர்களின் படைப்பாற்றலைத் தூண்டுதல்.
- தமிழ் இலக்கியம் சார்ந்த போட்டித் தேர்வுகளுக்கு ஏற்ப கற்பித்தல் நடைமுறைகளை மேற்கொள்ளுதல்.

கற்றலின் விளைவுகள்

இத்தாளை வெற்றிகரமாக முடித்தவுடன் மாணவர்கள்,

CO1[K1]: பாரதியார் காலந்தொட்டு தற்காலக் கவிதைகள் வரை கவிதை இலக்கியம் அறிமுகப்படுத்தப்படுவதால் அவற்றை அடையாளம் காண்பர்.

CO2[K2]: கவிதை வரலாற்றினை புரிந்து கொண்டு பிழை இல்லாமல் எழுதும் திறன் பெறுவர்.

CO3[K3]: இக்கால இலக்கிய வகைகள் மற்றும் இலக்கணம் கற்பதன் மூலம் அவற்றை தம் வாழ்நிலையோடு பொருத்திப் பார்ப்பர்.

CO4[K4]: மொழியறிவோடு சிந்தனைத்திறன் பெற்று இலக்கியம் மற்றும் இலக்கணங்களைப் பகுப்பாய்வர்.

CO5[K5]: உலகளாவிய இலக்கியங்களைக் கற்று மதிப்பீடு செய்வர்.

CO/PO Mapping Table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	2	-	2	-	-	-
CO2[K2]	2	2	-	2	-	-	-
CO3[K3]	2	1	-	2	1	-	1
CO4[K4]	2	1	1	1	1	1	1
CO5[K5]	2	1	1	1	-	1	1
Weightage of the course	10	07	02	08	02	02	03
Weighted percentage of Course contribution to POs	**1.84**	**1.56**	**0.72**	**2.74**	**1.37**	**1.09**	**1.52**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

கூறு I **(18 hrs)**

மரபுக்கவிதை: பெ.சுந்தரனார் - தமிழ்த் தெய்வ வணக்கம், பாரதிதாசன் - சிறுத்தையை வெளியில் வா, கவிமணி - புத்தரும் சிறுவனும், முடியரசன் - மொழி உணர்ச்சி, கண்ணதாசன் - ஆட்டனத்தி ஆதிமந்தி - ஆதிமந்திபுலம்பல், சுரதா - துறைமுகம் தொகுப்பிலிருந்து ஏதேனும் ஒருகவிதை, தமிழ் ஒளி - கடல்

கூறு II **(18 hrs)**

புதுக்கவிதை: அப்துல் ரகுமான் - வீட்டுக்கொருமரம் வளர்ப்போம், ஈரோடு தமிழன்பன் - சென்ரியூ கவிதைகள் (ஏதேனும் ஐந்து கவிதைகள்), வைரமுத்து - பிற்சேர்க்கை, மு.மேத்தா - வாழைமரம், அறிவுமதி - வள்ளுவம் பத்து, நா முத்துக்குமார் - ஆனந்தயாழை மீட்டுகிறாய், சுகிர்தராணி - சபிக்கப்பட்ட முத்தம், இளம் பிறை - நீ எழுத மறுக்கும் எனது அழகு.

கூறு III **(18 hrs)**

சிறுகதைகள் : வாய்ச்சொற்கள் - ஜெயகாந்தன் (மாலைமயக்கம் தொகுப்பு), கடிதம் - புதுமைப்பித்தன், கரு - உமாமகேஸ்வரி, முள்முடி - தி.ஜானகிராமன், சிதறல்கள் - விழி.பா.இதயவேந்தன், காகிதஉறவு - சு.சமுத்திரம், வீட்டின் மூலையில் சமையல் அறை - அம்பை, (மொழிபெயர்ப்புக் கதை) ஆண்டன் செக்காவ் - நாய்க்காரச் சீமாட்டி, சந்தியா பதிப்பகம்.

கூறு IV **(18 hrs)**

மரபுக்கவிதை கவிதை தோற்றம் வளர்ச்சி - புதுக்கவிதை கவிதை தோற்றம் வளர்ச்சி - சிறுகதை தோற்றம் வளர்ச்சி

கூறு V **(18 hrs)**

மொழித்திறன் போட்டிதேர்வு: பொருள் பொதிந்த சொற்றொடர் அமைத்தல், ஓர் எழுத்து ஒருமொழி, வேற்றுமை உருபுகள், திணை, பால், எண், இடம், கலைச்சொல்லாக்கம், மொழிபெயர்ப்பு.
(குறிப்பு: அலகு 4, 5 ஆகியன போட்டித் தேர்வு நோக்கில் நடத்தப்பட வேண்டும்).

பாடநூல்கள்

1. தமிழியல் துறையினர், *தொகுப்பு நூல்,* ஸ்ரீ காளீஸ்வரி கல்லூரி (தன்னாட்சி), சிவகாசி.
2. வாசுதேவன், கா. *பன்முக நோக்கில் தமிழ் இலக்கிய வரலாறு,* தேவன் பதிப்பகம், திருச்சிராப்பள்ளி, 2017.

பார்வை நூல்கள்

1. சிற்பி. பாலசுப்பிரமணியன், *தமிழ் இலக்கிய வரலாறு,* கவிதா வெளியீடு, சென்னை.
2. தமிழண்ணல், *புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு,* சோலை பதிப்பகம், மதுரை
3. பாக்கியமேரி, *வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு*, பாரி நிலையம், சென்னை.

வலைப்பதிவுகள் (Web Sources)

1. Tamil Heritage Foundation- www.tamilheritage.org <http://www.tamilheritage.org>

2. Tamil virtual University Library- www.tamilvu.org/ library http://www.virtualvu.org/library
3. Project Madurai - www.projectmadurai.org.
4. Chennai Library- www.chennailibrary.com <http://www.chennailibrary.com>.
5. Tamil Universal Digital Library- www.ulib.prg <http://www.ulib.prg>.
6. Tamil E-Books Downloads- tamilebooksdownloads. blogspot.com
7. Tamil Books on line- books.tamil cube.com
8. Catalogue of the Tamil books in the Library of British Congress archive.org
9. Tamil novels on line - books.tamilcube.com

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF ENGLISH
UG PROGRAMME - B.A./ B.COM/B.B.A./ B.SC./BCA
SEMESTER- I
GENERAL ENGLISH-I (23UENL11)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 6 (L-5, T-1) **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 90 hrs **MAX. MARKS: 100**

Course Objectives

- To enable learners to acquire the linguistic competence necessarily required in various life situations.
- To help them understand the written text and able to use skimming, scanning skills
- To assist them in creative thinking abilities.
- To enable them become better readers and writers.
- To assist them in developing correct reading habits, silently, extensively and intensively.

Course Outcomes (CO)

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

CO1[K1]: identify the use of the language skills i.e. Reading, Listening, Speaking and Writing.

CO2[K2]: demonstrate communicative skills by articulating simple dialogues and instructions.

CO3[K3]: apply knowledge of word power and grammar in framing correct sentences.

CO4[K4]: analyze prose, poetry and short stories to develop language skills through literature.

CO5[K5]: assess the linguistic competence that enables them, in the future, to present their views in various social, academic and employment situations.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	2	-	2	-	-	-
CO2[K2]	2	2	-	2	-	-	-
CO3[K3]	2	1	-	2	1	-	1
CO4[K4]	2	1	1	1	1	1	1
CO5[K5]	2	1	1	1	-	1	1
Weightage of the course	10	07	02	08	02	02	03
Weighted percentage of Course contribution to POs	**1.84**	**1.56**	**0.72**	**2.74**	**1.37**	**1.09**	**1.52**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I - PROSE **(18 hrs)**

Jerome K Jerome	–	Uncle Podger Hangs a Picture
David Sedaris	–	Us and Them -From Dress Your Family in Corduroy and Denim
Harish Bhat	–	JRD

UNIT II - POETRY **(18 hrs)**

William Ralph Emerson	–	A Nation's Strength
Paul Laurence Dunbar	–	The Sparrow
Subramania Bharati	–	A Patch of Land
Chinua Achebe	–	Love Cycle

UNIT III - SHORT STORIES **(18 hrs)**

Bhabani Bhattacharya	–	The Faltering Pendulum
R.K. Laxman	–	The Gold Frame
Sudha Murthy	–	How I Taught My Grandmother to Read

UNIT IV - LANGUAGE COMPETENCY **(18 hrs)**

Vocabulary: Synonyms, Antonyms, Word Formation
Appropriate use of Articles and Parts of speech
Error Correction

UNIT V - ENGLISH FOR WORKPLACE **(18 hrs)**

Self-Introduction, Greetings
Introducing others
Listening for General and Specific Information
Listening to and Giving Instructions/Directions

TEXTBOOKS

1. Bhattacharya, Bhabani. *Steel Hawk and other stories*. New Delhi: Sahitya Akademi, 1967.

2. Sudha, Murthy. *How I Taught My Grandmother to Read and other Stories*, India: Penguin Books, 2004.

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1. Kumar, Vijay T & K Durga Bhavani. *English in use -A Textbook for College Students.* YL Srinivas
2. Swan, Michael. *Practical English Usage* - 4th Edition. New York: Oxford University Press, 2016.
3. Shepherd Margaret & Sharon Hogan. Penny Carter (Illustrator). *The Art of Civilized Conversation: A Guide to Expressing Yourself with Style and Grace.* Now York: Broadway Books, 2005.

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1. https://books.google.co.in/books?id=iSHvOmXuvLMC&printsec=frontcover&dq=subramania+bharati+poems&hl=en&newbks=1&newbks_redir=0&source=gb_mobile_search&sa=X&redir_esc=y#v=onepage&q=subramania%20bharati%20poems&f=false
2. https://poets.org/poem/sparrow-0
3. https://poets.org/poem/nations-strength
4. https://www.best-poems.net/chinua-achebe/love-cycle.html
5. https://www.tata.com/newsroom/heritage/coffee-tea-jrd-tata-stories
6. https://legacy.npr.org/programs/morning/features/2004/jun/sedaris/usandthem.html
7. http://rosyhunt.blogspot.com/2013/01/uncle-podger-hangs-picture.html
8. https://fybaenglish.blogspot.com/2018/12/the-gold-frame-r-k-laxman.html

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- I
CORE COURSE – I: GENERAL CHEMISTRY – I (23UCHC11)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS: 25**
CREDITS : 4 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- To study various atomic models and atomic structure
- To understand wave particle duality of matter
- To gain knowledge in Periodic table, periodicity in properties
- To identify the nature of chemical bonding
- To know fundamental concepts of organic chemistry

Course Outcomes (CO)

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

CO1[K1]: explain the atomic structure, wave particle duality of matter, resonance, periodic properties, structure and bonding.

CO2[K2]: Classify the elements in the periodic table, Dual nature of matter, types of bonds, reaction intermediates and types of reagents.

CO3[K3]: apply the theories of atomic structure and bonding in the molecules.

CO4[K4]: evaluate the relationship existing between electronic configuration, bonding, geometry of molecules and reactions; structure reactivity and electronic effects.

CO5[K5]: predict trends in periodic properties, assess the properties of elements and explain hybridization in molecules, orbital, nature of H-bonding and organic reaction mechanisms and construct MO diagrams.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	2	1	-	1	-
CO2[K2]	3	2	2	2	-	1	-
CO3[K3]	3	2	2	1	1	-	1
CO4[K4]	3	2	2	2	1	1	1
CO5[K5]	3	3	2	1	1	1	1
Weightage of the course	15	12	10	07	03	04	03
Weighted percentage of Course contribution to POs	**2.76**	**2.67**	**3.6**	**2.4**	**2.05**	**2.17**	**1.52**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – ATOIMIC STRUCTURE AND PERIODIC TRENDS (12 hrs)

History of Atom (J. J. Thomson, Rutherford) – Moseley's Experiment and Atomic Number – Atomic Spectra – Black-Body Radiation and Planck's Quantum Theory – Bohr's Model of Atom – The Franck-Hertz Experiment – Interpretation of H-Spectrum – Photoelectric Effect – Compton Effect – Dual Nature of Matter-De-Broglie Wavelength – Davisson and Germer Experiment – Heisenberg's Uncertainty Principle – Electronic Configuration of Atoms and Ions – Hund's Rule – Paui's Exclusion Principle and Aufbau Principle. Numerical Problems Involving the Core Concepts.

UNIT II – INTRODUCTION TO QUANTUM MECHANICS (12 hrs)

Classical Mechanics – Wave Mechanical Model of Atom – Distinction Between a Bohr Orbit and Orbital – Postulates of Quantum Mechanics – Probability Interpretation of Wavefunctions – Formulation of Schrodinger Wave Equation – Probability and Electron Density – Visualizing the Orbitals – Probability Density and Significance of Ψ And Ψ^2. **Modern Periodic Table:** Cause of Periodicity – Features of the Periodic Table – Classification of Elements – Periodic Trends for Atomic Size-Atomic Radii, Ionic, Crystal and Covalent Radii – Ionization Energy – Electron Affinity – Electronegativity – Electronegativity Scales – Applications of Electronegativity. Problems Involving the Core Concepts.

UNIT III – STRUCTURE AND BONDING – I (12 hrs)

Ionic Bond: Lewis Dot Structure of Ionic Compounds – Properties of Ionic Compounds – Energy Involved in Organic Compounds – Born Haber Cycle – Lattice Energies- Madelung Constant – Relative Effect of Lattice Energy And Salvation Energy – Ion Polarization – Polarising Power and Polarizability – Fajan's Rules – Effects of Polarization on Properties Of Compounds – Problems

Involving the Core Concepts. **Covalent Bond:** Shapes of Orbitals – Overlap of Orbitals – σ and π Bonds – Directed Valency – Hybridization – VSEPR Theory – Shapes of Molecules of The Type AB_2, AB_3, AB_4, AB_5, AB_6 And AB_7. Partial Ionic Character of Covalent Bond – Dipole Moment – Application to Molecules of the Type A_2, AB, AB_2, AB_3, AB_4 – Percentage of Ionic Character – Numerical Problems Based on Calculation Percentage Ionic Character.

UNIT IV – STRUCTURE AND BONDING–II (12 hrs)

VB Theory – Application to Hydrogen Molecule – Concept of Resonance – Resonance Structures of Some Inorganic Species – CO_2, NO_2, CO_3^{2-},NO_3^- – Limitations of VBT – MO Theory – Bonding, Antibonding And Nonbonding Orbitals – Bond Order – MO Diagrams of H_2, C_2, O_2, O_2^+, O^{2-}, O_2^{2-}, N_2, NO, HF, CO – Magnetic Characteristics-Comparison of VB And MO Theories. **Coordinate Bond**: Definition-Formation of $F_3B \longleftarrow NH_3$ – Metallic Bond – Electron Sea Model – VB Model – Band Theory – Mechanism of Conduction in Solids – Conductors – Insulator – Semiconductor – Types, Applications of Semiconductors. **Weak Chemical Forces**: Vander Waals Forces – Ion-Dipole Forces – Dipole-Dipole Interactions – Induced Dipole Interactions – Instantaneous Dipole-Induced Dipole Interactions – Repulsive Forces – Hydrogen Bonding – Types – Special Properties of Water, Ice, Stability of DNA – Effects of Chemical Force – Melting and Boiling Points.

UNIT V – BASICS CONCEPTS IN ORGANIC CHEMISTRY AND ELECTRONIC EFFECTS (12 hrs)

Types of Bond Cleavage – Heterolytic and Hemolytic – Arrow Pushing in Organic Reactions – Reagents And Substrates– Types of Reagents–Electrophiles, Nucleophiles, Free Radicals – Reaction Intermediates – Carbanions, Carbocations, Carbenes, Arynes and Nitrynes. Inductive Effect – Reactivity of Alkyl Halides – Acidity of Halo Acids – Basicity of Amines – Inductomeric and Electromeric Effects. Resonance – Resonance Energy – Conditions for Resonance – Acidity of Phenols – Basicity of Aromatic Amines – Stability of Carbonium Ions, Carbanions and Free Radicals – Reactivity of Vinyl Chloride – Dipole Moment of Vinyl Chloride and Nitrobenzene – Bond Lengths – Steric Inhibition to Resonance. Hyperconjugation – Stability of Alkenes – Bond Length – Orienting Effect of Methyl Group – Dipole Moment of Aldehydes and Nitromethane. Types of Organic Reactions-Addition, Substitution, Elimination and Rearrangements

TEXTBOOKS

1. Madan, R. D and Sathya Prakash, *Modern Inorganic Chemistry,* 2nd Edition, S. Chand and Company: New Delhi, 2003.
2. Puri B. R and Sharma, L. R, *Principles of Physical Chemistry*, 38th Edition, Vishal Pubishing Company: Jalandhar, 2002.
3. Bruce P. Y and Prasad K. J. R, *Essential Organic Chemistry*, Pearson Education: New Delhi, 2008.

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1. Maron S. H and Prutton C. P Principles of Physical Chemistry, 4th Edition, The Macmillan Company: New York, 1972.
2. Lee J. D, Concise Inorganic Chemistry, 4th Edition, ELBS William Heinemann: London, 1991.
3. Gurudeep Raj, Advanced Inorganic Chemistry, 26th Edition, Goel Publishing House: Meerut, 2001.
4. Atkins, P.W. & Paula, J. *Physical Chemistry*, 10th Edition, Oxford University Press: New York, 2014.
5. Huheey J. E, *Inorganic Chemistry: Principles of Structure and Reactivity,* 4th Edition, Addison, Wesley Publishing Company: India, 1993.

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1. https://www.digimat.in/nptel/courses/video/104106096/L01.html
2. https://www.youtube.com/watch?v=R6bxF0PPsTo
3. https://www.youtube.com/watch?v=mwog2IxDFso

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- I
CORE COURSE – II: PRACTICAL: QUANTITATIVE INORGANIC ESTIMATION AND INORGANIC PREPARATIONS (23UCHC1P)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS: 25**
CREDITS : 4 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- To be aware of laboratory safety
- To handle glass wares properly
- To estimate the ions Quantitatively
- To prepare inorganic compounds
- To know the water analysis

Course Outcomes (CO)

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

CO1[K2]: explain the basic principles involved in titrimetric analysis and inorganic preparations and laboratory safety.

CO2[K3]: compare the methodologies of different titrimetric analysis, preparation of inorganic compounds.

CO3[K4]: plan and perform all the experiments, analyze and record the readings.

CO4[K5]: determine the concentrations of unknown solutions in different ways and develop the skill to estimate the amount of a substance present in a given solution.

CO5[K6]: predict the yield of different inorganic preparations and the end point of various titrations.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	3	3	1	2	1	1
CO2[K3]	3	2	2	1	-	1	1
CO3[K4]	3	2	2	1	1	1	1
CO4[K5]	3	3	2	2	1	-	1
CO5[K6]	3	3	2	2	1	1	1
Weightage of the course	15	13	11	07	05	04	05
Weighted percentage of Course contribution to POs	**2.76**	**2.89**	**3.96**	**2.4**	**3.42**	**2.17**	**2.53**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

ORGANIC CHEMISTRY PRACTICAL

UNIT I **(5 hrs)**

CHEMICAL LABORATORY SAFETY IN ACADEMIC INSTITUTIONS

Introduction – Importance of Safety Education for Students – Common Laboratory Hazards – Assessment and Minimization of the Risk of the Hazards – Prepare for Emergencies from Uncontrolled Hazards – Concept of MSDS – Importance and Care of PPE – Proper use and Operation of Chemical Hoods and Ventilation System – Fire Extinguishers – Types and Uses of Fire Extinguishers – Demonstration of Operation – Chemical Waste and Safe Disposal.

COMMON APPARATUS USED IN QUANTITATIVE ESTIMATION (VOLUMETRIC)

Description and use of Burette – Pipette – Standard Flask – Measuring Cylinder – Conical Flask – Beaker – Funnel – Dropper – Clamp – Stand – Wash Bottle – Watch Glass – Wire Gauge and Tripod Stand.

PRINCIPLE OF QUANTITATIVE ESTIMATION (VOLUMETRIC)

Equivalent Weight of an Acid – Base – Salt – Equivalent Weight – Reducing Agent –Oxidizing Agent – Concept of Mole, Molality, Molarity, Normality – Primary and Secondary Standards – Preparation of Standard Solutions – Theories of Acid – Base, Redox, Complexometric, Iodimetric and Iodometric Titrations – Indicators – Types, Theory of Acid – Base, Redox, Metal Ion and Adsorption Indicators – Choice of Indicators.

UNIT II **(30 hrs)**

QUANTITATIVE ESTIMATION (VOLUMETRIC)

Preparation of Standard Solution – Dilution from Stock Solution

Permanganometry

1. Estimation of Sodium Oxalate using Standard Ferrous Ammonium Sulphate

Dichrometry

2. Estimation of Ferric Alum using Standard Dichromate (External Indicator)
3. Estimation of Ferric Alum using Standard Dichromate (Internal Indicator)

Iodometry

4. Estimation of Copper in Copper Sulphate using Standard Dichromate

Argentimetry

5. Estimation of Chloride in Barium Chloride using Standard Sodium Chloride
6. Estimation of Chloride in Sodium Chloride (Volhard's Method)

UNIT III **(25 hrs)**

Complexometry

1. Estimation of Hardness of Water Using EDTA

Estimations

2. Estimation of Iron in Iron Tablets
3. Estimation of Ascorbic Acid

Preparation of Inorganic Compounds

1. Potash Alum
2. Tetraammine Copper (II) Sulphate
3. Hexammine Cobalt (III) Chloride
4. Mohr's Salt

TEXTBOOKS

1. Venkateswaran V, Veeraswamy R, Kulandivelu A. R, *Basic Principles of practical Chemistry,* 2nd Edition, Sultan Chand & sons: New Delhi, 1997.

2. Nad A. K, Mahapatra, Ghoshal A, *An Advanced course in practical chemistry,* 3rd Edition, New Central Book Agency: Kolkata, 2007.

REFERENCE

Book

1. Mendham J, Denney R. C, Barnes J. D, Thomas M, Sivasankar B, *Vogel's Textbook of Quantitative Chemical Analysis*, 6th Edition, Pearson Education Ltd: New Delhi, 2000.

Web Sources

1. http://www.federica.unina.it/agraria/analyticalchemistry/volumetric-analysis
2. https://chemdictionary.org/titration-indicator/

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF MATHEMATICS
UG Programme - B.Sc. Physics / B. Sc. Chemistry
SEMESTER - I
ELECTIVE COURSE GENERIC / DISCIPLINE SPECIFIC - I: MATHEMATICS - I
(23UPHA11/23UCHA11)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 6 (L-5, T-1)	**INT. MARKS: 25**
CREDITS : 5	**EXT. MARKS: 75**
DURATION : 90 hrs	**MAX. MARKS: 100**

Course Objectives

- To explore the fundamental concepts of Mathematics
- To acquire knowledge about finding approximate roots of the polynomial equations.
- To improve students' ability in solving problems of matrices and calculus.

Course Outcomes (CO)

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

CO1[K1]: state the elementary concepts of calculus, numerical methods of solving equations, eigen values and eigen vectors of matrices

CO2[K2]: explain the application of differentiation, integration and the method of solving polynomial equations numerically

CO3[K3]: find the numerical solution of polynomial equations, eigen values and eigen vectors of matrices, curvature and radius of curvature of curves, area, volume and centroid of surfaces

CO4[K4]: interpret Cayley-Hamilton theorem, Leibnitz theorem, Jacobian determinant, iterative methods of solving polynomial equations

CO5[K5]: determine the approximate solution of polynomial equations numerically, inverse, eigen values and eigen vectors of a matrix, n^{th} derivative of a function, curvature and radius of curvature of a curve, double and triple integration of integrands

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	1	-	1	-	1	-
CO2[K2]	3	1	1	1	-	1	1
CO3[K3]	3	2	1	1	-	1	1
CO4[K4]	3	2	1	1	-	1	1
CO5[K5]	3	2	2	1	-	1	1
Weightage of the course	14	08	05	05	0	05	04
Weighted percentage of Course contribution to POs	**2.58**	**1.78**	**1.8**	**1.71**	**0**	**2.72**	**2.02**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I **(18 hrs)**

The Solution of Numerical Algebraic and Transcendental Equations: The Bisection Method - Iteration Method - Regula Falsi Method – Newton-Raphson Method - Simple problems.

TextBook 1 - Page No. 69-97

UNIT II **(18 hrs)**

Solutions of Simultaneous Linear Algebraic Equations: Gauss-Elimination Method - Gauss Jordan Elimination Method – Iterative Methods – Gauss Jacobi Method - Gauss Seidel Iterative Method - Simple problems.

TextBook 1 - Page No. 112 -126 and 145 - 158

UNIT III **(18 hrs)**

Matrices: Eigen Values and Eigen vectors-Cayley -Hamilton Theorem [without proof].

TextBook 2 - Page No. 85 - 95

UNIT IV **(18 hrs)**

Successive Differentiation: The n-th Derivatives – Standard Results – Trigonometrical Transformation - Leibnitz Formula for the n-th derivative of a product Theorem [without proof]. **Curvature:** Circle, Radius and Centre of curvature – Cartesian Formula for the Radius of Curvature – The Co-ordinates of the Centre of Curvature – Evolute and Involute - Radius of Curvature when the curve is given in Polar Co-ordinates.

TextBook 3 - Page No. 70 - 75, 82 – 84, 291 – 312.

UNIT V **(18 hrs)**

Multiple Integrals: Evaluation of the Double Integral – Double Integral in Polar Co-ordinates - Triple Integrals – Simple Applications to Area and Volume.

TextBook 4 - Page No. 203-241

TEXTBOOKS

1. Kandasamy P, Thilagavathy K and Gunavathy K, *Numerical Methods.* New Delhi: S. Chand & Company Ltd, 2002. **(UNITS I & II)**
2. Balasubramanyam P and Subramanian K. G, *Ancillary Mathematics Volume I*. New Delhi: Tata McGraw-Hill Publishing Company Ltd,1996. **(UNIT III)**
3. Narayanan S and Manicavachagom Pillay T. K, *Calculus Vol I*. Chennai: S. Viswanathan Pvt Ltd, 2006. **(UNITIV)**
4. S.Narayanan and T.K.Manicavachagom Pillay. *Calculus Vol II*. Chennai: S. Viswanathan Pvt Ltd, 2006. **(UNIT V)**

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1. Venkatesan S. J, *Allied Mathematics – I,* Chennai: Sri Krishna Publications.
2. Vittal P. R, *Allied Mathematics.* Chennai: Margham Publication, 2003.
3. Singaravelu A, *Numerical Methods*. Meenakshi Publications.

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1. https://www.onlinemath4all.com/characteristic-equation-of-matrix.html
2. https://www.youtube.com/watch?app=desktop&v=_WcPtsuMMz0
3. https://www.youtube.com/watch?app=desktop&v=KgItZSst2sU
4. https://www.youtube.com/watch?app=desktop&v=w_KiHgultbM

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- I
SKILL ENHANCEMENT COURSE – I: FOUNDATION COURSE – BASIC CONCEPTS OF CHEMISTRY (23UCHS11)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX. MARKS: 100**

Course Objectives

- To understand the lab safety measures
- To outline the basic concepts of organic chemistry
- To describe the importance of periodic table
- To understand the importance of redox reactions
- To improve their skill in IUPAC nomenclature

Course Outcomes (CO)

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

CO1[K1]: describe the general lab safety and basic concepts of organic, inorganic and physical chemistry

CO2[K2]: classify the first aid, various elements in periodic table and bonds.

CO3[K3]: apply the rules to write IUPAC nomenclature and to write electronic configuration

CO4[K4]: evaluate the safety rules, bonding and states of matter.

CO5[K5]: predict the hybridization, equivalent weight and fundamental and derived units

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	1	1	-	1	1
CO2[K2]	3	2	1	2	1	1	1
CO3[K3]	2	2	2	2	1	1	1
CO4[K4]	2	2	1	1	1	2	2
CO5[K5]	2	2	1	1	-	2	2
Weightage of the course	12	10	06	07	03	07	07
Weighted percentage of Course contribution to POs	**2.21**	**2.22**	**2.16**	**2.4**	**2.05**	**3.8**	**3.54**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – GENERAL SAFETY AND FIRST AID IN CHEMISTRY LABORATORY (6 hrs)

Safety in chemistry lab – Handling of laboratory glass wares – Storage and handling of chemicals – Handling of toxic and poisonous chemicals – Handling of ethers, acids and alkalies – Carcinogenic chemicals. First Aid techniques – Burns and cuts – Burns and chemical spills in eye – Inhalation of toxic vapours – Dealing with hazardous chemicals like bromine, hydrogen sulphide and phenol.

UNIT II – INTRODUCTION TO ORGANIC CHEMISTRY (6 hrs)

Catenation-Homologous Series – General Molecular Formula and Nomenclature – Functional Groups (General and IUPAC Nomenclature) – Bonding in organic molecules – sp^3, sp^2 and sp hybridizations in carbon – Geometry of methane, ethylene and acetylene molecules.

UNIT III – INTRODUCTION TO INORGANIC CHEMISTRY (6 hrs)

Concept of atomic orbitals – Shapes of s,p and d orbitals – Periodic table and the classification of elements – Electronic configuration of elements up to atomic number 30 – Types of Chemical bonds – Schematic Illustration of bonds.

UNIT IV – INTRODUCTION TO PHYSICAL CHEMISTRY (6 hrs)

Units – Fundamental units – Derived units and SI Units – States of matter – Solid state – Properties and types of solids (amorphous and crystalline solids) – Liquid state – Properties and Vapour Pressure – Gaseous state – Gas laws – Ideal and real gases.

UNIT V – BASIC CONCEPTS OF REDOX REACTION (6 hrs)

Definition – Oxidation and reduction reactions – Calculation of oxidation numbers – Equivalent weight – Definition and calculation for acids, bases and salts. Electrode potentials and electrochemical series.

TEXTBOOKS

1. Puri B. R, Sharma L.R and Kalia K. C. *Principles of Inorganic Chemistry*, 13th Edition, Milestone Publishers and Distributors: New Delhi, 2009.
2. Soni P. L and Chawla H M. *Textbook of Organic Chemistry*, New Delhi: Sultan Chand & Sons, 29th Edition, 2007.
3. Puri B. R and Sharma, L. R, *Principles of Physical Chemistry*, 38th Edition, Vishal Pubishing Company: Jalandhar, 2002.

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1. Lee J. D, Concise Inorganic Chemistry, 4th Edition, ELBS William Heinemann: London, 1991.
2. Gurudeep Raj, Advanced Inorganic Chemistry, 26th Edition, Goel Publishing House: Meerut, 2001

3. Bahl B S, Arul Bhal, *Advanced Organic Chemistry*, 3rd Edition, S. Chand and company: New Delhi, 2003.
4. Maron S. H and Prutton C. P Principles of Physical Chemistry, 4th Edition, The Macmillan Company: New York, 1972.

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1. https://www.youtube.com/watch?v=-VK-bfKCboQ
2. https://www.youtube.com/watch?v=vf6PiQVK6oU

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- I
SKILL ENHANCEMENT COURSE – II: NON MAJOR ELECTIVE COURSE: FOOD CHEMISTRY (23UCHN11)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX. MARKS: 100**

Course Objectives

- To know various types of food and its sources
- To understand Food adulteration and Food poison
- To gain knowledge about beverages
- To identify the various food additives
- To be familiar about edible oils

Course Outcomes (CO)

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

CO1[K1]: outline the food adulteration, contamination of wheat, rice, milk, butter, pesticides, food additives, poison, fats and oils

CO2[K2]: discuss the awareness about food poisons, food additives, contaminations, beverages, saturated and unsaturated fats and oils

CO3[K3]: explain the exposure on food additives, contamination, natural poisons, determination of oils and soft drinks.

CO4[K4]: inspect the knowledge on beverages, determination of adulterants, preservatives, chemical poisons and vegetable oils.

CO5[K5]: discuss about fats and oils, adulterants, food flavors and food poisons.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	1	-	-	1	1	1	1
CO2[K2]	2	-	1	1	-	1	1
CO3[K3]	2	1	1	2	-	1	1
CO4[K4]	2	2	-	2	-	1	1
CO5[K5]	2	2	1	2	1	1	1
Weightage of the course	09	05	03	08	02	05	05
Weighted percentage of Course contribution to POs	**1.66**	**1.11**	**1.08**	**2.74**	**1.37**	**2.72**	**2.53**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – FOOD ADULTERATION (6 hrs)

Sources of Food, Types, Advantages and Disadvantages. Food Adulteration – Contamination of Wheat, Rice, Milk, Butter, Etc. With Clay Stones, Water and Toxic Chemicals – Common Adulterants; Ghee Adulterants and their Detection. Detection of Adulterated Foods by Simple Analytical Techniques.

UNIT II – FOOD POISON (6 hrs)

Food Poisons – Natural Poisos (Alkaloids - Nephrotoxin) – Pesticides, (DDT, BHC, Malathion) – Chemical Poisons – First Aid for Poison Consumed Victims.

UNIT III – FOOD ADDITIVES (6 hrs)

Food Additives – Artificial Sweeteners – Saccharin – Cyclamate And Aspartate Food Flavours – Esters, Aldehyde And Heterocyclic Compounds – Food Colours – Emulsifying Agents – Preservatives – Leaving Agents. Baking Powder – Yeast – Tastemakers – MSG – Vinegar.

UNIT IV – Beverages (6 hrs)

Beverages – Soft Drinks – Soda – Fruit Juices – Alcoholic Beverages – Examples. Carbonation – Addiction to Alcohol – Diseases of Liver and Social Problems.

UNIT V – Edible Oils (6 hrs)

Fats and Oils – Sources of Oils – Production Of Refined Vegetable Oils – Preservation. Saturated and Unsaturated Fats – Iodine Value – Role of MUFA and PUFA in Preventing Heart Diseases – Determination of Iodine Value, RM Value, Saponification Values and their Significance.

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2. Swaminathan M, *Food Science and Experimental Foods,* Ganesh and Company, 2008.
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3. https://www.youtube.com/watch?v=xKKukaDfFLE

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF TAMIL
UG PROGRAMME - B.A./ B.COM/B.B.A./ B.SC./BCA
SEMESTER - II
பொதுத்தமிழ் - II (23UTAG21)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 6 **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 90 hrs **MAX. MARKS: 100**

நோக்கங்கள்

- சமய இலக்கியங்களையும் சிற்றிலக்கியங்களையும் மாணவர்களுக்கு அறிமுகப்படுத்துதல்
- மொழித்திறனையும் சிறுகதை இலக்கிய வடிவத்தையும் மாணவர்களுக்கு உணர்த்துதல்.

கற்றலின் விளைவுகள்

இத்தாளை வெற்றிகரமாக முடித்தவுடன் மாணவர்கள்,

CO1[K1]: பக்தி இலக்கியங்களைக் கற்பதன் மூலம் பக்தி நெறியினையும், சமய நல்லிணக்கத்தையும் அறிவர்.

CO2[K2]: சமயப்பாடல்கள் மற்றும் சிற்றிலக்கியங்களின் அமைப்பினையும், நோக்கத்தினையும் தெளிவாகக் கூறுவர்.

CO3[K3]: தமிழில் உள்ள பக்தி இலக்கியம் மற்றும் சிற்றிலக்கியங்களின் பொருண்மைகளுடன் இலக்கணத் தெளிவையும் அடைவர்.

CO4[K4]: தமிழ்ச் சமூகப் பண்பாட்டு வரலாற்றினை இலக்கியங்கள் வாயிலாக அறிந்து கொண்டு பாகுபடுத்துவர்.

CO5[K5]: போட்டித் தேர்வுகளில் வெற்றி பெறுவதற்குத் தமிழ்ப் பாடத்தினைப் பயன்கொள்ளும் வகையில் ஏற்ற பயிற்சி பெற்று மதிப்பீடு செய்வர்.

CO/PO Mapping Table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	1	-	1	-	-	-
CO2[K2]	2	2	-	1	1	-	1
CO3[K3]	2	2	-	2	-	1	-
CO4[K4]	2	2	1	2	1	-	1
CO5[K5]	2	1	1	2	-	1	1
Weightage of the Course	10	08	02	08	02	02	03
Weighted percentage of Course Contribution to POs	**1.84**	**1.78**	**0.72**	**2.74**	**1.37**	**1.09**	**1.52**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

கூறு I **(18 hrs)**

பக்தி இலக்கியம்: திருநாவுக்கரசர் தேவாரம் - நாமார்க்கும் குடியெல்லாம் எனத் தொடங்கும் பதிகம் (10 பாடல்கள்), ஆண்டாள் - திருப்பாவை (முதல் 10 பாசுரம்)

கூறு II **(18 hrs)**

வள்ளலார் - அருள் விளக்கமாலை (முதல் 10 பாடல்),எச்.ஏ.கிருட்டிணப் பிள்ளை - இரட்சணியமனோகரம் - பால்யபிரார்த்தனை, குணங்குடி மஸ்தான் சாகிபு - பராபரக்கண்ணி (முதல் 10 கண்ணி)

கூறு III **(18 hrs)**

சிற்றிலக்கியங்கள்: தமிழ்விடு தூது (முதல் 20 கண்ணி), திருக்குற்றாலக் குறவஞ்சி - குறத்தி மலைவளம் கூறுதல், முக்கூடல் பள்ளு - நாட்டு வளம்

கூறு IV **(18 hrs)**

பாடம் தழுவிய இலக்கிய வரலாறு (பல்லவர் காலம், நாயக்கர் காலம்)

கூறு V **(18 hrs)**

மொழித்திறன் போட்டித்தேர்வுதிறன்: தொடர் வகைகள், மரபுத்தொடர், பழமொழிகள், பிறமொழிச் சொற்களைக் களைதல், வழுச்சொற்கள் நீக்குதல், இலக்கணக் குறிப்பு அறிதல்.

(குறிப்பு: அலகு 4, 5 ஆகியன போட்டித் தேர்வு நோக்கில் நடத்தப் பட வேண்டும்).

பாடநூல்கள்

1. தமிழியல் துறையினர், *தொகுப்பு நூல்,* ஸ்ரீ காளீஸ்வரி கல்லூரி (தன்னாட்சி), சிவகாசி.
2. வாசுதேவன், கா. *பன்முக நோக்கில் தமிழ் இலக்கிய வரலாறு,* தேவன் பதிப்பகம், திருச்சிராப்பள்ளி, 2017.

பார்வை நூல்கள்

1. சிற்பி. பாலசுப்பிரமணியன், *தமிழ் இலக்கிய வரலாறு,* கவிதா வெளியீடு, சென்னை.
2. தமிழண்ணல், *புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு,* சோலை பதிப்பகம், மதுரை
3. பாக்கியமேரி, *வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு*, பாரி நிலையம், சென்னை.

வலைப்பதிவுகள் (Web Sources)

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2. Tamil virtual University Library- www.tamilvu.org/ library http://www.virtualvu.org/library
3. Project Madurai - www.projectmadurai.org.
4. Chennai Library- www.chennailibrary.com <http://www.chennailibrary.com>.
5. Tamil Universal Digital Library- www.ulib.prg <http://www.ulib.prg>.
6. Tamil E-Books Downloads- tamilebooksdownloads. blogspot.com
7. Tamil Books on line- books.tamil cube.com
8. Catalogue of the Tamil books in the Library of British Congress archive.org
9. Tamil novels on line - books.tamilcube.com

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF ENGLISH
UG PROGRAMME - B.A./ B.COM/B.B.A./ B.SC./BCA
SEMESTER- II
GENERAL ENGLISH-II (23UENL21)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 6(L-5, T-1) **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- To introduce learners to the essential skills of communication in English.
- To enable them use these skills effectively in academic and non-academic contexts.
- To help them identify and eliminate common mistakes in writing and speaking.
- To enable them use various business communication strategies and to use advanced vocabulary.
- To familiarize them in writing descriptive essays and respond to arguments orally and in writing.

Course Outcomes (CO)

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

CO1 [K1]: identify appropriate literary terms such as diction, tone, imagery, figures of speech, motif etc.,

CO2 [K2]: define verbs, tenses and concord and its role in speaking and writing effectively.

CO3 [K3]: apply the knowledge of language competency at workplace and day-to-day life

CO4 [K4]: analyze prose, poetry and short stories to develop language skills through literature.

CO5 [K6]: construct grammatically correct and meaningful sentences by choosing apt words.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	1	-	1	-	-	-
CO2[K2]	2	2	-	1	1	-	1
CO3[K3]	2	2	-	2	-	1	-
CO4[K4]	2	2	1	2	1	-	1
CO5[K6]	2	1	1	2	-	1	1
Weightage of thenb course	10	08	02	08	02	02	03
Weighted percentage of Course contribution to POs	**1.84**	**1.78**	**0.72**	**2.74**	**1.37**	**1.09**	**1.52**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I- PROSE **(18 hrs)**

W.R. Inge	-	The Spoon-Fed Age
Dale Carnegie	-	If You Are Wrong. Admit it
Shashi Tharoor	-	Kindly Adjust to our English

UNIT II- POETRY **(18 hrs)**

Alfred Lord Tennyson	-	The Flower
Nissim Ezekiel	-	Very Indian Poem in Indian English
Maya Angelou	-	Still I Rise
Dr. Gieve Patel	-	On Killing a Tree

UNIT III- FICTION **(18 hrs)**

Paulo Coelho	-	The Alchemist

UNIT IV- LANGUAGE COMPETENCY **(18 hrs)**

Homonyms, Homophones, Homographs, Portmanteau words
Verbs and Tenses, Subject Verb Agreement, Error correction

UNIT V- ENGLISH IN THE WORKPLACE **(18 hrs)**

Reading for General and Specific information [charts, tables, schedules, graphs etc]
Reading news and weather reports
Writing paragraphs
Taking and making notes

TEXTBOOKS

1. Coelho, Paulo. *The Alchemist*. New York: Harper, 2005.
2. Pillai, Radhakrishna. *Emerald English Grammar and Composition.* Chennai: Emerald Publishers, 2016.

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1. Hewings, Martin. *Advanced English Grammar*. Cambridge University Press, 2000.
2. SP Bakshi, Richa Sharma. *Descriptive English*. India: Arihant Publications Ltd, 2019.
3. Sheena Cameron, Louise Dempsey. *The Reading Book: A Complete Guide to Teaching Reading*. London: S & L. Publishing, 2019.
4. Sherman, Barbara. *Skimming and Scanning Techniques.* Virginia: Liberty University Press, 2014.
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3. https://www.poemhunter.com/poem/the-flower-2/
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5. https://www.tbr.fun/if-youre-wrong-admit-it/
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SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- II
CORE COURSE – III: GENERAL CHEMISTRY – II (23UCHC21)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS: 25**
CREDITS : 4 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- To improve the knowledge in chemistry of acids, bases and ionic equilibrium
- To study the properties of s and p-block elements
- To desire the chemistry of hydrocarbons
- To ensure the applications of acids and bases
- To acquire knowledge in the compounds of main block elements

Course Outcomes (CO)

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

CO1[K1]: explain the concept of acids, bases and ionic equilibria; periodic properties of s and p block elements, preparation and properties of aliphatic and aromatic hydrocarbons.

CO2[K2]: classify hydrocarbons, reactions of s and p – block elements, acids and bases, reaction mechanisms of aliphatic and aromatic hydrocarbons.

CO3[K3]: examine the various compounds of s and p-block elements, strength of acids and poly nuclear aromatic hydro carbons.

CO4[K4]: comment the theories of acids, bases and indicators, buffer action and important compounds of s-block elements, cycloalkanes, hydrocarbons.

CO5[K5]: assess the application of hard and soft acids, indicators, buffers, compounds of s and p-block elements and hydrocarbons.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	1	-	-	1
CO2[K2]	3	2	2	1	-	1	-
CO3[K3]	3	2	2	1	1	1	1
CO4[K4]	3	3	2	1	1	1	1
CO5[K5]	3	3	2	2	1	1	1
Weightage of the course	15	12	10	06	03	04	04
Weighted percentage of Course contribution to POs	**2.76**	**2.67**	**3.6**	**2.05**	**2.05**	**2.17**	**2.02**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – ACIDS, BASES AND IONIC EQUILIBRIA (12 hrs)

Concepts of Acids And Bases – Arrhenius Concept – Bronsted-Lowry Concept – Lewis Concept – Relative Strength of Acids, Bases and Dissociation Constant- Dissociation of Poly Basic Acids – Ionic Product of Water – pH Scale – pH of Solutions – Degree of Dissociation– Common Ion Effect – Factors Affecting Degree of Dissociation – Acid Base Indicators – Theory of Acid Base Indicators – Action of Phenolphthalein and Methyl Orange – Titration Curves – Use of Acid Base Indicators. Buffer Solutions **–** Types, Mechanism of Buffer Action in Acid and Basic Buffer –Henderson – Hasselbalch Equation. Salt Hydrolysis – Salts of Weak Acids and Strong Bases – Weak Bases and Strong Acids –Weak Acids and Weak Bases – Hydrolysis Constant – Degree of Hydrolysis And Relation Between Hydrolysis Constant and Degree of Hydrolysis. Solubility Product – Determinations and Applications – Numerical Problems Involving the Core Concepts.

UNIT II – CHEMISTRY OF S and P-BLOCK ELEMENTS (12 hrs)

Chemistry of S-Block Elements - Hydrogen: Position of Hydrogen in the Periodic Table **–** Alkali Metals **–** Comparative Study of the Elements with Respect to Oxides **–** Hydroxides **–** Halides **–** Carbonates And Bicarbonates**–** Diagonal Relationship of Li with Mg **–** Preparation, Properties and uses of NaOH, Na_2CO_3, KBr, $KClO_3$ Alkaline Earth Metals**–** Anomalous Behaviour of Be. **Chemistry of P-Block Elements (Group 13&14):** Preparation And Structure Of Diborane And Borazine **–** Chemistry of Borax **–**Extraction of Al and its Uses **–** Alloys of Al. Comparison of Carbon With Silicon **–** Carbon-Di-Sulphide **–** Preparation, Properties, Structure and Uses **–** Percrbonates **–** Permono Carbonates and Per Dicarbonates.

UNIT-III–CHEMISTRY OF P-BLOCK ELEMENTS (Group15-18) (12 hrs)

General Characteristics of Elements of Group 15– Chemistry of $H_2N\text{-}NH_2$, NH_2OH, HN_3 and HNO_3. Chemistry of PH_3, PCl_3, PCl_5, $POCl_3$, P_2O_5 and Oxyacids of Phosphorous (H_3PO_3 and H_3PO_4). General Properties of Elements of Group 16-Structure and Allotropy of Elements – Chemistry of Ozone – Classification And Properties of Oxides-Oxides of Sulphur and Selenium – Oxyacids of Suphur(Caro's And Marshall's Acids). Chemistry of Halogens – General Characteristics of Halogen With Reference to Electro-Negativity – Electron Affinity – Oxidation States And Oxidizing Power – Peculiarities of Fluorine – Halogen Acids (HF, HCl, HBr and HI) – Oxides and Oxy Acids ($HClO_4$) – Inter-Halogen Compounds (ICl, ClF_3, BrF_5 and IF_7) – Pseudo Halogens [$(CN)_2$ and $(SCN)_2$] – Basic Nature of Iodine. Noble Gases – Position in the Periodic Table – Preparation, Properties and Structure of XeF_2, XeF_4, XeF_6 and $XeOF_4$ – Uses of Noble Gases – Clathrate Compounds.

UNIT IV –HYDROCARBON CHEMISTRY-I (12 hrs)

Petroproducts: Fractional Distillation of Petroleum – Cracking, Isomerisation, Alkylation, Reforming and Uses. **Alkenes:** Nomenclature – General Methods of Preparation – Mechanism of B-Elimination Reactions – E_1 and E_2 Mechanism – Factors Influencing – Stereochemistry – Orientation – Hofmann and Saytzeff Rules – Reactions of Alkenes – Addition Reactions – Mechanisms – Markownikoff's Rule – Kharasch Effect – Oxidation Reactions – Hydroxylation – Oxidative Degradation, Epoxidation, Ozonolysis – Polymerization. **Alkadienes:** Nomenclature – Classification – Isolated, Conjugated and Cumulated Dienes - Stability of Conjugated Dienes – Mechanism of Electrophilic Addition to Conjugated Dienes – 1,2 And 1,4 Additions – Free Radical Addition to Conjugated Dienes – Diels-Alder Reactions – Polymeristion – Polybutadiene – Polyisoprene (Natural Rubber) – Vulcanization – Polychoroprene. **Alkynes:** Nomenclature – General Methods of Preparation, Properties and Reactions – Acidic Nature of Terminal Alkynes and Acetylene – Polymerization and Isomerisation. **Cycloalkanes:** Nomenclature – Relative Stability of Cycloalkanes – Bayer's Strain Theory and its Limitations – Conformational Analysis of Cyclohexane – Mono and Di Substituted Cyclohexanes. Geometrical Isomerism in Cycohexanes.

UNIT V – HYDROCARBON CHEMISTRY-II (12 hrs)

Benzene: Source – Structure of Benzene – Stability of benzene Ring – Molecular Orbital Picture of Benzene – Aromaticity, Huckel's (4n+2) Rule and its Applications – Electrophilic Substitution Reactions – General Mechanism of Aromatic Electrophilic Substitution – Nitration – Sulphonation – Halogenations – Friedel-Craft's Alkylation and Acylation – Mono Substituted and Disubstituted Benzene – Effect of Substituent-Orientation and Reactivity. **Polynuclear Aromatic Hydrocarbons:** Naphthalene – Nomenclature – Haworth Synthesis – Physical Properties, Reactions – Electrophilic Substitution Reaction – Nitration,

Sulphonation – Halogenations – Friedel-Craft's Acylation & Alkylation – Preferential Substitution at Position – Reduction, Oxidation – Uses. Anthracene – Synthesis by Elbs Reaction – Diels-Alder Reaction And Haworth Synthesis – Physical Properties – Reactions – Diels-Alder Reaction – Preferential Substitution At C-9 And C-10 – Uses.

TEXTBOOKS

1. Madan R. D, Sathya Prakash, *Modern Inorganic Chemistry*, 2nd Edition, S. Chand and Company: New Delhi, 2003.
2. Sathya Prakash, Tuli G. D, Basu S. K and Madan R. D *Advanced Inorganic Chemistry*, 17th Edition, S. Chand and Company: New Delhi, 2003.
3. Bahl B. S, Arul Bhal, *Advanced Organic Chemistry*, 3rd Edition, S. Chand and company: New Delhi, 2003.
4. Tewari K. S, Mehrothra S. N and Vishnoi N. K, *Text book of Organic Chemistry*, 2nd Edition, Vikas Publishing House: New Delhi.
5. Puri B R, Sharma L R, *Principles of Physical Chemistry*, 38th Edition,Vishal Publishing Company: Jalandhar, 2002.

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1. Maron S. H and Prutton C P, *Principles of Physical Chemistry*, 4th Edition, The Macmillan Company: New York, 1972.
2. Barrow G M, *Physical Chemistry*, 5th Edition, Tata McGraw Hill: New Delhi.
3. Lee J. D, *Concise Inorganic Chemistry*, 4th Edition, ELBS William, Heinemann: 1991.
4. Huheey J. E, *Inorganic Chemistry, Principles of Structure and Reactivity*, 4th Edition, Addison Wesley Publishing Company: India, 1993.
5. Gurudeep Raj, (*Advanced Inorganic Chemistry* Vol- I), 26th Edition, Goel Publishing House: Meerut, 2001.
6. Agarwal O. P, *Reactions and Reagents in Organic Chemistry*, 8th Edition, Goel Publishing House: Meerut, 1995.

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1. https://onlinecourses.nptel.ac.in
2. https://www.youtube.com/watch?v=aeLQjdo3tGE
3. https://www.youtube.com/watch?v=Jyqoa8WP6cc
4. https://www.youtube.com/watch?v=ncO07NHi3HU

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- II
CORE COURSE – IV: PRACTICAL: QUALITATIVE ORGANIC ANALYSIS AND PREPARATION OF ORGANIC COMPOUNDS (23UCHC2P)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS: 25**
CREDITS : 4 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- To acquire knowledge in Laboratory safety
- To impart knowledge on apparatus handling
- To develop the skill in organic analysis
- To ensure the skill in organic preparations
- To inculcate the recrystallization technique

Course Outcomes (CO)

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

CO1[K2]: infer the organic analysis and organic preparation

CO2[K3]: identify the presence of special elements and functional group in an unknown organic compound performing a systematic analysis, first aid and purification of organic compounds.

CO3[K4]: classify the different functional groups and preparation pathway

CO4[K5]: explain and identify the functional group, electrophoresis, basic idea about Bunsen burner.

CO5[K6]: predict a solid derivative with respect to the identified functional group, recrystallize the compound prepared.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	2	3	2	2	2	1
CO2[K3]	3	3	2	1	1	2	1
CO3[K4]	3	3	2	2	1	1	1
CO4[K5]	3	3	2	1	1	1	1
CO5[K6]	3	2	2	2	1	1	1
Weightage of the course	15	13	11	08	06	07	05
Weighted percentage of Course contribution to POs	**2.76**	**2.89**	**3.96**	**2.74**	**4.11**	**3.8**	**2.53**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I **(2 hrs)**

Safety Rules – Symbols and First – Aid in Chemistry Laboratory – Basic Ideas About Bunsen Burner – its Operation and Parts of the Flame. Chemistry Laboratory Glass Ware – Basic Information and Uses.

UNIT II – QUALITATIVE ORGANIC ANALYSIS **(30 hrs)**

Preliminary Examination – Detection of Special Elements – Nitrogen, Sulphur and Halogens – Aromatic and Aliphatic Nature – Test for Saturation and Unsaturation.

Identification of Functional Groups Using Solubility Tests

Confirmation of Functional Groups

- Monocarboxylic Acid, Dicarboxylic Acid
- Monohydric Phenol, Polyhydric Phenol
- Aldehyde, Ketone, Ester
- Carbohydrate(Reducing And Non-Reducing Sugars)
- Primary, Secondary ,Tertiary Amine
- Monoamide, Diamide and Thioamide
- Anilide, Nitro Compound
- Preparation of Derivatives For Functional Groups

UNIT III – PREPARATION OF ORGANIC COMPOUNDS **(28 hrs)**

1. Nitration: Picric Acid from Phenol
2. Halogenation: p-Bromo Acetanilide from Acetanilide
3. Oxidation: Benzoic Acid from Benzaldehyde
4. Microwave Assisted Reactions in Water
5. Methyl Benzoate to Benzoic Acid
6. Salicylic acid from Methyl Salicylate

7. Rearrangement: Benzil to Benzilic acid
8. Hydrolysis of Benzamide to Benzoic acid

SEPARATION AND PURIFICATION TECHNIQUES (NOT FOR EXAMINATION)

1. Purification of Compounds by Crystallization (from Water/Alcohol) and Distillation.
2. Determination of Melting and Boiling Points of Organic compounds
3. **Steam Distillation –** Extraction of Essential Oil from Citrus Fruits/Eucalyptus Leaves.
4. **Chromatography (any one)(Group Experiment)**
   a. Separation of Amino Acids by Paper Chromatography
   b. Thin Layer Chromatography **–** Mixture of Sugars/Plant Pigments/ Permanganate/ Dichromate.
   c. Column Chromatography **–** Extraction of Carotene, Chlorophyll and Xanthophylls
   d. From Leaves/Separation of Anthracene- Anthracene picrate.
5. **Electrophoresis –** Separation of Amino Acids and Proteins **(Demonstration)**
6. Isolation of Casein from Milk/Determination of Saponification Value of Oil or Fat /Estimation of Acetic Acid from Commercial Vinegar. (Any One Group Experiment)(4,5&6-not for ESE)

TEXTBOOKS

1. Venkateswaran V, Veeraswamy R, Kulandaivelu A. R, *Basic Principles of practical chemistry,* 2nd Edition, Sultan Chand: New Delhi, 2012.
2. Manna A. K, *Practical Organic Chemistry,* Books and Allied: India, 2018.

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Books

1. Gurtu, J. N, Kapoor, R. *Advanced Experimental Chemistry (Organic)*, Sultan Chand: New Delhi, 1987.
2. Furniss B. S, Hannaford A. J, Smith P. W. G, Tatchell A. R. *Vogel's Textbook of Practical Organic Chemistry*, 5th Edition, Pearson: India, 1989.

Web Source

1. https://www.vlab.co.in/broad-area-chemical-sciences

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF MATHEMATICS
UG Programme - B.Sc. Physics / B. Sc. Chemistry
SEMESTER - II
ELECTIVE COURSE GENERIC / DISCIPLINE SPECIFIC - II: MATHEMATICS - II
(23UPHA21/23UCHA21)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 6 (L-5, T-1) **INT. MARKS: 25**
CREDITS : 5 **EXT. MARKS: 75**
DURATION : 90 hrs **MAX. MARKS: 100**

Course Objectives

- To study the method of interpolating data
- To gain knowledge on expansion of trigonometric functions and the method of solving partial differential equations
- To know the basic concepts of vector calculus
- To know the basics of Hyperbolic Function

Course Outcomes (CO)

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

CO1[K1]: describe the terminologies in trigonometric functions, hyperbolic functions, partial differentiation, vector calculus and interpolation

CO2[K2]: explain the elementary concepts of trigonometric functions, hyperbolic functions, partial differentiation, vector calculus and interpolation

CO3[K3]: find out the expansions of trigonometric functions, the missing values of given data, divergence and curl of the vector field, partial differentiation of functions

CO4[K4]: characterize the properties of divergence and curl,hyperbolic functions and partial derivatives of functions

CO5[K5]: determine the missing values of given data, partial differentiation of functions, expansion of trigonometric functions, derivatives of vector functions

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	1	-	1	-	1	-
CO2[K2]	3	1	1	1	-	1	1
CO3[K3]	3	2	1	1	-	1	1
CO4[K4]	3	2	1	1	-	1	1
CO5[K5]	3	2	2	1	-	1	1
Weightage of the course	14	08	05	05	-	05	04
Weighted percentage of Course contribution to POs	**2.58**	**1.78**	**1.8**	**1.71**	**0**	**2.72**	**2.02**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I **(18hrs)**

Trigonometry: Expansions of sin nθ, cos nθ, $\sin^n\theta$, $\cos^n\theta$, $\tan^n\theta$.

TextBook: 1 - Page No: 61-82

UNIT II **(18 hrs)**

Hyperbolic Functions: Hyperbolic and Inverse Hyperbolic Functions – **Resolution Into Factors**: Logarithm of complex quantities

TextBook:1 - Page No: 93-104, 122-127

UNIT III **(18hrs)**

Vector Differentiation: Vector functions – Directional Derivative – Normal Derivative – Maximal Directional Derivative – Divergence and Curl

TextBook: 2 - Page No:245-269

UNIT IV **(18hrs)**

INTERPOLATION: Linear interpolation – Gregory-Newton's forward and backward interpolation formula – Equidistant terms with one or more missing values – Lagrange's interpolation formula – Inverse interpolation.

TextBook: 3 - Page No: 209-227, 271-278

UNIT V **(18hrs)**

PARTIAL DIFFERENTIATION: Successive partial derivatives– Functions of functions rule - Total differential coefficient – Implicit functions – Homogeneous functions – Partial derivatives of a function of two functions.

TextBook: 4 - Page No: 178-182 & 188-198

TEXTBOOKS

1. Narayanan S and ManicavachagomPillay T. K, *Trigonometry*, Chennai: S.Viswanathan Pvt Ltd, 2007. **(UNITS I& II)**

2. Balasubramanyam P and Subramanian K. G, *Ancillary Mathematics Vol I*. New Delhi: Tata McGraw-Hill Publishing Company Ltd, 1996. **(UNIT III)**
3. Kandasamy P, Thilagavathy K and Gunavathy K, *Numerical Methods,* New Delhi: S. Chand & Company Ltd, 2002. **(UNIT IV)**
4. Narayanan S and Manicavachagompillay T. K, *Calculus Vol I,* Chennai: S.Viswanathan Pvt Ltd, 2006. **(UNIT V)**

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1. Rajagopalan S. P and Sattanathan R, *Allied Mathematics Vol I & II,* New Delhi: Vikas Publications, 2005.
2. Venkatesan S. J *Allied Mathematics – II,* Chennai: Sri Krishna Publications.
3. Vittal P. R, *Allied Mathematics. Chennai:* Margham Publications, 2003.
4. Kandhasamy P and Thilagavathy K, *Allied Mathematics Vol I & II,* New Delhi: Tata McGraw Hill, 2003.
5. Kandasamy P and Thilagavathy K, *Calculus of Finite differences & Numerical Analysis,* New Delhi: S. Chand & Company Ltd, 2003.

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2. https://www.scribd.com/document/323436605/3-Problems-on-Expansion-of-Sinn%CE%B8-and-Cosn%CE%B8-in-Terms-of-Sinn%CE%B8-Andcosn%CE%B8
3. https://solitaryroad.com/c254.html
4. https://nptel.ac.in/courses/111108144
5. https://mathworld.wolfram.com/FiniteDifference.html

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- II
SKILL ENHANCEMENT COURSE - III: COSMETICS AND PERSONAL CARE PRODUCTS (23UCHS21)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX. MARKS: 100**

Course Objectives

- To know about skin care products.
- To understand the hair and dental care
- To impart knowledge on various makeup items
- To identify the various perfumes
- To be familiar with the beauty treatments

Course Outcomes (CO)

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

CO1[K1]: list out the composition of various cosmetic products

CO2[K2]: understand chemical aspects and applications of hair care and dental care and skin care products

CO3[K3]: identify chemical aspects and applications of perfumes and skin care products.

CO4[K4]: examine the various methods of beauty treatments and their advantages and disadvantage

CO5[K5]: assess the various cosmetics used in personal grooming

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	1	1	1	-	2	1
CO2[K2]	2	1	1	-	1	1	1
CO3[K3]	2	1	1	1	1	1	1
CO4[K4]	2	2	-	1	1	1	1
CO5[K5]	2	2	1	1	-	1	1
Weightage of the course	10	07	04	04	03	06	05
Weighted percentage of Course contribution to POs	**1.84**	**1.56**	**1.44**	**1.37**	**2.05**	**3.26**	**2.53**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – SKIN CARE **(6 hrs)**

Nutrition of the Skin, Skin Care and Cleansing of the Skin; Face Powder – Ingredients; Creams and Lotions – Cleansing, Moisturizing all Purpose, Shaving And Sunscreen (Formulation only); Gels – Formulation and Advantages; Astringent and Skin Tonics – Key Ingredients, Skin Lightness, Depilatories.

UNIT II – HAIR AND DENTALCARE **(6 hrs)**

Hair Care: Shampoos – Types – Powder, Cream, Liquid, Gel – Ingredients; Conditioner – Types – Ingredients. **Dental Care:** Tooth Pastes – Ingredients – Mouth Wash

UNIT III – MAKE UP **(6 hrs)**

Make Up: Base – Foundation – Types – Ingredients; Lipstick, Eyeliner, Mascara, Eye Shadow, Concealers, Rouge

UNIT IV – PERFUMES **(6 hrs)**

Classification – Natural – Plant Origin – Parts of the Plant Used, Chief Constituents; Animal Origin – Amber Gries from Whale, Civetone from Civet Cat, Musk from Musk Deer; Synthetic – Classification Emphasizing Characteristics – Esters – Alcohols – Aldehydes – Ketones

UNIT V – BEAUTY TREATMENTS **(6 hrs)**

Facials – Types – Advantages – Disadvantages; Face Masks – Types; Bleach – Types – Advantages – Disadvantages; Shaping The Brows; Eyelash Tinting; Perming – Types; Hair Colouring And Dyeing; Permanent Waving – Hair Straightening; Wax – Types – Waxing; Pedicure, Manicure – Advantages – Disadvantages

TEXTBOOK

1. Thankamma Jacob, *Foods, drugs and cometics – A consumer guide*, Macmillan publication: London, 1997.

REFERENCES

Books

1. Wilkinson J. B. E and Moore R. J, *Harry's cosmeticology*, 7th Edition, Chemical Publishers: London, 1997.
2. George Howard, *Principles and practice of perfumes and cosmetics,* Stanley Therones: Chettenham, 1987.

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3. https://www.youtube.com/watch?v=Bz2Kq8uEhLU

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- II
SKILL ENHANCEMENT COURSE – IV: NON MAJOR ELECTIVE COURSE: DIARY CHEMISTRY (23UCHN21)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX. MARKS: 100**

Course Objectives

- To acquire knowledge on composition of milk.
- To understand processing of milk
- To gain knowledge on milk preservation
- To identify the special milk
- To be familiar about the fermentation and milk products

Course Outcomes (CO)

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

CO1[K1]: outline the general composition, processing, preservation, fermented and types of milk products

CO2[K2]: explain composition, processing, types of pasteurization, common adulterants, rancidity, prevention, fermented and milk products

CO3[K3]: discuss about the cream and butter, composition, estimation of fat in milk products, cream milk, preservation, special, fermented milk

CO4[K4]: analyze about processing, preservation, constitution of milk products, homogenized milk, vitaminized milk, toned milk, fermented milk.

CO5[K5]: develop an idea about the processing of various milk products and its properties and fermented products.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	1	1	2	2	-	2
CO2[K2]	2	1	1	1	1	1	1
CO3[K3]	2	1	1	1	-	1	1
CO4[K4]	2	2	1	-	1	1	1
CO5[K5]	2	2	-	1	1	1	1
Weightage of the course	10	07	04	05	05	04	06
Weighted percentage of Course contribution to POs	**1.84**	**1.56**	**1.44**	**1.71**	**3.42**	**2.17**	**3.03**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – COMPOSITION OF MILK (6 hrs)

Milk – Definition – General Composition of Milk – Constituents of Milk – Lipids, Proteins, Carbohydrates, Vitamins and Minerals – Physical Properties of Milk – Colour, Odour, Acidity, Specific Gravity, Viscosity and Conductivity – Factors Affecting the Composition of Milk – Adulterants, Preservatives with Neutralizer – Examples and their Detection – Estimation Of Fat, Acidity and Total Solids in Milk.

UNIT II – PROCESSING OF MILK (6 hrs)

Microbiology of Milk – Destruction of Microorganism in Milk, Physical – Chemical Changes Taking Place in Milk Due to Processing – Boiling, Pasteurization – Types of Pasteurization – Bottle, Batch and HTST (High Temperature Short Time) – Vacuum Pasteurization – Ultra High Temperature Pasteurization.

UNIT III – MAJOR MILK PRODUCTS (6 hrs)

Cream – Definition – Composition – Chemistry of Creaming Process – Gravitational and Centrifugal Methods of Separation of Cream – Estimation of Fat in Cream. Butter – Definition – Composition – Theory of Churning – Desi Utter – Salted Butter, Estimation of Acidity and Moisture Content in Butter. Ghee – Major Constituents – Common Adulterants Added to Ghee and their Detection – Rancidity – Definition – Prevention – Antioxidants and Synergists – Natural and Synthetic.

UNIT IV – SPECIAL MILK (6 hrs)

Standardized Milk – Definition- Merit – Reconstituted Milk – Definition – Flow Diagram of Manufacture – Homogenised Milk – Flavoured Milk – Vitaminised Milk – Toned Milk – Incitation Milk – Vegetable Toned Milk – Humanized Milk – Condensed Milk – Definition, Composition and Nutritive Value.

UNIT V – FERMENTED AND OTHER MILK PRODUCTS (6 hrs)

Fermented Milk Products – Fermentation of Milk – Definition, Conditions, Cultured Milk – Definition of Culture – Example, Conditions – Cultured Cream, Butter Milk – Bulgarious Milk – Acidophilous Milk – Yoheer Indigeneous Products – Khoa and Chhena Definition – Ice Cream Definition Percentage Composition – Types – Ingredients – Manufacture of Ice Cream, Stabilizers – Emulsifiers And Their Role – Milk Powder – Definition – Need for Making Milk Powder – Drying Process – Types of Drying.

TEXTBOOKS

1. Bagavathi Sundari K, *Applied Chemistry*, 1st Edition, MJP Publisher, 2006.
2. Rangappa K. S, Acharya K. T, *Indian Diary Products*. Asia Publishing House: New Delhi, 1974.
3. Saurav Singh. *A Text Book of Diary Chemistry,* 1st Edition, Daya Publishing House, 2013.
4. Choudhary P. L, *A Text Book of Diary Chemistry.* Bio – Green book Publishers, 2021.

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1. Robert Jenness, Patom S, *Principles of Diary Chemistry*, S. Wiley: New York. 2005.
2. Wond F. P, *Fundamentals of Diary Chemistry*, Spinger: Singapore. 2006.
3. Sukumar De, *Outlines of Diary Technology,* Oxford University Press: New Delhi. 1980.
4. Fox P. F, Mesweeney P. L. H, *Diary Chemistry and Biochemistry,* 2nd Edition, Spinger, 2016.
5. Fox P. F, Uniake Lowe, McSweeney P. L. H, Mahony J. A. O, *Diary Chemistry and Biochemistry,* 2nd Edition, Spinger, 2016.

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1. https://www.digimat.in/nptel/courses/video/126105013/L24.html
2. https://www.youtube.com/watch?v=XF4qE0pE5ZA
3. https://www.youtube.com/watch?v=oC2-dZ0O_Po

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF TAMIL
UG PROGRAMME - B.A./ B.COM/B.B.A./ B.SC./BCA
SEMESTER - III
பொதுத்தமிழ் - III (23UTAG31)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 6 **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 90 hrs **MAX. MARKS: 100**

நோக்கங்கள்

- இலக்கியங்களின் சிறப்பினை உணர்த்துதல்.
- காலந்தோறும் எழுந்த காப்பியங்களின் போக்கையும், புதினத்தின் இலக்கிய வடிவத்தையும் யாப்பு, அணி போன்ற இலக்கிய வகைகளையும் மொழிபெயர்ப்புத் திறனையும் மாணவர்கள் உணருமாறு செய்தல்.
- தமிழ் இலக்கியம் சார்ந்த போட்டித் தேர்வுகளுக்கு ஏற்ப கற்பித்தல் நடைமுறைகளை மேற்கொள்ளுதல்.

கற்றலின் விளைவுகள்

இத்தாளை வெற்றிகரமாக முடித்தவுடன் மாணவர்கள்,

CO1[K1]: இலக்கியங்களின் வழி வாழ்வியல் சிந்தனைகள் பற்றி அறிவர்.
CO2[K2]: காப்பிய சமயக் கருத்துக்களையும் நோக்கங்களையும் அடையாளம் காண்பர்.
CO3[K3]: தமிழ் புதினங்களின் வழி சமகாலப் படைப்புகளின் வாழ்க்கை முறையின் ஆற்றலைப் பெறுவர்.
CO4[K4]: காப்பியங்கள் மற்றும் புதினங்களின் வரலாற்றினைப் பாகுபடுத்துவர்.
CO5[K5]: இலக்கிய இலக்கணங்களை கற்று அவற்றை மதிப்பீடு செய்வர்.

CO/PO Mapping Table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	1	-	1	-	-	-
CO2[K2]	2	1	-	1	-	-	-
CO3[K3]	2	2	-	2	1	-	-
CO4[K4]	2	2	1	2	-	1	1
CO5[K5]	2	2	1	2	1	1	1
Weightage of the Course	10	08	02	08	02	02	02
Weighted percentage of Course Contribution to Pos	1.84	1.78	0.72	2.74	1.37	1.09	1.01

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

கூறு I **(18 Hrs)**

பெருங்காப்பியங்கள்: சிலப்பதிகாரம் - வழக்குரை காதை - இளங்கோவடிகள், மணிமேகலை ஆதிரை பிச்சையிட்ட காதை – சீத்தலைச்சாத்தனார், சீவகசிந்தாமணி – பூமகள் இலம்பகம் - திருத்தக்கதேவர், வளையாபதி – நாதகுந்தனார்.

கூறுII **(18Hrs)**

சமயக் காப்பியங்கள்: பெரியபுராணம் - பூசலார் நாயனார் புராணம் - சேக்கிழார், கம்பராமாயணம் - மந்தரை சூழ்ச்சிப் படலம் - கம்பர், வில்லிபாரதம் - மற்போர் சருக்கம் - வில்லிப்புத்தூராழ்வார், சீறாப்புராணம் - புலி வசனித்த படலம் - உமறுப்புலவர்.

கூறு III **(18 hrs)**

புதினம்: வஞ்சிமாநகரம் (வரலாற்றுப் புதினம்) – நா.பார்த்தசாரதி.

கூறு IV **(18 hrs)**

காப்பியத்தின் தோற்றமும் வளர்ச்சியும் - புதினத்தின் தோற்றமும் வளர்ச்சியும்

கூறு V **(18 hrs)**

மொழித்திறன்: நூல் மதிப்புரை, திறனாய்வு செய்தல், கடிதம் வரைதல், விண்ணப்பம் எழுதுதல்.

பாடநூல்கள்

1. தமிழியல் துறையினர், *தொகுப்பு நூல்,* ஸ்ரீ காளீஸ்வரி கல்லூரி (தன்னாட்சி), சிவகாசி.
2. வாசுதேவன், கா. *பன்முக நோக்கில் தமிழ் இலக்கிய வரலாறு,* தேவன் பதிப்பகம், திருச்சிராப்பள்ளி, 2017.
3. நா.பார்த்தசாரதி, வஞ்சி மாநகரம், கவிதா வெளியீடு, சென்னை, 600017

பார்வை நூல்கள்

1. சிற்பி. பாலசுப்பிரமணியன், *தமிழ் இலக்கிய வரலாறு,* கவிதா வெளியீடு, சென்னை.
2. தமிழண்ணல், *புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு,* சோலை பதிப்பகம், மதுரை
3. பாக்கியமேரி, *வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு*, பாரி நிலையம், சென்னை.

வலைப்பதிவுகள் (Web Sources)

1. Tamil Heritage Foundation- www.tamilheritage.org http://www.tamilheritage.org
2. Tamil virtual University Library- www.tamilvu.org/ library http://www.virtualvu.org/library
3. Project Madurai - www.projectmadurai.org.
4. Chennai Library- www.chennailibrary.com http://www.chennailibrary.com
5. Tamil Universal Digital Library- www.ulib.prg http://www.ulib.prg
6. Tamil E-Books Downloads- tamilebooksdownloads. blogspot.com
7. Tamil Books on line- books.tamil cube.com
8. Catalogue of the Tamil books in the Library of British Congress archive.org
9. Tamil novels on line - books.tamilcube.com

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF ENGLISH
UG PROGRAMME - B.A./ B.COM/B.B.A./ B.SC./BCA
SEMESTER- III
GENERAL ENGLISH - III (23UENL31)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 6 (L-5, T-1) **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 90 hrs **MAX. MARKS: 100**

Course Objectives

- To enhance the level of literary and aesthetic experience of students and to help them respond creatively.
- To sensitize them to the major issues in the society and the world.
- To provide them with an ability to build and enrich their communication skills.
- To equip them to utilize the digital knowledge resources effectively for their chosen fields of study.
- To help them think and write imaginatively and critically.

Course Outcomes (CO)

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

CO1[K1]: relate and state ideas by reading simple poems and scenes from Shakespearean plays.
CO2[K2]: demonstrate effective speaking skills by listening to speeches of famous personalities and express it in day-to-day life.
CO3[K3]: apply the knowledge of language competency in writing letters, emails and display social etiquettes in everyday life.
CO4[K4]: analyse data interpretation, meeting etiquettes, organizing and participating in a meeting.
CO5[K5]: develop language skills through literature and assess the knowledge of English in the workplace.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	1	-	2	-	-	-
CO2[K2]	2	2	-	2	1	1	-
CO3[K3]	2	2	1	2	1	1	-
CO4[K4]	2	2	1	2	-	-	1
CO5[K5]	2	1	1	1	1	1	1
Weightage of the course	10	08	03	09	03	03	02
Weighted percentage of Course contribution to POs	**1.84**	**1.78**	**1.08**	**3.08**	**2.05**	**1.63**	**1.01**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I - SPEECHES OF FAMOUS PERSONALITIES **(18 hrs)**

Jawaharlal Nehru	-	Tryst with Destiny
Steve Jobs	-	You've got to Find What You Love
Barack Obama	-	Yes, We Can

UNIT II- POETRY **(18 hrs)**

Christina Rossetti	-	In an Artist's Studio
Toru Dutt	-	Sita
Oodgeroo Noonuccal	-	A Song of Hope
Mamang Dai	-	The Voice of the Mountains

UNIT III - SCENES FROM SHAKESPEARE **(18 hrs)**

Romeo & Juliet	-	The Balcony Scene
Macbeth	-	Banquet Scene
Julius Caesar	-	Murder Scene

UNIT IV - LANGUAGE COMPETENCY **(18 hrs)**

Writing letters and emails
Writing and messaging in social media platforms [blogs, twitter, Instagram, facebook]
Learning netiquette, email etiquette

UNIT V - ENGLISH FOR WORK PLACE **(18 hrs)**

Data Interpretation and Reporting
Data Presentation and analysis
Meeting Etiquettes - language, dress code, voice modulation
Online Meetings - Terms and expressions used
Conducting and participating in a meeting

TEXTBOOK

1. Arden Shakespeare*: Complete works of William Shakespeare*. Bloomsbury, 2011.

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Books

1. Wells, Stanley. *The Shakespeare Book: Big Ideas Simply Explained*, et al. DK Publishing, 2015.
2. Gandhi, Mahatma. *Famous Speeches by Mahatma Gandhi*, Create space Independent Publishing Platform, 2016.
3. Bernish, Jeanne Kelly. *How to Build a Professional Digital Profile* Kindle Edition, Bernish Communications Associates, LLC; 1st edition (May 29, 2012).
4. Folse, Keith.S. *Keys to Teaching Grammar to English Language Learners*, Second Ed.: A Practical Handbook, Michigan Teacher Training, 2016.
5. Yardley, Krysia.M. *Role Play- Theory and Practice*. Matwiejczuk, SAGE publications ltd, 1997.

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1. https://www.scribd.com/document/558838656/
2. http://www.wordslikethis.com.au/

3. https://www.poetryfoundation.org/poems/146804/in-an-artist39s-studio
4. https://www.poetrynook.com/poem/s%E2%94%9C%C2%ABta
5. https://www.cam.ac.uk/files/a-tryst-with-destiny/index.html#:~:text=Jawaharlal%20Nehru%2C%20delivering%20his%20Tryst%20with%20Destiny%20speech.&text=%22Long%20years%20ago%20we%20made,awake%20to%20life%20and%20freedom

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- III
CORE COURSE – V: GENERAL CHEMISTRY – III (23UCHC31)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS: 25**
CREDITS : 4 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- To know the physical properties of gases, liquids, solids and X-ray diffraction of solids.
- To gain the fundamental knowledge of nuclear chemistry and nuclear waste management.
- To inculcate applications of nuclear energy
- To get the basic idea about chemistry of halo-organic compounds, phenol and other aromatic alcohols.
- To study the preparation and properties of phenols and alcohols.

Course Outcomes (CO)

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

CO1[K1]: explain the kinetic properties of gases, solid & liquid states, nuclear radioactivity, and reaction in organic compounds, halogen derivatives and phenol

CO2[K2]: describe the properties of states, the crystal structure, packing, terms in nuclear chemistry, halogen derivatives and phenol

CO3[K3]: discuss the radioactivity, nuclear energy, nuclear waste management, alcohols, basis of halo, phenol derivatives

CO4[K4]: examine about gaseous, liquid and solid states, radioactivity, isotopes, alcohols, halides, reaction of organic compounds

CO5[K5]: deduct the derivations & equations of gases, solid & liquid states, organic compounds- halides, alcohols, phenols and crystal structure.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	1	-	-	1
CO2[K2]	3	2	2	1	-	1	1
CO3[K3]	3	3	2	1	1	1	1
CO4[K4]	3	3	1	1	1	1	1
CO5[K5]	3	3	2	2	1	1	1
Weightage of the course	15	13	09	06	03	04	05
Weighted percentage of Course contribution to POs	**2.76**	**2.89**	**3.24**	**2.05**	**2.05**	**2.17**	**2.53**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – GASEOUS STATE **(12 hrs)**

Kinetic Molecular Model of a Gas: Postulates and Derivation from the Kinetic Gas Equation; The Maxwell – Boltzmann Distribution of Speed of Molecules – Average, Root Mean Square and Most Probable Velocity and Average Kinetic Energy, Law of Equipartition of Energy, Degrees of Freedom and Molecular Basis of Heat Capacities. Collision Frequency; Collision Diameter; Mean Free Path and Viscosity of Gases. **Real Gases:** Deviations from Ideal Gas Behavior, (Andrew's and Amagat's Plots); Compressibility Factor, Z and its Variation with Pressure for Different Gases. Equation of States for Real Gases – Van der Waal's Equation; Virial equation; Boyle Temperature; Numerical Problems based on Equations of States for Real Gases, Isotherms of Real Gases – Critical Phenomena – Isotherms of CO_2 – Continuity of State – Van der Waal's Equation and the Critical State; Law of Corresponding States – Liquefaction of Gases; Numerical Problems Involving the Core Concepts.

UNIT II – LIQUID AND SOLID STATE **(12 hrs)**

Liquids: Properties of Liquids – Surface Tension, Viscosity and their Applications. Crystalline and amorphous – Differences – Geometry, Isotropy and Anisotropy, Melting Point; Isomorphism, Polymorphism. **Solid State:** Crystals – Size and Shape; Laws of Crystallography; Symmetry Elements – Plane Centre and Axis; MillerIndices, Unit Cells and Space Lattices; Classification of Crystal Systems; Bravais Lattices; X- ray Diffraction – Bragg's Equation. Packing in Atomic Solids – Simple Cubic, Body Centered Cubic, Face Centered and Hexagonal Close Packing; Co-ordination Number in Typical Structures – NaCl. CsCl, ZnS, TiO_2; Comparison of Structure and Properties of Diamond and Graphite; Numerical Problems Involving Core Concepts – Defects in Solids – Stiochiometric and Non-stoichiometric Defects. **Liquid Crystals** – Classification and Applications.

UNIT III – NUCLEAR CHEMISTRY **(12 hrs)**

Natural Radioactivity – α, β and γ rays; Half – Life Period; Fajan – Soddy Group Displacement Law; Geiger Nattal Rule; Isotopes, Isobars, Isotones, Mirror Nuclei, Iso Diaphers; Nuclear Isomerism; Radioactive Decay Series; Magic Numbers; Units – Curie, Rutherford, Roentgen; Nuclear Stability – Neutron – Proton Ratio; Binding Energy; Packing Fraction; Mass Defect. Simple Calculations Involving Mass Defect and Binding Energy; Decay Constant and t_2^1 and Radioactive Series. Isotopes – Uses – Traces – Determination of Age of Rocks by Radiocarbon Dating (Problems to be Worked Out) Nuclear Energy; Nuclear Fission and Fusion – Major Nuclear Reactors in India; Radiation Hazards, Disposal of Radioactive Waste and Safety Measures.

UNIT IV – HALOGEN DERIVATIVES **(12 hrs)**

Aliphatic Halogen Derivatives: Nomenclature and Classes of Alkyl Halides – Isomerism, Physical Properties, Chemical Reactions. Nucleophilic Substitution Reactions – S_N1, S_N2 and S_Ni mechanisms with stereochemical aspects and effect of solvent. **Di, Tri and Tetra Halogen Derivatives**: Nomenclature, Classification, Preparation, Properties and Applications. **Aromatic Halogen Compounds**: Nomenclature, Preparation, Properties and Uses – Mechanism of Nucleophilic Aromatic Substitution – Benzyne Intermediate. **Aryl Alkyl Halides:** Nomenclature, Benzyl Chloride – Preparation, Properties and Uses. **Alcohols**: Nomenclature, Classification, Preparation, Properties and Uses – Conversions – Ascent and Descent of Series; Test for Hydroxyl Groups. Oxidation of Diols by Periodic Acid and Lead Tetraacetate.

UNIT V – PHENOLS **(12 hrs)**

Nomenclature: Classification, Preparation from Diazonium Salts, Cumene, Dow's Process, Raching Process; Properties – Acidic Character and Effect of Substitution on Acidity. Reactions – Fries, Claisen Rearrangement, Electrophilic Substitution Reactions, Reimer – Teimen, Kolbe, Schmidt, Gattermann Synthesis, Libermann, Nitro Reaction, Phthalein Reaction. Resorcinol, Quinol, Picric Acid – Preparation, Properties and Uses. **Aromatic Alcohols:** Nomenclature, Benzyl Alcohol – Methods of Preparation – Hydrolysis, Reduction of Benzaldehyde, Cannizzarro Reactions, Grignard Synthesis, Physical Properties, Reactions – Reaction with Sodium, Phosphorous Pentachloride, Thionyl Chloride, Acetic Anhydride Iodide, Oxidation – Substitution on the Benzene Nucleus, Uses – **Thiols:** Nomenclature, Structure, Preparation and Properties.

TEXTBOOKS

1. Puri B. R, Sharma L. R and Pathania M. S. *Principles of Physical Chemistry*. 46th Edition, Vishal Publishing, 2020.
2. Puri B. R, Sharma L. R and Kalia K. C. *Principles of Inorganic Chemistry*, Milestone Publishers and Distributors: New Delhi, 13th Edition, 2009.
3. Soni P. L and Mohan Katyal, *Textbook of Inorganic Chemistry*, 20th Edition, Sultan Chand & amp Sons, 2006.
4. Jain M. K and Sharma S. C, *Modern Organic Chemistry,* 4th Reprint, Vishal Publishing, 2003
5. Mukherji S. M and Singh S. P, *Reaction Mechanism in Organic Chemistry*, 3rd Edition, Macmillan India Ltd., 1994.

REFERENCES

Books

1. Graham Solomons, *Organic Chemistry,* 5th Edition, John Wiley & amp; Sons, 1992.
2. Carey Francis A. *Organic Chemistry,* 7th Edition, Tata McGraw – Hill Education Pvt., Ltd: New Delhi, 2009
3. Finar I. L, *Organic Chemistry,* 6th Edition, Wesley Longman Ltd: England, 1996.
4. Soni P. L and Chawla H M. *Textbook of Organic Chemistry*, 29th Edition, New Delhi: Sultan Chand & Sons, 2007.
5. Lee J. D, *Concise Inorganic Chemistry,* 5th Edition, Blackwell Science, 2005.

Web Sources

1. https://nptel.ac.in/courses/104104101
2. https://nptel.ac.in/courses/103106071
3. https://nptel.ac.in/courses/104106119s

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- III
CORE COURSE – VI: PRACTICAL: QUALITATIVE INORGANIC ANALYSIS (23UCHC3P)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS: 25**
CREDITS : 4 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- To know the techniques involved in qualitative analysis
- To learn analyze the mixture of given salt
- To inculcate applications solubility product and common ion effect in cation analysis
- To get the basic idea interfering and non-interfering anion
- To study the elimination of interfering anion

Course Outcomes (CO)

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

CO1[K2]: generalize the cations into groups based on common ion effect and solubility product principles

CO2[K3]: identify the elimination of interfering anions by using suitable reagents

CO3[K4]: analysis anion and cation by following systematic procedure of semi-micro qualitative analysis

CO4[K5]: assign cations into different groups and carry out group analysis to confirm the cation

CO5[K6]: predict anions and cations present in the mixture using selective reagents.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	2	3	1	-	1	1
CO2[K3]	3	3	2	1	1	-	1
CO3[K4]	3	3	2	1	-	1	1
CO4[K5]	3	3	2	2	1	1	1
CO5[K6]	3	3	2	2	1	1	1
Weightage of the course	15	14	11	07	03	04	05
Weighted percentage of Course contribution to POs	**2.76**	**3.11**	**3.96**	**2.4**	**2.05**	**2.17**	**2.53**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

LIST OF EXPERIMENTS

1. Analysis of Simple Acid Radicals: Carbonates, Sulphides, Sulphate, Thiosulphite, Chloride, Bromide, Iodide, Nitrate.
2. Analysis of Interfering Acid Radicals: Fluoride, Oxalate, Borate, Phosphate, Arsenate, Arsenite.
3. Elimination of Interfering Acid Radicals and Identifying The Group of Basic Radicals
4. Analysis of Simple Basic Radical (Group Wise): Lead, Copper, Bismuth, Cadmium, Tin, Antimony, Iron, Aluminium, Arsenic, Zinc, Manganese, Nickel, Cobalt, Calcium, Strontioum, Barium, Magnesium, and Ammonium.
5. Analysis of Mixture – I to VIII Containing Two Cations and Two Anions (of which one is Interfering Type).

REFERENCE

Book

1. Venkateswaran V, Veeraswamy R and Kulandivelu *A. R. Basic Principles of Practical Chemistry,* 2nd Edition, Sultan Chand & Sons: *New Delhi, 1997.*

Web Source

1. https://www.vlab.co.in/broad-area-chemical-sciences

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Maths/Chemistry
SEMESTER - I/III
ELECTIVE COURSE GENERIC/ DISCIPLINE SPECIFIC - I/III: ALLIED PHYSICS – I (23UMAA11/23UCHA31)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 4**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 60 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To analyze and demonstrate the various dynamic motions mathematically and relate the theory with practical applications
- To impart the basic concepts of elasticity, viscosity and surface tension of materials and describe the experimental methods to determine it.
- To describe the process of liquefactions of gases, working of heat engines and concepts of change in entropy with theory.
- To impart the basic concepts of electricity and magnetism, AC current and voltage, household and factory electrical wiring.
- To introduce logic gates, universal building blocks, Boolean theorems
- To know the government initiatives for Digital India.

Course Outcomes (CO)

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

CO1[K1]: outline the basic concepts of waves, oscillations, ultrasonics, properties of matter, heat and thermodynamics, electricity and magnetism, and digital electronics

CO2[K2]: explain the basic principles with theory pertaining to the course

CO3[K3]: apply basic concepts to derive the expressions and solve problems

CO4[K4]: analyze and verify the basic concepts in the physical processes

CO5[K5]: examine the experimental methods to determine the physical parameters

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	1	-	1	-	-	-
CO2[K2]	3	1	-	2	-	-	-
CO3[K3]	3	3	1	1	1	1	1
CO4[K4]	2	3	1	1	1	1	1
CO5[K5]	2	3	1	1	1	1	1
Weightage of the course	13	11	03	06	03	03	03
Weighted percentage of Course contribution to POs	**2.39**	**2.44**	**1.08**	**2.05**	**2.05**	**1.63**	**1.52**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – WAVES, OSCILLATIONS AND ULTRASONICS (12 hrs)

Simple Harmonic Motion (SHM) – Composition of Two SHMs at Right Angles (Periods in the Ratio 1:1) – Lissajous Figures – Uses – Laws of Transverse Vibrations of Strings – Determination of AC Frequency Using Sonometer (Steel and Brass Wires). Ultrasound – Production – Piezoelectric Method – Application of Ultrasonics: Medical Field – Lithotripsy, Ultrasonography – Ultrasonoimaging-Ultrasonics in Dentistry – Physiotheraphy, Opthalmology – Advantages of Noninvasive Surgery – Ultrasonics in Green Chemistry.

UNIT II – PROPERTIES OF MATTER (12 hrs)

Elasticity: Elastic Constants – Bending of Beam – Theory of Non- Uniform Bending – Determination of Young's Modulus by Non-Uniform Bending – Energy Stored in a Stretched Wire – Torsion of a Wire – Determination of Rigidity Modulus by Torsional Pendulum.

Viscosity: Streamline and Turbulent Motion – Critical Velocity – Coefficient of Viscosity – Poiseuille's Formula – Comparison of Viscosities – Burette Method.

Surface Tension: Definition – Molecular Theory – Droplets Formation – Shape, Size and Lifetime – COVID Transmission through Droplets, Saliva – Drop Weight Method – Interfacial Surface Tension.

UNIT III – HEAT AND THERMODYNAMICS (12 hrs)

Joule-Kelvin Effect – Joule-Thomson Porous Plug Experiment – Theory – Temperature of Inversion – Liquefaction of Oxygen – Linde's Process of Liquefaction of Air – Liquid Oxygen for Medical Purpose – Importance of Cryocoolers – Thermodynamic System – Thermodynamic Equilibrium – Laws of Thermodynamics – Heat Engine – Carnot's Cycle – Efficiency – Entropy – Change of Entropy in Reversible and Irreversible Process.

UNIT IV – ELECTRICITY AND MAGNETISM (12 hrs)

Potentiometer – Principle – Measurement of Thermo emf using Potentiometer – Magnetic Field due to a Current Carrying Conductor – Biot-Savart's law – Field along the Axis of the Coil Carrying Current – Peak, Average and RMS Values of AC Current and Voltage – Power Factor and Current Values in an AC circuit – Types of Switches in Household and Factories – Smart WiFi Switches - Fuses and Circuit Breakers in Houses.

UNIT V – DIGITAL ELECTRONICS AND DIGITAL INDIA (12 hrs)

Logic Gates, OR, AND, NOT, NAND, NOR , EXOR Logic Gates – Universal Building Blocks – Boolean Algebra – De Morgan's Theorem – Verification. Overview of Government Initiatives: Software Technological Parks Under MeitY, NIELIT- Semiconductor Laboratories Under Dept. of Space – An Introduction to Digital India.

UNIT VI – PROFESSIONAL COMPONENTS (NOT FOR EXAMINATION)

Expert Lectures – Seminars – Webinars – Industry Inputs – Social Accountability – Patriotism.

TEXTBOOKS

1. Murugesan R, *Allied Physics*, New Delhi: S.Chand & Co., 2001.
2. Brijlal and N. Subramanyam. Waves and Oscillations. New Delhi: Vikas Publishing House, 2001.
3. Murugesan R. *Properties of Matter*. New Delhi: S.Chand & Co., 2012.
4. Rajam J.B. and Arora C.L. *Heat and Thermodynamics.* New Delhi: S.Chand & Co., Eighth edition, 1976.
5. Murugeshan R. *Optics and Spectroscopy*. New Delhi: S.Chand & Company Ltd., Sixth Edition, 2006.
6. Subramaniyam A. *Applied Electronics*. Chennai: National Publishing Co., Second Edition, 1996.

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1. Resnick Halliday and Walker. *Fundamentals of Physics*. Singapore:John Willey and Sons, Asia Pvt. Ltd., Eleventh edition, 2018.
2. Khanna V.R. and Bedi R.S. *Text book of Sound.* Meerut: Kedharnaath Publish & Co, First Edition, 1998.
3. Khare N.S. and Srivastava S.S. *Electricity and Magnetism.* New Delhi: Atma Ram & Sons, Tenth Edition, 1983.
4. Khanna D.R. and Gulati H.R. *Optics.* New Delhi: S. Chand & Co. Ltd., 1979.
5. Mehta V.K and Rohit Mehta. *Principles of Electronics.* New Delhi: S.Chand & Company Ltd., Revised Eleventh Edition, Reprint 2013.

Web Sources

1. https://youtu.be/M_5KYncYNyc
2. https://youtu.be/ljJLJgIvaHY
3. https://youtu.be/7mGqd9HQ_AU
4. https://youtu.be/h5jOAw57OXM
5. https://www.youtube.com/watch?v=t6nGiBzGLD8
6. https://ncert.nic.in/ncerts/l/jesc113.pdf

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme –B.Sc. Maths/Chemistry
SEMESTER - I/III
ELECTIVE COURSE GENERIC/DISCIPLINE SPECIFIC- I/III: PRACTICAL: ALLIED PHYSICS – I (23UMAA1P/23UCHA3P)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 2**	**INT. MARKS**	**: 25**
CREDITS	**: 2**	**EXT. MARKS**	**: 75**
DURATION	**: 30 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To set up experiments to understand the various concepts of properties of matter
- To arrange the experiments to evaluate physical parameters of materials and verify theories
- To quantify and analyze experimental results
- To do error analysis and correlate results

Course Outcomes (CO)

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

CO1[K1]: identify the basic concepts of properties of matter, electricity and digital electronics underlying in the experiments

CO2[K2]: setup the experiment and collect data to determine the physical parameters involved in the experiments

CO3[K3]: calculate the basic parameters involved in the experiments from the experimental data

CO4[K4]: analyze/interpret/plot graph/verify the theorem from the experimental data

CO5[K5]: evaluate the physical parameters using appropriate formula/make conclusions from the experimental data

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	1	-	-	-	-	-
CO2[K2]	2	2	-	1	1	-	-
CO3[K3]	2	2	1	1	1	1	1
CO4[K4]	2	2	1	1	1	1	1
CO5[K5]	2	3	1	1	1	1	1
Weightage of the course	10	10	03	04	04	03	03
Weighted percentage of Course contribution to POs	**1.84**	**2.22**	**1.08**	**1.37**	**2.74**	**1.63**	**1.52**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

LIST OF EXPERIMENTS (Minimum 8**):**

1. Young's Modulus by Non-Uniform Bending using Pin and Microscope
2. Young's Modulus by Non-Uniform Bending using Optic Lever, Scale and Telescope
3. Rigidity Modulus by Static Torsion Method
4. Rigidity Modulus by Torsional Oscillations Without Mass
5. Surface Tension and Interfacial Surface Tension – Drop Weight Method
6. Comparison of Viscosities of Two Liquids – Burette Method
7. Specific Heat Capacity of a Liquid – Half Time Correction
8. Verification of Laws of Transverse Vibrations using Sonometer
9. Calibration of Low Range Voltmeter using Potentiometer
10. Determination of Thermo emf using Potentiometer
11. Verification of Truth Tables of Basic Logic Gates using ICs
12. Verification of De Morgan's Theorems using Logic Gate ICs.
13. Use of NAND as Universal Building Block.

TEXTBOOKS

1. Srinivasan M.N, Balasubramanian S and Ranganathan R. *A Textbook of Practical Physics.* New Delhi: Sultan Chand & Sons, First Edition, Reprint 2011.
2. Ouseph C.C, Rao U.J and Vijayendran V. *Practical Physics and Electronics*. Chennai: Ananda Book Depot, First Edition, Reprint 2019.
3. Ouseph C.C, Srinivasan V and Balakrishnan R. *A Textbook of Practical Physics - Part I.* Chennai: S.Viswanathan (Printers & Publishers) Pvt., Ltd., Revised Edition, Reprint 2000.

REFERENCES

Books

1. Arora C.L. *B Sc Practical Physics.* New Delhi: S.Chand & Sons Co. Ltd., Reprint 2018.
2. Kakani S.L and Shubhra K. *Applied Physics: Theory and Practical*. New Delhi: Viva Books Pvt. Ltd., First Edition, 2015.
3. Manjeet S and Anita D. *Applied Physics: Theory and Experiment*. New Delhi: Vayu Education of India, First Edition, 2011.
4. Tayal D.C. *University Practical Physics*. Mumbai: Himalaya Publishing House, First Millennium Edition, 2000.

Web Sources

1. https://www.youtube.com/watch?v=RvPNGULZASY
2. https://www.youtube.com/watch?v=Ke3xGTfVeCk
3. https://www.youtube.com/watch?v=-vbtoSsRpfk
4. https://www.youtube.com/watch?v=yjOcbjpTCFA
5. https://egyankosh.ac.in/bitstream/123456789/18821/1/Experiment-7.pdf

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- III
SKILL ENHANCEMENT COURSE - V: (ENTREPRENEURIAL SKILL) – ENTREPRENEURIAL SKILLS IN CHEMISTRY (23UCHS3P)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 1 **INT. MARKS: 25**
CREDITS : 1 **EXT. MARKS: 75**
DURATION : 15 hrs **MAX. MARKS: 100**

Course Objectives

- To develop the entrepreneur skill in chemistry
- To provide hands on experience to prepare the products.
- To develop startups
- To gain knowledge on dyes.
- To be aware of water analysis.

Course Outcomes (CO)

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

CO1[K1]: identify adulterated food items by doing simple chemical tests.
CO2[K2]: educate others about adulteration and motivate them to become entrepreneurs.
CO3[K3]: plan a method to prepare cleaning products and become entrepreneurs
CO4[K4]: Analyze the adulterated food items.
CO5[K5]: evaluate the hardness, chlorine content and pH of water samples

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	2	-	-	-	-	1
CO2[K2]	2	2	1	1	-	1	1
CO3[K3]	2	2	1	1	1	1	1
CO4[K4]	2	1	1	1	1	1	1
CO5[K5]	1	1	2	1	1	1	1
Weightage of the course	09	08	04	04	03	04	05
Weighted percentage of Course contribution to POs	**1.66**	**1.78**	**1.44**	**1.37**	**2.05**	**2.17**	**2.53**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – FOOD CHEMISTRY AND DYES **(5 hrs)**

Food Chemistry: Food adulteration – contamination of food items with clay stones, water and toxic chemicals – Common adulterants. Food additives, Natural and synthetic anti-oxidants, glazing agents (hazardous effect), food colourants, Preservatives, leavening agents, Baking powder and baking soda, yeast, MSG, vinegar. **Dyes:** Classification – Natural, synthetic dyes and their characteristics – basic methods and principles of dyeing

UNIT II **(10 hrs)**

Hands on Experience (Students can choose any four)

1. Detection of adulterants in food items like coffee, tea, pepper, chilli powder, turmeric powder, butter, ghee, milk, honey etc., by simple techniques.
2. Preparation of Jam, squash and Jelly, Gulkand, cottage cheese.
3. Preparation of products like candles, soap, detergents, cleaning powder, shampoos, pain balm, tooth paste/powder and disinfectants in small scale.
4. Extraction of oils from spices and flowers.
5. Testing of water samples using testing kit.
6. Dyeing – cotton fabrics with natural and synthetic dyes
7. Printing – tie and dye, batik.

TEXTBOOKS

1. George S & Muralidharan V, *Fibre to Finished Fabric – A Simple Approach,* Publication Division, University of Madras, Chennai, 2007.
2. Appaswamy G. P, *A Handbook on Printing and Dyeing of Textiles*.

REFERENCE

Book

1. Shyam Jha. *Rapid detection of food adulterants and contaminants (Theory and Practice)*. 1st Edition, Elsevier, 2015.

Web Source

1. https://www.vlab.co.in/broad-area-chemical-sciences

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- III
SKILL ENHANCEMENT COURSE - VI: PESTICIDE CHEMISTRY (23UCHS31)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX. MARKS: 100**

Course Objectives

- To gain knowledge on various types of pesticide and their toxicity
- To understand the accumulation of pesticide in the form of residue and its analysis
- To develop skill in bio-fertilizers
- To impart the knowledge on eco-friendly pesticides
- To know about various insecticides

Course Outcomes (CO)

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

CO1[K1]: illustrate about the pesticides, insecticides and biopesticides.

CO2[K2]: explain the preparation, properties and structures of pesticides, insecticides and biopesticides.

CO3[K3]: outline the pesticide residues, classification of insecticides and biopesticides.

CO4[K4]: examine the extraction, analytical methods of pesticides, pesticide residues and application of biopesticides.

CO5[K5]: create awareness to the public on toxicity of pesticides, effects of pesticide residues and bio - pesticides.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	2	2	-	1	1	1
CO2[K2]	2	2	1	1	1	-	1
CO3[K3]	2	2	1	1	1	1	1
CO4[K4]	2	1	1	1	1	1	1
CO5[K5]	2	1	1	1	1	1	1
Weightage of the course	10	08	06	04	05	04	05
Weighted percentage of Course contribution to POs	**1.84**	**1.78**	**2.16**	**1.37**	**3.42**	**2.17**	**2.53**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – PESTICIDES (6 hrs)

History of Pesticides. Chemistry of Pesticides: Brief Introduction to Classes of Pesticides (Chemical Class, Targets), Structures, Chemical Names, Physical and Chemical Properties. Toxicity of Pesticides: Acute and Chronic Toxicity in Ammmals, Birds, Aquatic Species Etc. Methods of Analysis of Pesticides.

UNIT II – INSECTICIDES (6 hrs)

Classification and Study of Following Insecticides with Respect to Structure, Chemical Name, Physical Properties, Chemical Properties, Synthesis, Degradation, Metabolism, Formulations, Mode of Actions, Uses, Toxicity. Organophosphates and Phosphothionates: Acephate, Chloropyriphos, Monocrotophos and Parathion – Methyl Organochlorine – Endosulfan, Heptachlor, Cabamate: Cartap Hydrochloride, Methomyl, Propoxur.

UNIT III – PESTICIDE RESIDUE (6 hrs)

Introduction – Application of Agrochemicals, Dissemination Pathways of Pesticides, Causes of Pesticide Residues, Remedies. Pesticides Residue in Atmosphere – Entry into Atmosphere, Action of Pesticides, Effects on Environments. Pesticides Residues in Water – Entry into Water Systems, Action And Effect in Aquatic Environment. Pesticides Residues in Soil – Entry in Soil, Absorption, Retention and Transport in Soil, Effects on Microorganism, Soil Condition and Fertility Decomposition and Degradation by Climatic Factors and Microorganism.

UNIT IV – PESTICIDE RESIDUE EFFECT AND ANALYSIS (6 hrs)

Effects of Pesticides Residue on Human Life, Birds and Animals – Routes for Exposure to Pesticides, Action of Pesticides on Living System. Analysis of Pesticides Residues – Sample Preparation, Extraction of Pesticides Residues (Soil, Water and Vegetables/ Fruits) Simple Methods and Schemes of Analysis, Multi-Residue Analysis.

UNIT III (10 hrs)

Biopesticide: Pheromones, Attractants, Repellents – Introduction, Types And Application (8 -Dodeccen-1-ol, 10-cis-12 Hexadecadienoic, Trimedlure, Cue-lure, Methyl Eufgenol, N, N-Diethyl-M-Toluamide, Dimethyl Phthalate, Learidine), Baits – Metaldehyde, Iron (II) Phosphate, Indoxacarb, Zinc Phosphide, Bromadiolone.

TEXTBOOKS

1. Handa S. K, *Principles of Pesticide Chemistry,* Agrobios: India, 2012.
2. Matolesy G, Nadasy M, Andriska V, *Pesticide Chemistry,* Elseiver, 1989.
3. Miyamotp J, Kearney P C. *Pesticide Chemistry Human Welfare and the Environment Vol. IV Pesticide Residue and Formulation Chemistry, Pergamon* press*,* 1985*.*

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Books

1. Roy N. K. *Chemistry of Pesticides*. 1st Edition, CRB Publisher & Distributors P. Ltd., 2010.
2. Nollet L. M, Rathore H. S, *Handbook of Pesticides, Methods of Pesticide Residues Analysis,* CRC Press, 2016.
3. Ellerbrock R. H, *Pesticide Residues: Significance, Management and Analysis.* 2005.

Web Sources

1. https://www.youtube. watch?v=yHuOvO2RRG4com/
2. https://www.youtube.com/watch?v=WxD54Qj4l1M
3. https://www.youtube.com/watch?v=RP31MeF3fWk

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF TAMIL
UG PROGRAMME - B.A./ B.COM/B.B.A./ B.SC./BCA
SEMESTER - IV
பொதுத்தமிழ் - IV (23UTAG41)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 6 **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 90 hrs **MAX. MARKS: 100**

நோக்கங்கள்

- இலக்கியங்களின் சிறப்பினை உணர்த்துதல்.
- சங்க இலக்கியத்தின் சிறப்பையும், நாடகம் என்னும் இலக்கிய வகையின் தன்மையையும் அகபுற இலக்கணங்களையும் மாணவர்களுக்கு அறிமுகப்படுத்துதல்.
- தமிழ் இலக்கியம் சார்ந்த போட்டித் தேர்வுகளுக்கு ஏற்ப கற்பித்தல் நடைமுறைகளை மேற்கொள்ளுதல்.

கற்றலின் விளைவுகள

இத்தாளை வெற்றிகரமாக முடித்தவுடன் மாணவர்கள்,

CO1[K1]: சங்க இலக்கியத்தில் காணப்பெறும் அறக்கருத்துக்களை அறிந்து கொள்வர்.

CO2[K2]: சங்க இலக்கியங்கள் மற்றும் நாடக இலக்கியம் வாயிலாக மக்களின் வாழ்க்கை முறையினை எடுத்துரைப்பர்.

CO3[K3]: நாடக இலக்கியம் மூலம் நடிப்பாற்றலையும், கலைத்தன்மையையும், படைப்பாற்றலையும் கற்பர். மேலும் மொழிபெயர்ப்பு ஆற்றலையும் பெறுவர்.

CO4[K4]: கலைச்சொற்களைக் கண்டறிந்து அவற்றோடு தொடர்புடைய சொல்லைப் பகுப்பர்.

CO5[K5]: சங்க இலக்கியம் மற்றும் நாடக இலக்கியங்களை மதிப்பீடு செய்வர்.

CO/PO Mapping Table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	1	-	1	-	-	-
CO2[K2]	2	1	-	2	-	-	-
CO3[K3]	2	2	-	2	1	-	1
CO4[K4]	2	2	1	2	1	1	-
CO5[K5]	2	2	1	2	-	1	1
Weightage of the Course	10	08	02	09	02	02	02
Weighted percentage of Course Contribution to POs	**1.84**	**1.78**	**0.72**	**3.08**	**1.37**	**1.09**	**1.01**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

கூறு I **(18 hrs)**

எட்டுத்தொகை: நற்றிணை (10,14,16பாடல்கள்), குறுந்தொகை (16,17,19,20,25,29,38,440), கலித்தொகை (38,51), அகநானூறு (15,33,55), புறநானூறு (37,86,112), பரிபாடல் (55)

கூறு II **(18 hrs)**

பத்துப்பாட்டு: நெடுநல்வாடை - நக்கீரர்

கூறு III **(18 hrs)**

நாடகம்: சபாபதி - பம்மல் சம்பந்த முதலியார்

கூறு IV **(18 hrs)**

சங்க இலக்கியம் தோற்றம் வளர்ச்சி - நாடகத்தின் தோற்றம் வளர்ச்சி

கூறு V **(18 hrs)**

மொழித்திறன்: மொழிபெயர்ப்பு - கலைச்சொற்கள், கொடுக்கப்பட்டுள்ள ஆங்கிலப் பகுதியைத் தமிழில் மொழிபெயர்தல், அலுவலகக் கடிதம் - தமிழில் மொழிபெயர்த்தல்.

பாடநூல்கள்

1. தமிழியல் துறையினர், *தொகுப்பு நூல்,* ஸ்ரீ காளீஸ்வரி கல்லூரி (தன்னாட்சி), சிவகாசி.
2. வாசுதேவன், கா. *பன்முக நோக்கில் தமிழ் இலக்கிய வரலாறு,* தேவன் பதிப்பகம், திருச்சிராப்பள்ளி, 2017.
3. சபாபதி, *பம்மல் சம்பந்த முதலியார்,* கௌரா பதிப்பகக் குழுமம், சென்னை

பார்வை நூல்கள்

1. சிற்பி. பாலசுப்பிரமணியன், *தமிழ் இலக்கிய வரலாறு,* கவிதா வெளியீடு, சென்னை.
2. தமிழண்ணல், *புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு,* சோலை பதிப்பகம், மதுரை
3. பாக்கியமேரி, *வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு*, பாரி நிலையம், சென்னை.

வலைப்பதிவுகள் (Web Sources)

1. Tamil Heritage Foundation- www.tamilheritage.org <http://www.tamilheritage.org>
2. Tamil virtual University Library- www.tamilvu.org/ library http://www.virtualvu.org/library
3. Project Madurai - www.projectmadurai.org.
4. Chennai Library- www.chennailibrary.com <http://www.chennailibrary.com>.
5. Tamil Universal Digital Library- www.ulib.prg <http://www.ulib.prg>.
6. Tamil E-Books Downloads- tamilebooksdownloads. blogspot.com
7. Tamil Books on line- books.tamil cube.com
8. Catalogue of the Tamil books in the Library of British Congress archive.org
9. Tamil novels on line - books.tamilcube.com

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF ENGLISH
UG PROGRAMME - B.A./ B.COM/B.B.A./ B.SC./BCA
SEMESTER- IV
GENERAL ENGLISH –IV (23UENL41)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 6(L-5, T-1) **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 90 hrs **MAX. MARKS: 100**

Course Objectives

- To help learners imbibe the rules of language unconsciously and tune to deduce language structure and usage.
- To use receptive skills through reading and listening to acquire good exposure to language and literature.
- To develop language skill for effective communication.
- To provide exposure to plays, autobiographies and expose them to value based ideas.
- To enhance the learner's language skills especially in the areas of grammar and pronunciation.

Course Outcomes (CO)

On successful completion of the course, the learners will be able to
CO1 [K1]: state ideas effectively and appropriately in real life situations.
CO2 [K2]: demonstrate speaking skills in appreciating literature.
CO3 [K3]: use grammar and pronunciation effectively and appropriately.
CO4 [K4]: examine the literary works to develop language skills.
CO5 [K6]: construct grammatically correct and meaning full sentences.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	1	-	1	-	-	-
CO2[K2]	2	1	-	1	-	-	-
CO3[K3]	2	2	1	2	1	1	1
CO4[K4]	2	2	1	2	1	1	1
CO5[K6]	2	3	1	2	-	1	1
Weightage of the course	10	09	03	08	02	03	03
Weighted percentage of Course contribution to Pos	**1.84**	**2**	**1.08**	**2.74**	**1.37**	**1.63**	**1.52**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I - LIFE WRITING **(18 hrs)**

Malala Yousafzai - I am Malala - Chapter 1
Nikola Tesla - My Inventions - Chapter 2

UNIT II - ONE ACT PLAYS **(18 hrs)**

Edward Albee - The Zoo Story
Anton Chekhov - The Proposal

UNIT III - INTERVIEWS **(18 hrs)**

Nelson Mandela's Interview with Larry King
Rakesh Sharma's Interview with Indira Gandhi from Space
Lionel Messi with Sid Lowe (Print)

UNIT IV - LANGUAGE COMPETENCY **(18 hrs)**

Refuting, Arguing & Debating, Making Suggestions & Responding to Suggestions, Asking for and Giving Advice or Help, Interviews (face to face, telephone and video conferencing)

UNIT V - ENGLISH FOR WORKPLACE **(18 hrs)**

Job Applications: Covering letters, CV and Resume
Creating a digital profile - Linkedin
Filling Forms (Online & Manual): creation of account, railway reservation, ATM, Credit/debit card
Body Language -Practical Skills for Interviews

TEXTBOOKS

1. Yousafzai, Malala, and Christina Lamb. *I Am Malala The Girl Who Stood Up for Education and Was Shot by the Taliban*. New York: Little Brown, 2013.
2. Tesla , Nikola. *My Inventions.* London: Ingram Short Title, 2011.

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Books

1. Taylor, Mary Borg, & Francis, *Writing Your Life: A Guide to Writing Autobiographies.* Routledge, 2021.
2. Bert, A. Norman. *One-act Plays for Acting Students: An Anthology of Short one-Act Plays for one, Two or Three actors*. Christian Publisher LLC, 1987.
3. Dolley, Colin. and Rex Welford.*The One-Act Play Companion: A Guide to plays, Play wrights and Performance*. Bloomsbury Publishing, 2015.
4. Bernis, Jeanne Kelly. Editor. *How to Build a Professional Digital Profile*. Bernish, Bernish Communications Associates, LLC, 2012
5. Yardley, M Yardley - Matwiejczuk, *Role Play-Theory and Practice.* SAGE publications ltd, 1997.

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1. For Readers' Theatre: https://www.youtube.com/watch?v=JaLQJt8orSw&t=469s(the link to the performance; refer scripts by Aaron Sheperd) http://BBC learn English.com
2. https://www.infoplease.com/dictionary/brewers/animals-cries

3. http://onestopenglish.com
4. http://hearn-english-today.com
5. http://talkenglish.com

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- IV
CORE COURSE – VII: GENERAL CHEMISTRY – IV (23UCHC41)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS: 25**
CREDITS : 4 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- To ensure the thermodynamic concepts on chemical processes and applied aspects.
- To improve thermo-chemical calculations
- To study the periodic properties and group study of transition metals.
- To understand the organic chemistry of ethers, aldehydes and ketones
- To gain knowledge on organic chemistry of carboxylic acids

Course Outcomes (CO)

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

CO1[K1]: recognize the terms, applications in thermodynamics, transition elements, and organic compounds like ethers, thio ethers, epoxides and acids

CO2[K2]: explain the laws, importance of thermodynamics, trends of transition series, ethers, thio ethers, epoxides and acids

CO3[K3]: organize the conditions involved in thermodynamics, transition element, and organic compounds

CO4[K4]: discriminate the features of thermodynamics, d - block elements, ethers, thio ethers, epoxide and acids

CO5[K5]: assess reactivity of thermodynamics, transition element, and organic compounds

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	3	3	1	1	1	1
CO2[K2]	3	2	2	1	-	1	-
CO3[K3]	3	2	2	1	1	1	1
CO4[K4]	3	3	2	2	-	1	1
CO5[K5]	3	3	2	2	1	1	1
Weightage of the course	15	13	11	07	03	05	04
Weighted percentage of Course contribution to POs	**2.76**	**2.89**	**3.96**	**2.4**	**2.05**	**2.72**	**2.02**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – THERMODYNAMICS I (12 hrs)

Terminology – Intensive, Extensive Variables, State, Path Functions; Isolated, Closed and Open Systems; Isothermal, Adiabatic, Isobaric, Isochoric, Cyclic, Reversible and Irreversible Processes; First Law of Thermodynamics – Concept and Significance of Heat (q), Work (w) Internal Energy (E), Enthalpy (H); Calculations of q, w, E and H for Reversible, Irreversible Expansion of Ideal and Real Gases Under Isothermal and Adiabatic Conditions; Relation Between Heat Capacities (Cp & Cv); Joule Thomson Effect – Inversion Temperature. Thermochemistry – Heats of Reactions, Standard States; Types of Heats of Reactions and their Applications; Effect of Temperature (Kirchhoff's Equation) and Pressure on Enthalpy of Reactions; Hess's Law and its Applications; Determination of Calorific Value of Food and Fuels – Zeroth Law of Thermodynamics – Absolute Temperature Scale.

UNIT II – THERMODYNAMICS II (12 hrs)

Second Law of Thermodynamics – Limitations of First Law, Spontaneity and Randomness; Carnot's Cycle; Concept of Entropy of mixing, Calculation of Entropy Changes of an Ideal Gas and a Van der Waals Gas with Changes in Temperature, Volume and Pressure, Entropy and Disorder. Free Energy and Work Function – Need for Free Energy Functions, Gibbs Free Energy, Helmholtz Free Energy – Their Variation with Temperature, Pressure and Volume, Criteria for Spontaneity; Gibbs – Helmholtz Equation – Derivations and Applications; Maxwell Relationships, Thermodynamics Equations of State; Thermodynamics of Mixing of Ideal Gases, Ellingham Diagram – Application. Third Law of Thermodynamics – Nernst Heat Theorem; Applications of Third Law – Evaluation of Absolute Entropies from Heat Capacity Measurements, Exceptions to Third Law.

UNIT III – GENERAL CHARACTERISTICS OF d- BLOCK ELEMENTS (12 hrs)

Transition Elements – Electronic Configuration – General Periodic Trend Variable Valency. Oxidation States, Stability of Oxidation States, Colour, Magnetic Properties, Catalytic Properties ad Tendency to Form Complexes. Comparative Study of Transition Elements and Non- Transition Elements – Comparison of II and III Transition Series with I Transition Series. Group Study of Titanium, Vanadium, Chromium, Manganese, Iron, Cobalt, Nickel and Zinc Groups.

UNIT IV – ETHERS, THIO ETHERS AND EPOXIDES (12 hrs)

Nomenclature, Isomerism, General Methods of Preparations, Ractions Involving Cleavage of C- O Linkages, Alkyl Group and Ethereal Oxygen. Zeisel's Method of Estimation of Methoxy Group.Reactions of Epoxides with Alcohols, Ammonia Derivatives and $LiAlH_4$ – Thiethers – Nomenclature, Structure, Preparation, Properties and uses. Aldehydes and Ketones – Nomenclature, Structure and Reactivity of Aliphatic and Aromatic Aldehydes and Ketones; General methods of Preparation and Physical Properties. Nucleophlic Addition Reactions, Base Catalyzed Reactions with Mechanism – Aldol, Cannizzaro's Reaction, Perkin Reacton, Benzoin Condensation, Haloform Reaction, Knoevenagel Reaction. Oxidation of Aldehyde. Bayer-Villiger Oxidation of Ketones. Reduction: Clemmensen Reduction, Wolf-Kishner Reduction, Meerwein-Pondorf Verley Reduction, reduction With $LiAlH_4$ and $NaBH_4$. Addition Reactions of Unsaturated Carbonyl Compounds: Micheal Addition.

UNIT V – CARBOXYLIC ACIDS (12 hrs)

Carboxylic acids: Nomenclature, Structure, Preparation and Reactions of Aliphatic and Aromatic Monocarboxylic Acids. Physical Properties, Acidic Nature, Effect of Substituent on Acidic Strength: HVZ Reaction, Claisen Ester Condensation, Bouveault Blanc Reducction, Decarboxylation, Hunsdiecke Reaction. Formic Acid – Reducing Property. Reactions of Dicarboxylic Acids, Hydroxy Acids and Unsaturated Acids. **Carboxylic Acid Derivatives:** Preparations of Aliphatic and Aromatic Acid Chlorides, Esters, Amides and Anhydrides. Nucleophilic Substitution Reactionat the Acyl Carbon of Acyl Halide, Anhydride, Ester, Amide. Schottan-Baumann Reaction. Claisen Condensation, Diekmann and Reformatsky Reactions, Hofmann Bromamide Degradation and Curtius Rearrangement. **Active Methylene Compounds:** Keto-Enol Tautomerism. Preparation and Synthetic Applications of Diethyl Malonate and Ethyl Acetoacetate. **Halogen Substituted Acids**: Nomenclature; Preparation by Direct HAlogenation, Iodination from Unsaturated Acids, Alkyl Malonic Acids. **Hydroy acids**: Nomenclature; Preparation from halo, Amino, Aldehydic and Ketonic Acids, Ethylene Glycol, Aldol Acetaldehyde; Reactions – Action of Heat on α, β and γ hydroxy Acids.

TEXTBOOKS

1. Puri B. R and Sharma L. R, *Principles of Physical Chemistry,* 33th Edition, *Shoban Lal Nagin Chand and Co.*, 1992.
2. Kapoor K. L, *A Textbook of Physical Chemistry* (Volume -2 and 3), 3rd Edition, Macmillam, India Ltd., 2009.
3. Soni P. L and Mohan Katyal, *Textbook of Inorganic Chemistry,* 20th Edition, S. Chand & Sons, 2006.
4. Mukherji S. M and Singh S. P, *Reaction Mechanism in Organic Chemistry,* 3rd Edition*,* Macmillan India Ltd*., 1994.*
5. Jain M. K and Sharma S. P, *Modern Organic Chemistry,* 4th Reprint, Macmillan India Ltd., Vishal Publishing, 2003.

REFERENCES

Books

1. Maron S. H and Prutton C. P, *Principles of Physical Chemistry*, 4th Edition, The Macmillan Company: Newyork, 1972.
2. Lee J. D, *Concise Inorganic Chemistry*, 4th Edition, ELBS William Heinemann: London, 1991.
3. Gurudeep Raj, *Advanced Inorganic Chemistry*, 26th Edition, Goel Publishing House: Meerut, 2001.
4. Atkins P. W and Paula J, *Physical Chemistry,* 10th Edition, Oxford University Press: New York, 2014.
5. Huheey J. E, *Inorganic Chemistry: Principles of Structure and Reactivity*. 4th Edition, Addison Wesley Publishing Company: India, 1993.

Web Sources

1. https://nptel.ac.in/courses/112102255
2. https://nptel.ac.in/courses/104101136

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- IV
CORE COURSE – VIII: PRACTICAL: PHYSICAL CHEMISTRY – I (23UCHC4P)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 3 **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- To carry out the laboratory experiments in order to understand the concepts of physical changes in chemistry
- To understand the rates of chemical reactions
- To ensure the colligative properties and adsorption isotherm thermo-chemical calculations
- To inculcate the instrumentation techniques of Conductometer and Colorimeter
- To improve the knowledge in adsorption technique

Course Outcomes (CO)

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

CO1[K2]: describe the principles and methodology for practical work

CO2[K3]: apply the principles of electrochemistry, kinetics, thermochemistry, adsorption and colligative properties for carrying out the practical work

CO3[K4]: analyze the skills involved in kinetics, electrochemistry, molecular weight determination and adsorption

CO4[K5]: select the procedure, data and methodology for the project work

CO5[K6]: predict rate constant, cell constant and conductance, colorimetry, molecular weight determination and adsorption

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	2	3	-	1	1	1
CO2[K3]	3	2	3	1	-	1	1
CO3[K4]	3	3	2	2	1	1	1
CO4[K5]	3	3	2	2	1	1	1
CO5[K6]	3	3	2	2	1	1	1
Weightage of the course	15	13	12	07	04	05	05
Weighted percentage of Course contribution to POs	**2.76**	**2.89**	**4.32**	**2.4**	**2.74**	**2.72**	**2.53**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I **(30 hrs)**

Chemical Kinetics

1. Determination of Rate Constant of Acid Catalysed Hydrolysis of an Ester (Methyl Acetate).
2. Determination of Order of Reaction Between Iodide and Persulphate (Initial Rate Method).
3. Polarimetry: Determination of Rate Constant of Acid Catalysed Inversion of Cane Sugar.

Thermochemistry

4. Determination of Heat of Neutralisation of a Strong acid by a Strong Base.
5. Determination of Heat of Hydration of Copper Sulphate

UNIT II **(20 hrs)**

Electrochemistry- Conductance Measurements

6. Determination of Cell Constant.
7. Determination of Molar Conductance of Strong Electrolyte.
8. Determination of Dissociation Constant of Acetic Acid

Colorimetry

9. Determination of Concentration of Copper Sulphate Solution.

UNIT III **(10 hrs)**

Colligative Property

10. Determination of Molecular Weight of an Organic Compound by Rast Method using Naphthalene or Diphenyl as Solvent.

Adsorption

11. onstruction of Freundlich Isotherm for the Adsorption of Acetic Acid on Activated Charcoal.

REFERENCES

Books

1. Sindhu P. S, *Practicals in Physical Chemistry*, Macmillan: New Delhi, 2005.
2. Khosla B. D. Garg and Gulati V. C, *A Senior Practical Physical Chemistry,* R. Chand: New Delhi, 2011.
3. Gupta and Renu, *Practical Physical Chemistry,* 1st Edition, New Age International: New Delhi, 2017.

Web Sources

1. https://www.youtube.com/watch?v=YbFdRFdkG3s
2. https://www.youtube.com/watch?v=ONNkQkkphHw

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme –B.Sc. Maths/Chemistry
SEMESTER - II/IV
ELECTIVE COURSE GENERIC/DISCIPLINE SPECIFIC - II/IV: ALLIED PHYSICS – II (23UMAA21/23UCHA41)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 4**	**INT. MARKS**	**: 25**
CREDITS	**: 3**	**EXT. MARKS**	**: 75**
DURATION	**: 45 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To explain concepts of interference, diffraction and polarization
- To outline the basic foundation of different atom models and various experiments establishing quantum concepts.
- To summarize the properties of nuclei, nuclear models, nuclear processes, importance of nuclear energy and safety measures to be carried out.
- To describe the basic concepts of special theory of relativity, mass energy equivalence and give an overview of research projects of National and International importance.
- To summarize the working of semiconductor devices like junction diode, Zener diode, transistors and practical devices we use in our daily life.

Course Outcomes (CO)

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

CO1[K1]: outline the basic concepts of wave optics, relativity, atomic, nuclear and semiconductor physics
CO2[K2]: explain the physical phenomena pertaining to the course
CO3[K3]: apply the concepts to derive the expressions and solve problems
CO4[K4]: distinguish different physical phenomena, models, processes, and semiconductor devices
CO5[K5]: examine the experimental methods to determine the physical parameters using basic concepts

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	-	1	-	-	-
CO2 [K2]	3	1	-	2	-	-	-
CO3 [K3]	3	3	1	1	1	1	1
CO4 [K4]	2	3	2	1	1	1	1
CO5 [K5]	2	3	2	1	1	1	1
Weightage of the course	13	11	05	06	03	03	03
Weighted percentage of Course contribution to POs	**2.39**	**2.44**	**1.8**	**2.05**	**2.05**	**1.63**	**1.52**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – OPTICS (9 hrs)

Interference – Interference in Thin Films – Colors of Thin Films – Air Wedge – Determination of Diameter of a Thin Wire by Air Wedge – Diffraction – Diffraction of Light Vs Sound – Normal Incidence – Experimental Determination of Wavelength using Diffraction Grating (No Theory) – Polarization – Polarization by Double Reflection – Brewster's Law – Optical Activity – Application in Sugar Industries.

UNIT II – ATOMIC PHYSICS (9 hrs)

Atom Models – Bohr Atom Model – Mass Number – Atomic Number – Nucleons – Vector Atom Model – Various Quantum Numbers – Pauli's Exclusion Principle – Electronic Configuration – Periodic Classification of Elements – Bohr Magneton – Stark Effect – Zeeman Effect (Elementary Ideas Only) – Photo Electric Effect – Einstein's Photoelectric Equation – Applications of Photoelectric Effect: Solar Cells, Solar Panels, Optoelectric Devices.

UNIT III – NUCLEAR PHYSICS (9 hrs)

Nuclear Models – Liquid Drop Model – Magic Numbers – Shell Model – Nuclear Energy – Mass Defect – Binding Energy – Radioactivity – Uses – Half Life – Mean Life - Radio Isotopes and Uses – Controlled and Uncontrolled Chain Reaction – Nuclear Fission – Energy Released in Fission – Chain Reaction – Critical Reaction – Critical Size - Atom Bomb – Nuclear Reactor – Breeder Reactor – Importance of Commissioning PFBR in Our Country – Heavy Water Disposal, Safety of Reactors: Seismic and Floods – Introduction to DAE, IAEA – Nuclear Fusion – Thermonuclear Reactions – Differences between Fission and Fusion.

UNIT IV – INTRODUCTION TO RELATIVITY AND GRAVITATIONAL WAVES (9 hrs)

Frame of Reference – Postulates of Special Theory of Relativity – Galilean Transformation Equations – Lorentz Transformation Equations – Derivation – Length Contraction – Time Dilation – Twin Paradox – Mass-Energy Equivalence – Introduction on Gravitational Waves, LIGO, ICTS Opportunities at International Centre for Theoretical Sciences.

UNIT V – SEMICONDUCTOR PHYSICS (9 hrs)

P-N Junction Diode – Forward and Reverse Biasing – Characteristic of Diode – Zener Diode – Characteristic of Zener Diode – Voltage Regulator – Full Wave Bridge Rectifier – Construction and Working – Advantages (No Mathematical Treatment) – USB Cell Phone Charger – Introduction to e-Vehicles and EV Charging Stations.

UNIT VI – PROFESSIONAL COMPONENTS (NOT FOR EXAMINATION)

Expert Lectures – Seminars – Webinars – Industry Inputs – Social Accountability – Patriotism.

TEXTBOOKS

1. Murugesan R, *Allied Physics*, NewDelhi: S.Chand & Co., 2005.
2. Thangaraj K and Jayaraman D. *Allied Physics*, Chennai: Popular Book Depot., 2004.
3. Subraminyam N, Brij lal and Avadhanulu M.N. *A Textbook of Optics,* New Delhi: S.Chand & Company Ltd., Twenty Fifth Revised Edition, Reprint 2018.
4. Murugeshan R and Kiruthiga Sivaprasath, *Modern Physics.* New Delhi: S. Chand & Company Ltd., Eighteenth Edition, Reprint 2019.
5. Subramaniyam A. *Applied Electronics.* Chennai: National Publishing Co., 2nd Edition, 1996.

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1. Resnick Halliday and Walker. *Fundamentals of Physics*. Singapore: John Willey and Sons, Asia Pvt. Ltd., 11th edition, 2018.
2. Khanna D.R. and Gulati H. R, *Optics*. New Delhi: S. Chand & Co., 1979.
3. Arthur Beiser, *Concepts of Modern Physics,* New Delhi: Tata McGraw-Hill Publication, Sixth Edition, Reprint 2006.
4. Thomas L. Floyd. *Digital Fundamentals*, New Delhi: Universal Book Stall, Eleventh edition 2017.
5. Mehta V. K and Rohit Mehta, *Principles of Electronics.* New Delhi: S. Chand & Company Ltd., Revised Eleventh Edition, Reprint 2013.

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1. https://atoptics.co.uk/atoptics/blsky.htm
2. https://www.metoffice.gov.uk/weather/learn-about/weather/optical-effects
3. https://archive.nptel.ac.in/courses/115/101/115101011/
4. https://www.elprocus.com/semiconductor-devices-types-and-applications/
5. https://www.khanacademy.org/science/in-in-class-12th-physics-india/nuclei

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG PROGRAMME –B.Sc. Maths/Chemistry
SEMESTER - II/IV
ELECTIVE COURSE GENERIC/DISCIPLINE SPECIFIC - II/IV: PRACTICAL: ALLIED PHYSICS– II (23UMAA2P/23UCHA4P)
(From 2023-2024 Batch onwards)

HOURS/WEEK	**: 2**	**INT. MARKS**	**: 25**
CREDITS	**: 2**	**EXT. MARKS**	**: 75**
DURATION	**: 30 hrs**	**MAX. MARKS**	**: 100**

Course Objectives

- To set up experiments to understand the various concepts of optics, thermal physics, electricity, sound and electronics
- To arrange the experiments to evaluate physical parameters of materials and verify theories
- To quantify and analyze experimental results
- To do error analysis and correlate results

Course Outcomes (CO)

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

CO1[K1]: identify the basic concepts of physics underlying in the experiments
CO2[K2]: setup the experiment and collect data to determine the physical parameters involved in the experiments
CO3[K3]: calculate the basic parameters involved in the experiments from the experimental data
CO4[K4]: analyze/interpret/plot graph/verify the theorem from the experimental data
CO5[K5]: evaluate the physical parameters using appropriate formula/make conclusions from the experimental data

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	1	-	-	-	-	-
CO2 [K2]	2	2	-	1	1	-	1
CO3 [K3]	2	2	1	1	1	1	1
CO4 [K4]	2	2	1	1	1	1	1
CO5 [K5]	2	3	1	1	1	1	1
Weightage of the course	10	10	03	04	04	03	04
Weighted percentage of Course contribution to POs	**1.84**	**2.22**	**1.08**	**1.37**	**2.74**	**1.63**	**2.02**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

LIST OF EXPERIMENTS (Minimum 8**):**

1. Radius of Curvature of Lens by Forming Newton's Rings
2. Thickness of a Wire using Air Wedge
3. Wavelength of Mercury Lines using Spectrometer and Grating
4. Refractive Index of Material of the prism by Minimum Deviation
5. Refractive Index of Liquid using Liquid Prism
6. Determination of AC Frequency using Sonometer
7. Specific Resistance of a Wire using PO Box
8. Thermal Conductivity of Poor Conductor using Lee's Disc
9. Determination of figure of merit table galvanometer
10. Determination of Earth's Magnetic Field using Field along the Axis of a Coil
11. Characterisation of Zener Diode
12. Construction of Zener/IC Regulated Power Supply
13. Construction of AND, OR, NOT Gates using Diodes and Transistor
14. NOR Gate as a Universal Building Block

TEXTBOOKS

1. Srinivasan M. N, Balasubramanian S and Ranganathan R, *A Textbook of Practical Physics.* New Delhi: Sultan Chand & Sons, 1st Edition, Reprint 2011.
2. Ouseph C. C, Rao U. J and Vijayendran V, *Practical Physics and Electronics*. Chennai: Ananda Book Depot, 1st Edition, Reprint 2019.
3. Ouseph C.C, Srinivasan V and Balakrishnan R, *A Textbook of Practical Physics - Part I & II,* Chennai: S. Viswanathan (Printers & Publishers) Pvt., Ltd., Revised Edition, Reprint 2000.
4. Virendra Kumar, *Digital Electronics: Theory and Experiments*. New Delhi: New Age International (P) Ltd., 2nd Edition, 2015.

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1. Arora C. L, *B Sc Practical Physics,* New Delhi: S.Chand & Sons Co. Ltd., Reprint 2018.
2. Kakani S. L and Shubhra K, *Applied Physics: Theory and Practical*, New Delhi: Viva Books Pvt. Ltd., First Edition, 2015.
3. Manjeet S and Anita D, *Applied Physics: Theory and Experiment*, New Delhi: Vayu Education of India, First Edition, 2011.
4. Tayal D. C, *University Practical Physics,* Mumbai: Himalaya Publishing House, First Millennium Edition, 2000.

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1. https://www.youtube.com/watch?v=l0XmP4YY6-w
2. https://www.youtube.com/watch?v=DD5woC4ZYAQ
3. https://www.youtube.com/watch?v=6Ha-ePYMyfM
4. https://www.youtube.com/watch?v=fWhgguWc8rk
5. https://www.youtube.com/watch?v=BxbXnYFqygU&t=311s
6. https://www.youtube.com/watch?v=aXFNoYa95-8

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- IV
SKILL ENHANCEMENT COURSE - VII: INSTRUMENTAL METHODS OF CHEMICAL ANALYSIS (23UCHS41)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX. MARKS: 100**

Course Objectives

- To be aware of operation and trouble-shooting of chemical instruments
- To know the fundamentals of analytical techniques and its application in the characterization of compounds
- To study the theory of chromatographic separation and develop startups
- To understand the theory of thermo/electro-analytical techniques
- To ensure the stoichiometry and the related concentration terms

Course Outcomes (CO)

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

CO1[K1]: relate error analysis in the calibration and use of analytical instruments, explain theory, instrumentation and application of flame photometry and Atomic Absorption spectrometry

CO2[K2]: explain preparation of solutions, stoichiometric calculations

CO3[K3]: apply error analysis in the calibration and use of analytical instruments, explain theory, instrumentation and application of flame photometry and Atomic Absorption spectrometry

CO4[K4]: examine the use of chromatographic techniques in the separation and identification of mixtures

CO5[K5] : discuss instrumentation, theory and applications of thermal and electrochemical techniques

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	1	1	-	1	1
CO2[K2]	2	2	1	1	1	1	1
CO3[K3]	2	2	2	1	1	1	1
CO4[K4]	2	2	2	1	1	2	1
CO5[K5]	2	2	2	1	1	2	2
Weightage of the course	11	10	08	05	02	07	06
Weighted percentage of Course contribution to POs	**2.03**	**2.22**	**2.88**	**1.71**	**1.37**	**3.8**	**3.03**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – QUALITATIVE AND QUANTITATIVE ASPECTS OF ANALYSIS (6 hrs)

S.I Units, Distinction between Mass and Weight. Moles, Millimoles, Milli equivalence, Molality, Molarity, Normality, Percentage by Weight and Volume, ppm, ppb. Density and Specific Gravity of Liquids. Stoichiometry Calculations Sampling, evaluation of analytical data, Errors – Types of Errors, Accuracy, Precision, Minimization of Errors. Significant Figures. Methods of Expressing Precision: Mean, Median, Average Deviation, Standard Deviation, Coefficient of Variation, Confidence Limits, Qtest, F-test, T-test. The Least Square Method for Deriving Calibration plots.

UNIT II – ATOMIC ABSORPTION SPECTROSCOPY (6 hrs)

Basic Principles of Instrumentation (Choice of Source, Monochromator, Detector, Choice of Flame and Burner Designs. Techniques of Atomization and Sample Introduction; Method of Background Correction, Sources of Chemical Interferences and their Method of Removal. Techniques for the Quantitative Estimation of Trace Level of Metal Ions from Water Samples.

UNIT III – UV-VISIBLE AND IR SPECTROSCOPY (6 hrs)

Origin of Spectra, Interaction of Radiation with Matter, Fundamental Laws of Spetroscopy and Selection Rules, Validity of Beer-Lambert's Law. **UV-Visible Spectrometry:** Basic Principles, Instrumentation (Choice of Source, Monochromator and Detector) for Single and Double Beam Instrument; Basic Principles of Quantitative Analysis: Estimation of Metal Ions from Aqueous Solution, Geometrical Isomers, Keto-Enol Tautomers. **Infrared Spectroscopy:** Basic Principles of Instrumentation (Choice of Source, Monochromator& Detector) for Single and Double Beam Instrument; Sampling Techniques.

UNIT IV–THERMAL AND ELECTRO-ANALYTICAL METHODS OF ANALYSIS (6 hrs)

TGA and DTA – Principle, Instrumentation, Methods of Obtaining Thermograms, Factors Affecting TGA/DTA, Thermal Analysis of Silver Nitrate, Calcium Oxalate and Calcium Acetate DSC – Principle, Instrumentation And Applications. Electroanalytical Methods: Polarography – Principle, Instrumentation and Applications. Derivative Polarography – Cyclic Voltammetry – Principle.

UNIT V – SEPARATION AND PURIFICATION TECHNIQUES (6 hrs)

Classification, principle, Factors affecting - Solvent Extraction – Liquid - Liquid Extraction, **Chromatography:** Column, TLC, Paper, Gas, HPLC and Electrophoresis, Principle, Classification, Choice of Adsorbents, Solvents, Preparation of Column, Elution Mechanism of separation: adsorption, partition & ion exchange. Development of chromatograms and R_f value.

TEXTBOOKS

1. Vogel Arthur I. *A, Test book of Quantitative Inorganic Analysis,* 5th Edition, The English Language Book Society of Longman.
2. Gopalan R, Subramanian P. S and Rengarajan K, *Elements of Analytical Chemistry*. Elements of Analytical Chemistry, Sultan Chand: New Delhi, 2007.
3. Skoog, Holler and Crouch, *Principles of Instrumental Analysis*6th Indian Reprint, Cengage Learning, 2017.
4. Speyer R, *Thermal Analysis of Materials,* CRC Press, 1993
5. Day R. A and Underwood A. L. *Quantitative Analysis.* 6th Edition, Prentice Hall of India Private Ltd: New Delhi, 1993.

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1. Skoog. D. A, West D. M and Holler F. J. *Analytical Chemistry: An Introduction* 5th Edition, Saunders college publishing: Philadelphia, 1998.
2. Dash U N, *Analytical Chemistry; Theory and Practice*. Sultan Chand and sons Educational Publishers: New Delhi, 2011.
3. Christian, Gary D, *Analytical Chemistry,* 6th Edition, John Wiley & Sons: New York, 2004.
4. Mikes O & Chalmes R. A, *Laboratory Handbook of Chromatographic & Allied Methods*, Elles Harwood Ltd: London.
5. Jeffery G.H, Bassett J, Mendham J and Denney R.C, *Vogel's Textbook of Quantitative Chemical Analysis,* 6th Edition, Pearson Education, 2000.

Web Sources

1. https://www.youtube.com/watch?v=x5Ga5SWIDNY
2. https://www.youtube.com/watch?v=MW4PwJxxyt0
3. https://www.youtube.com/watch?v=6afUkVH6jcM

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- IV
SKILL ENHANCEMENT COURSE - VIII: FORENSIC SCIENCE (23UCHS42)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX. MARKS: 100**

Course Objectives

- To understand the crime detection through analytical instruments
- To be aware of forgery and its detection
- To know the medical aspects involved
- To ensure about poison and its antidotes
- To improve the knowledge in the tracks and traces in the crime scene.

Course Outcomes (CO)

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

CO1[K1]: describe about the poisons, crime detection, forgery, tracks and traces and medical aspects.

CO2[K2]: discuss about the classification of poisons, accidental explosion, forged signatures and detection of foot prints.

CO3[K3]: find out the forgery documents, crime and contamination in heavy metal, steroid consumption and misuse of scheduled drugs.

CO4[K4]: analyze the postmortem appearances, composition of bullets, forgery documents and combustible materials.

CO5[K5]: create awareness on AIDS, handling fire explodes and explain DNA finger print, diagnosis of poisons and forgery in currency notes.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	1	1	-	-	-	-
CO2[K2]	2	2	1	1	-	-	1
CO3[K3]	2	2	1	1	1	1	1
CO4[K4]	2	2	1	1	1	1	1
CO5[K5]	2	2	1	1	1	1	1
Weightage of the course	11	09	05	04	03	03	04
Weighted percentage of Course contribution to POs	**2.03**	**2**	**1.8**	**1.37**	**2.05**	**1.63**	**2.02**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – POISONS (6 hrs)

Poisons – Types and Classification – Diagnosis of Poisons in the Living and the Dead – Clinical Symptoms – Post-mortem Appearances. Heavy Metal Contamination (Hg, Pb, Cd) of Seafood's – Use of Neuron Activation Analysis in Detecting Arsenic in Human Hair- Treatment in Cases of Poisoning – Use of Antidotes for Common Poisons.

UNIT II – CRIME DETECTION (6 hrs)

Accidental Explosion During Manufacture of Matches and Fireworks (as in Sivakasi) – Human Bombs – Possible Explosives (gelatin sticks and RDX) and Metal Detector Devices and Other Security Measures for VVIP – Composition of Bullets and Detecting Powder Burns .

UNIT III – FORGERY AND COUNTERFETING (6 hrs)

Documents – Different Types of Forged Signatures – Simulated and Traced Forgeries – Inherent Signs of Forgery Methods – Writing Deliberately Modified – Uses of Ultraviolet Rays – Comparison of Type Written Letters – Checking Silver Line Water Mark in Currency Notes – Alloy Analysis Using AAS to Detect Counterfeit Coins – Detection of Gold Purity in 22 Carat Ornaments – Detecting Gold Plated Jewels – Authenticity of Diamond.

UNIT IV – TRACKS AND TRACES (6 hrs)

Tracks and Traces – Small Tracks and Police Dogs – Foot Prints – Costing of Foot Prints – Residue Prints, Walking Pattern or Tyre Marks – Miscellaneous Traces and Tracks – Glass Fracture – Too Marks – Paints – Fibres – Analysis of Biological Substances – Blood, Semen, Saliva, Urine and Hair – Cranial Analysis

(Head and Teeth) DNA Finger Printing for Tissue Identification in Dismembered Bodies – Detecting Steroid Consumption in Athletes and Racehorses.

UNIT V – MEDICAL ASPECTS (6 hrs)

Aids – Causes and Prevention – Misuse of Scheduled Drugs – Burns and their Treatment by Plastic Surgery. Metabolite Analysis Using Mass Spectrum – Gas Chromatography – Arson – Natural Fires and Arson – Burning Characteristics and Chemistry of Combustible Materials – Nature of Combustion. Ballistics – Classification – Internal and Terminal Ballistics – Small Arms – Laboratory Examination of Barrel Washing and Detection of Powder Residue by Chemical Tests.

TEXTBOOKS

1. Iqbal S. A, Liviu M, *Textbook of Forensic Chemistry*. Discovery Publishing House Private Ltd., 2011.
2. Kelly M Elkins, *Introduction to Forensic Chemistry*. CRC Press, Taylor & Francis Group, 2019.
3. Javed I. Khan, Thomas J. Kennedy and Donnel R. Christian Jr., *Basic Principles of Forensic Chemistry*, 1st Edition, Human Press, 2012.
4. Bapuly A. K, *Forensic Sciences – Its Applications in Crime Investigation*. Paras Medical Publishers: Hyderabad, 2006.
5. Sharma B. R, *Scientific Criminal Investigation,* Universal Law Publishing Co. Pvt. Ltd: New Delhi, 2006.

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1. Richard. Saferst in and Criminalistics, An *Introduction to Forensic Science (Colege Version),* 8th Edition, Sopfestein, Printice Hall, 2003.
2. Suzanne B, *Forensic Chemistry*, Pearson Second International Edition, 2014.
3. Jay Siegel, *Forensic Chemistry: Fundamentals and Applications*, 1st Edition, Wiley- Blackwell, Harper Business, 2015.
4. Max M. Houck and Jay A. Segal, *Fundamental of Forensic Science,* Elseiver Academic Press, 2006.
5. Henry C. Lee, Timothy Palmbach, Marilyn T. Miller, *Henry Lee's Crime Scene Book Elseiver Academic Press*, 2006.

Web Sources

1. https://www.youtube.com/watch?v=X5fo1H7bc0g
2. https://www.youtube.com/watch?v=MA6KYcN895A
3. https://www.youtube.com/watch?v=i4DVLc-MhkI

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
UG PROGRAMME
SEMESTER- III & IV
ENVIRONMENTAL STUDIES (23UESR41)
(From 2023 - 2024 Batch onwards)

HOURS/WEEK: 2 (III SEM-1, IV SEM-1)	**INT. MARKS : 25**
CREDITS : 2	**EXT. MARKS : 75**
DURATION : 30 hrs	**MAX. MARKS: 100**

Course Objectives

- To provide a comprehensive understanding of various environmental issues, including pollution, deforestation, climate change, loss of biodiversity, water scarcity, and resource depletion
- To encourage sustainable practices in various sectors, such as energy, transportation, agriculture, and waste management.
- To promote the conservation and preservation of natural resources, habitats, and ecosystems
- To foster a sense of environmental ethics and values.
- To encourage individuals to, participate in community initiatives, and contribute to sustainable development at local, national, and global levels

Course Outcomes (CO)

On successful completion of the course, the learners should be able to

CO1[K1]: recognize the importance of environment and role of Individuals in its protection.

CO2 [K2]: explain the key concepts of Ecosystem, biodiversity and climatic change

CO3[K3]: apply the right measures for the sustainable use of natural resources.

CO4[K4]: analyse the ethical, cross-cultural, and historical context of environmental issues and the links between Human and Natural Systems.

CO5[K5]: evaluate the impact of human action on the biological environment

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	1	-	2	2	1	1
CO2 [K2]	2	1	-	2	1	1	1
CO3 [K3]	2	1	-	1	1	1	1
CO4 [K4]	1	1	1	1	2	1	1
CO5 [K5]	1	1	-	1	2	1	1
Weightage of the course	08	05	01	07	08	05	05
Weighted percentage of Course contribution to Pos	**1.47**	**1.11**	**0.36**	**2.4**	**5.48**	**2.72**	**2.53**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – NATURAL RESOURCES (6 hrs)

Natural resources: Definition of resource; Classification of natural resources- biotic and abiotic, renewable and non-renewable. **Biotic resources:** Major type of biotic resources- forests, grasslands, wetlands, wildlife and aquatic (fresh water and marine); Microbes as a resource; Status and challenges. **Water resources:** Types of water resources- fresh water and marine resources; Availability and use of water resources; Environmental impact of over-exploitation, issues and challenges; Water scarcity and stress; Conflicts over water.

UNIT II –SUSTAINABLE DEVELOPMENT (6 hrs)

Soil as a resource and its degradation. **Energy resources:** Sources of energy and their classification, renewable and non-renewable sources of energy; Conventional energy sources- coal, oil, natural gas, nuclear energy; Non-conventional energy sources- solar, wind, tidal, hydro, wave, ocean thermal, geothermal, biomass, hydrogen and fuel cells; Implications of energy use on the environment. **Introduction to sustainable development:** Sustainable Development Goals (SDGs) - targets and indicators, challenges and strategies for SDGs.

UNIT III – ENVIRONMENTAL ISSUES LOCAL, REGIONAL AND GLOBAL (6 hrs)

Industrial revolution and its impact on the environment; Population growth and natural resource exploitation; Global environmental change. **Pollution:** Impact of sectoral processes on Environment, Types of Pollution- air, noise, water, soil, municipal solid waste, hazardous waste; Trans boundary air pollution; Acid rain; Smog. Land use and Land cover change: land degradation,

deforestation, desertification, urbanization. **Biodiversity loss:** past and current trends, impact. Global change: Ozone layer depletion; Climate change.

UNIT IV – CONSERVATION OF BIODIVERSITY AND ECOSYSTEM (6 hrs)

Biodiversity and its distribution: Biodiversity as a natural resource; Levels and types of biodiversity; Biodiversity in India and the world; Biodiversity hotspots; Species and ecosystem threat categories. **Ecosystems and ecosystem services:** Major ecosystem types in India and their basic characteristics- forests, wetlands, grasslands, agriculture, coastal and marine; Threats to biodiversity and ecosystems. Major conservation policies: in-situ and ex-situ conservation approaches; Major protected areas.

UNIT V – CLIMATE CHANGE: IMPACTS, ADAPTATION AND MITIGATION (6 hrs)

Climate change: Natural variations in climate; Structure of atmosphere; Anthropogenic climate change from greenhouse gas emissions– past, present and future; Projections of global climate change with special reference to temperature, rainfall, climate variability and extreme events; Importance of 1.5 °C and 2.0 °C limits to global warming; Impacts of climate change on ocean and land systems; Sea level rise, changes in marine and coastal ecosystems; Impacts on forests and natural ecosystems; **Mitigation of climate change -** Renewable energy sources; Carbon capture and storage, National climate action plan and Intended Nationally Determined Contributions (INDCs)

TEXTBOOKS

1. Chiras D. D and Reganold J. P, *Natural Resource Conservation: Management for a Sustainable Future,* 10th Edition, Pearson, 2010
2. Harris, Frances, *Global Environmental Issues,* 2nd Edition, Wiley-Blackwell

REFERENCES

Books

1. Krishnamurthy K. V, *Textbook of Biodiversity,* Science Publishers, Plymouth, UK.
2. Pittock, Barrie, *Climate Change: The Science, Impacts and Solutions,* 2nd Edition, Routledge.

Web Sources

1. https://www.youtube.com/watch?v=QewEi2U1jLs
2. https://www.unep.org/news-and-stories/story/marine-biodiversity-gets-lifeline-high-seas-treaty

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- V
CORE COURSE - IX: ORGANIC CHEMISTRY - I (23UCHC51)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS: 25**
CREDITS : 4 **EXT. MARKS: 75**
DURATION : 75 hrs **MAX. MARKS: 100**

Course Objectives

- To know the stereoisomerism in chirals and geometric isomerism in olefins, conformations of ethane and butane
- To study the preparation and properties of aromatic and aliphatic nitro compounds and amines
- To understand the preparation of different dyes, food colour and additives
- To gain the knowledge in preparation and properties of five membered heterocycles like pyrrole, furan and thiophene
- To ensure the preparation and properties of six membered heterocycles like pyridine, quinoline and isoquinoline.

Course Outcomes (CO)

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

CO1[K1]: describe the reactions of chemistry of nitrogen compounds, heterocyclic compounds.

CO2[K2]: explain the stereochemistry of aliphatic and six membered heterocyclic compound reactions.

CO3[K3]: apply oxidizing and reducing agents in the organic synthesis and do conformational analysis in simple compounds such as ethane, butane.

CO4[K4]: examine the primary, secondary and tertiary structure of amines.

CO5[K5]: measure the basicity and acidity of amines, natural and artificial dyes and optical activity of allenes and biphenyl.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	1	-	1	-
CO2[K2]	3	2	2	1	1	1	1
CO3[K3]	3	3	2	1	1	1	-
CO4[K4]	3	3	2	2	-	-	1
CO5[K5]	3	3	1	2	1	1	1
Weightage of the course	15	13	09	07	03	04	03
Weighted percentage of Course contribution to POs	**2.76**	**2.89**	**3.24**	**2.4**	**2.05**	**2.17**	**1.52**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – STEREOCHEMISTRY (15 hrs)

Sterochemistry: Fischer Projection, Newmann and Sawhorse Projection formulae and their Interconversions; Geometrical isomerism: Cis-Trans, Syn-Anti Isomerism, E/Z Notations. **Optical Isomerism:** Optical Activity, Specific Rotation, Asymmetry, Enantiomers, Distereoisomers, Meso Structures – Molecules with One and Two Chiral Centres, Racemisation – Methods of Racemisation; Resolution- Methods of Resolution. C.I.P Rules. R And S Notations for One and Two Chirality (Stereogenic) Centres. Molecules with No Asymmetric Carbon Atoms – Allenes and Biphenyls. Conformational Analysis Of Ethane and Butane.

UNIT II – CHEMISTRY OF NITROGEN COMPOUNDS – I (15 hrs)

Nitroalkanes: Nomenclature, Isomerism, Preparation from Alkyl Halides, Halo Acids, Alkanes; Physical Properties; Reactions – Reduction, Halogenations, Grignard Reagent, Pseudo Acid Character. Nitro – Aci Nitro Tautomerism. **Aromatic Nitro Compounds;** Nomenclature, Preparation – Nitration, From Diazonium Salts, PhysicalProperties; Reactions – Reduction of Nitrobenzene in Different Medium, Electrophilic Substitution Reactions, TNT. **Amines: Aliphatic Amines:** Nomenclature, Isomerism, Preparation – Hofmanns' Degradation Reaction, Gabriel's Phthalimide Synthesis, Curtius Schmidt Rearrangement. Physical Properties, Reactions – Alkylation, Acylation, Carbylamine Reaction, Mannich Reaction, Oxidation, Basicity of Amines.

UNIT III – CHEMISTRY OF NITROGEN COMPOUNDS – II (15 hrs)

Aromatic Amines – Nomenclature, Preparation – from Nitro Compounds, Hofmann's Method; Schmidt Reaction, Properties – Basic Nature,

Ortho Effect; Reactions – Alkylation, Acylation, Carbylamine Reaction, Reaction with Nitrous Acid, Aldehydes, Oxidation, Electrophilic Substitution Reactions, Diazotization and Coupling Reactions; Sulphanilic Acid – Zwitter Ion Formation. Distinction between Primary, Secondary and Tertiary Amines – Aliphatic and Aromatic Diazonium Compounds Diazomethane, Benzene Diazonium Chloride – Preparations and Synthetic Applications. **Dyes:** Theory of Colour and Constitution; Classification Based on Structure and Application; Preparation – Martius Yellow, Aniline Yellow, Methyl Orange, Alizarin, Indigo, Malachite Green. Industry Oriented Content Dyes Industry, Food Colour and Additives.

UNIT IV – HETEROCYCLIC COMPOUNDS (15 hrs)

Nomenclature and Classification. General Characteristics – Aromatic Character and Reactivity. Five-Membered Heterocyclic Compounds – Pyrrole – Preparation – from Succinimide, Paal Knorr Synthesis; Reactions – Reduction, Basic Character, Acidic Character, Electrophilic Substitution Reactions, Ring Opening. Furan – Preparation from Mucic Acid and Pentosan; Reactions – Hydrogenation, Reaction with Oxygen, Diels Alder Reactions, Formation of Thiophene and Pyrrole; Electrophilic Substitution Reaction. Thiophene Synthesis from Acetylene; Reactions – Reduction; Oxidation; Electrophilic Substitution Reactions.

UNIT V – SIX-MEMBERED HETEROCYCLIC COMPOUNDS (15 hrs)

Pyridine – Synthesis - From Acetylene, Physical Properties; Reactions – Basic Character, Oxidation, Reduction, Electrophilic Substitution Reactions; Nucleophilic Substitution- Uses Condensed Ring Systems – Quinoline – Preparation - Skraup Synthesis and Friedlander's Synthesis; Reactions – Basic Nature, Reduction, Oxidation; Electrophilic Substitutions; Nucleophilic Substitutions – Chichibabin Reaction – Isoquinoline – Preparation by The Bischler – Napieralski Reaction, Reduction, Oxidation; Electrophilic Substitution.

TEXTBOOKS

1. Jain M. K, Sharma S .C, *Modern Organic Chemistry*, 4th print, VishalPublishing, 2009.
2. Mukherji S. M and Singh S. P, *Reaction Mechanism in OrganicChemistry*, 3rd Edition, Macmillan India Ltd., 2009.
3. Arun Bahl and Bahl B. S, *Advanced organic chemistry*, New Delhi, S. Chand & Company Pvt. Ltd., Multicolour Edition, 2012.
4. Soni P. L and Chawla H. M, *Text Book of Organic Chemistry*, Sultan Chand & Sons, New Delhi, 29th Edition, 2007.
5. Pillai C. N, *Text Book of Organic Chemistry*, Universities Press(India) Private Ltd., 2009.

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1. Morrison R. T and Boyd R. N, *Organic Chemistry*, 6th Edition, Pearson Education: Asia, 2012.
2. Graham Solomons T. W, *Organic Chemistry*, 11th Edition, John Wiley & Sons, 2012.
3. Carey Francis A, *Organic Chemistry*, 7th Edition, Tata McGraw-Hill Education Pvt. Ltd: New Delhi, 2009.
4. Finar I. L, *Organic Chemistry*, Vol. (1& 2), 6th Edition, England: Wesley Longman Ltd, 2006.
5. Joule J. A, and Smith G. F, *Heterocyclic Chemistry*, 5th Edition, Wiley, 2010.

Web Sources

1. https://www.youtube.com/watch?v=bSMx0NS0XfY&list=PL8dPuuaLjXtONguuhLdVmq0HTKS0jksS4
2. https://www.youtube.com/watch?v=PYZJXWBMqBE
3. https://www.youtube.com/watch?v=nP0gDV0xDLY

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- V
CORE COURSE - X: INORGANIC CHEMISTRY - I (23UCHC52)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 5	**INT. MARKS: 25**
CREDITS : 4	**EXT. MARKS: 75**
DURATION : 75 hrs	**MAX. MARKS: 100**

Course Objectives

- To know nomenclature, isomerism and theory of coordination compounds chelate complexes
- To ensure the crystal field theory, magnetic properties, stability of complexes and Jahn Teller effect
- To study the preparation and properties of metal carbonyls
- To gain knowledge in Lanthanoids and actinoids
- To understand the preparation and properties of inorganic polymers.

Course Outcomes (CO)

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

CO1[K1]: explain isomerism, Werner's Theory and stability of chelate complexes, metal carbonyls, f-block elements and inorganic polymers.

CO2[K2]: discuss crystal field theory, EDTA, magnetic and spectral properties of complexes, EAN rule and preparation, properties of silicones.

CO3[K3]: point out the preparation and properties of metal carbonyls, metal chelates, spectrochemical series, solvent extraction method and sulphur based polymers.

CO4[K4]: analyze the comparative account of the characteristics of lanthanoids and actinoids, nomenclature of co-ordination compound, thermodynamic stability, carbonyls and silicones.

CO5[K5]: assess the properties and uses of inorganic polymers, coordination compounds, ferrocene and chemistry of uranium.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	-	1	1	1
CO2[K2]	3	2	2	-	-	-	-
CO3[K3]	3	3	2	2	-	1	1
CO4[K4]	3	3	2	2	1	1	1
CO5[K5]	3	3	2	2	1	1	1
Weightage of the course	15	13	10	06	03	04	04
Weighted percentage of Course contribution to POs	**2.76**	**2.89**	**3.6**	**2.05**	**2.05**	**2.17**	**2.02**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – CO-ORDINATION CHEMISTRY-I (15 hrs)

IUPAC Nomenclature of Coordination Compounds, Isomerism in Coordination Compounds. Werner's Coordination Theory – Effective Atomic Number – Interpretation of Geometry and Magnetic Properties by Pauling's Theory – Geometry of Co-Ordination Compounds with Co-Ordination Number 4 &6. Chelates – Types of Ligands Forming Chelates – Stability of Chelates, Applications of Chelates in Qualitative and Quantitative Analysis – Application of DMG and Oxine in Gravimetric Analysis – Estimation of Hardness of Water Using EDTA, Metal Ion Indicators. Role of Metal Chelates in Living Systems – Haemoglobin and Chlorophyll

UNIT II – CO-ORDINATION CHEMISTRY-II (15 hrs)

Crystal Field Theory –Crystal Field Splitting of Energy Levels in Octahedral and Tetrahedral Complexes, Crystal Field Stabilization Energy (CFSE), Spectrochemical Series - Calculation of CFSE in Octahedral and Tetrahedral Complexes - Factors Influencing The Magnitude of Crystal Field Splitting, Crystal Field Effect on Ionic Radii, Lattice Energies, Heats of Ligation with Water as A Ligand (Heat of Hydration), Interpretation of Magnetic Properties, Spectra Of $[Ti(H_2O)_6]^{3+}$ - Jahn – Teller Effect. Stability of Complexes in Aqueous Solution, Stability Constants – Factors Affecting the Stability of a Complex Ion, Thermodynamic and Kinetic Stability (Elementary Idea). Comparison of VBT And CFT

UNIT III – ORGANOMETALLIC COMPOUNDS (15 hrs)

Metal Carbonyls: Mono And Polynuclear Carbonyls, General Methods of Preparation of Carbonyls – General Properties of Binary Carbonyls – Bonding in

Carbonyls – Structure and Bonding in Carbonyls of Ni, Fe, Cr, Co, Mn, Ru And Os. EAN Rule as Applied to Metal Carbonyls. **Ferrocene:** Methods of Preparation, Physical and Chemical Properties

UNIT IV – INNER TRANSITION ELEMENTS (15 hrs)

General Characteristics of F-Block Elements – Comparative Account Of Lanthanoids and Actinoids - Occurrence, Oxidation States, Magnetic Properties, Colour and Spectra – Lanthanoids and Actinoids, Separation by Ion-Exchange and Solvent Extraction Methods – Lanthanoids Contraction – Chemistry of Thorium and Uranium – Occurrence, Ores, Extraction, Properties and Uses – Preparation, Properties and Uses of Ceric Ammonium Sulphate, Thorium Dioxide And Uranyl Acetate.

UNIT V – INORGANIC POLYMERS (15 hrs)

General Properties – Classification of Inorganic Polymers Based on Element in the Backbone (Si, S, B And P) – Preparation And Properties of Silicones (Polydimethylsiloxane and Polymethylhydrosiloxane) Phosphorous Based Polymer (Polyphosphazines and Polyphophonitrilic Chloride), Sulphur Based Polymer (Polysulfide and Polymeric Sulphur Nitride), Boron Based Polymers (Borazine Polymers) – Industrial Applications of Inorganic Polymers.

TEXTBOOKS

1. Puri B. R, Sharma L. R, Kalia K. C, *Principles of Inorganicchemistry*, 31th Edition, Milestone Publishers & Distributors: Delhi, 2011.
2. Satya Prakash, Tuli G. D, Basu S. K, Madan R. D, Advanced Inorganic chemistry, 18th Edition, S. Chand & Co: New Delhi, 2009.
3. Lee J D, *Concise Inorganic Chemistry*, 4 th Edition, ELBS William Heinemann: London, 1991.
4. Malik W. V, Tuli G. D, Madan R. D, *Selected Topics in Inorganic Chemistry*, S. Chand and Company Ltd, 2000.
5. De A. K, *Text book of Inorganic Chemistry*, 7th edition, Wiley East Ltd, 1992.

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1. Madan R. D, Sathya Prakash, *Modern Inorganic Chemistry*, 2nd Edition, S. Chand and Company: New Delhi, 2003.
2. Gopalan R, *Inorganic Chemistry for Undergraduates*, Ist Edition, University Press (India) Private Limited: Hyderabad, 2009.
3. Sivasankar B, Inorganic Chemistry, 1st Edition, Pearson: Chennai, 2013.
4. Alan G. Sharp, *Inorganic Chemistry*, 3rd Edition, Addition-Wesley: England, 1992.
5. Peter Atkins, Tina Overton, Jonathan Rourke and Mark Weller, Inorganic Chemistry, 6th edition, Oxford University Press, 2014.

Web Sources

1. https://www.youtube.com/watch?v=BgQBbYsjgP4
2. https://www.youtube.com/watch?v=MHlwp_7kxbM

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- V
CORE COURSE - XI: PHYSICAL CHEMISTRY - I (23UCHC53)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS: 25**
CREDITS : 4 **EXT. MARKS: 75**
DURATION : 75 hrs **MAX. MARKS: 100**

Course Objectives

- To know the Gibbs free energy, Helmholtz free energy, Ellingham's diagram and partial molar properties
- To understand chemical kinetics and different types of chemical reactions
- To gain knowledge on adsorption, homogeneous and heterogeneous catalysis
- To ensure about colloids and macromolecules
- To recoganize the photochemistry, fluorescence and phosphorescence

Course Outcomes (CO)

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

CO1 [K1]: outline the concepts of energy functions, kinetics adsorption catalysis and photochemistry

CO2 [K2]: express the various thermodynamic terms, surface chemistry, adsorption theory, catalysis, macromolecules and photochemistry

CO3 [K3]: determine the Gibbs Helmholtz free energy, Ellingham diagram, adsorption isotherm and theories, sol preparation, properties, and concepts of photochemistry

CO4 [K4]: examine the various theories of molar quantities, activation energy, catalysis, adsorption, molecular weight, photochemical changes

CO5 [K5]: predict the effects of temperature on reaction rate, significance, adsorption isotherm, macromolecules emulsion, photochemistry and chemistry of vision.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	1	-	1	1
CO2[K2]	3	2	2	1	1	-	1
CO3[K3]	3	2	2	1	1	1	1
CO4[K4]	3	3	1	1	1	1	1
CO5[K5]	3	3	2	2	1	1	1
Weightage of the course	15	12	09	06	04	04	05
Weighted percentage of Course contribution to POs	**2.76**	**2.67**	**3.24**	**2.05**	**2.74**	**2.17**	**2.53**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – THERMODYNAMICS - III (15 hrs)

Free Energy and Work Functions – Need for Free Energy Functions, Gibbs Free Energy, Helmholtz Free Energy – Their Variation with Temperature, Pressure and Volume, Criteria for Spontaneity; Gibbs – Helmholtz Equation – Derivation and Applications; Maxwell Relationships, Thermodynamic Equation of State; Thermodynamics of Mixing of Ideal Gases, Ellingham Diagram - Application. Partial Molar Properties – Chemical Potential, Gibbs-Duhem Equation, Variation of Chemical Potential with Temperature and Pressure, Chemical Potential of a System of Ideal gases, Gibbs-Duhem-Margules Equation.

UNIT II – CHEMICAL KINETICS (15 hrs)

Rate of Reaction – Average and Instantaneous Rates, Factor Influencing Rate of Reaction – Molecularity of a Reaction – Rate Equation – Order of Reaction. Order and Molecularity of simple and complex Reactions, Rate Laws – Rate Constants – Derivation of Rate Constants and Characteristics for Zero, First Order, Second and Third Order (Equal Initial Concentration) – Derivation of Time for Half Change with Examples. Methods of Determination of Order of Volumetry, Manometry and Polarimetry. Effect of Temperature on Reaction Rate – Temperature Coefficient –Concept of Activation Energy – Arhenius Euation. Theories of Reaction Rates – Collision Theory – Derivation of Rate Constant of Bimolecular Gaseous Reaction – Failure of Collision Theory. Lindemann's Theory of Unimolecular Reaction. Theory of Absolute Reaction Rates – Derivation of Rate Constant for a Bimolecular Reaction – Significance of Entropy and Free Energy of Activation. Comparison of Collision Theory and ARRT. Complex Reactions – Reversible and Parallel Reactions (No Derivation and Only Examples) – Kinetics of Consecutive Reactions – Steady State Approximation.

UNIT III – ADSORPTION (15 hrs)

Chemical and Physical Adsorption and their General Characteristics – Distinction – Different Types of Isotherms – Freundlich and Langmuir Adsorption Isotherms and their Limitations – BET Theory, Kinetics of Enzyme Catalyzed Reaction- Micheaelis-Menten And Briggs – Halden Equation – Lineweaver – Burk Plot – Inhibition – Reversible – Competitive, Noncompetitive (No Derivation of Rate Equations) . Catalysis- General Characteristics of Catalytic Reactions, Auto Catalysis, Promoters, Negative Catalysis, Poisoning of a Catalyst – Theories of Homogeneous and heterogeneous Catalysis – Kinetics of Acid – Base and Enzyme Catalysis. Heterogeneous Catalysis.

UNIT IV – COLOIDS AND SURFACE CHEMISTRY (15 hrs)

Colloids: Types of Colloids, Characteristics Colloids (Lyophilic and Lyophobic Sols) – Preparation of Sols – Dispersion Methods, Aggregation Methods, Properties of Sols – Optical Properties, Electrical Properties – Electrical Double Layer, Electro Kinetic Properties – Electro – Osmosis, Electrophoresis. Coagulation or Precipitation, Stability of Sols, Associated Colloids, Emulsions, Gels-Preparation of Gels, Applications of Colloids. Macromolecules: Molecular Weight of Macromolecules – Number Average Molecular Weight – Average Molecular Weight – Determination of Molecular Weight of Molecules.

UNIT V – PHOTOCHEMISTRY (15 hrs)

Laws of Photochemistry – Lambert – Beer, Grothus – Draper and Stark – Einstein. Quantum Efficiency. Photochemical Reactions – Rate Law – Kinetics of H_2 – Cl_2, H_2 – Br_2 and H_2 – I_2 Reactions, Comparison Between Thermal and Photochemical reactions. Fluorescence – Applications Including Fluorimetry – Sensitized Fluorescence, Phosphorescence – Applications – Chemiluminescence and Photosensitation – Examples Chemistry of Vision -11 – Cis Retinal – Vitamin A as a Precursor – Colour Perception of Vision.

TEXTBOOKS

1. Puri B. R and Sharma L. R, *Principles of Physical Chemistry,* 48th Edition, Shoban Lal Nagin Chand and Co, 2021.
2. Peter Atkins, Julio de Paulo and James Keeler, *Physical Chemistry,* 11th Edition, Oxford University Press, International, 2018.
3. Arun Bahl B. S and Tuli G. D, *Essentials of Physical Chemistry*, 28th Edition, S. Chand & Co, 2019.
4. Dogra S. K and Dogra S, *Physical Chemistry Through Problems: New Age International,* 4th Edition, 1996.
5. Rajaram J and Kuriacose J. C, *Thermodynamics*, Shoban Lal Nagin Chand and Co., 1986.

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1. Rajaram J and Kuriacose J. C, *Chemical Thermodynamics*, Pearson, 1st Edition, 2013.
2. Keith J Laidler, *Chemical Kinetics,* 3rd Edition, 2003.
3. Atkins P. W and Julio de Paula, *Physical Chemistry,* 7th Edition, Oxford University Press, 2002.
4. Kapoor K. L, *A Textbook of Physical Chemistry,* 3rd Edition, *Macmillan India Ltd,* 2009.
5. Puri B. R, Sharma L. R and Pathaania M. S, *Principles of Physical Chemistry,* Shobanlal Nagin Chand and Co, Jalendhar, 41st Edition, 2001.

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2. https://youtu.be/2vFS6oXYpjE
3. https://youtu.be/I1kbPSUWAnQ

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- V
CORE COURSE - XII: PROJECT (23UCHJ51)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS: 25**
CREDITS : 4 **EXT. MARKS: 75**
DURATION : 75 hrs **MAX. MARKS: 100**

Course Objectives:

- To familiarize the learners with the objectives and stages in formulating a Research Project
- To relate conceptual knowledge and the fundamentals of the research
- To apply fundamental and disciplinary concepts and methods in ways appropriate to their principal areas of study
- To develop the art of writing coherently, originally and analytically

Course Outcomes (CO)

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

CO1[K2]: express their views with apt illustrations and critical support

CO2[K3]: organize the views and format them into a research paper of about twenty pages

CO3[K4]: analyze the plot, themes and characters of the chosen literary piece

CO4[K5]: evaluate the stylistic features employed in the chosen text

CO5[K6]: compile the Documentation as per the latest Research Methodology

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	2	2	2	-	1	-
CO2[K3]	3	2	2	2	1	1	-
CO3[K4]	3	2	2	2	1	1	1
CO4[K5]	2	2	2	2	1	1	1
CO5[K6]	2	2	2	3	1	1	1
Weightage of the course	13	10	10	11	04	05	03
Weighted percentage of Course contribution to POs	**2.39**	**2.22**	**3.6**	**3.77**	**2.74**	**2.72**	**1.52**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

Guidelines for Project Submission (UG)

1. Students will work individually on a semester-long project.
2. Depending on the interest of the students, project titles will be chosen.
3. Students must meet the guide periodically.
4. The project report should be of minimum 25 pages (excluding bibliography & appendices)
5. The project carries 100 marks of which 25 marks for Internal Assessment and 75 Marks for External Examination.
6. There will be two project review sessions.
7. A draft of the final project report should be submitted to the Project Guide for review at least two weeks prior to the end of the semester.
8. Three copies of the final project report should be submitted.
9. The Head of the department and the Project Guide will evaluate the final Project Report.
10. The viva-voce board shall consist of the External Examiner, the Head of the Department and the Internal Examiner

The following rubrics will be taken into account for the evaluation of Project work and viva-voce:

Internal Assessment (25 Marks)		**External Examination (75 Marks)**	
Project Report & Review	: 15 Marks	Project Report	: 25 Marks
PowerPoint Presentation	: 5 Marks	Viva Voce	: 50 Marks
Demo/Performance	: 5 Marks		

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- V
ELECTIVE COURSE GENERIC/ DISCIPLINE SPECIFIC - V: BIOCHEMISTRY
(23UCHO51)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4	**INT. MARKS: 25**
CREDITS : 3	**EXT. MARKS: 75**
DURATION : 60 hrs	**MAX. MARKS: 100**

Course Objectives

- To know the relationship between biochemistry and medicine, composition of blood
- To inculcate the structure and properties of amino acids, vitamins and proteins
- To ensure the biological functions of proteins, enzymes, vitamins and hormones
- To understand the biochemistry of nucleic acids and lipids
- To aware the metabolism of biomolecules

Course Outcomes (CO)

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

CO1[K1]: describe the fundamental macromolecules like lipids and amino acids enzymes

CO2[K2]: classify various biological functions, mechanism and applications of macromolecules

CO3[K3]: present the structure of proteins, nucleic acids and mechanism of enzyme action

CO4[K4]: compare the structure, arrangement of atoms in each biomolecule

CO5[K5]: interpret the structure, function of the molecule in bio system.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	1	1	1	1
CO2[K2]	3	2	1	1	1	1	1
CO3[K3]	2	2	1	2	-	-	1
CO4[K4]	2	2	1	2	1	1	1
CO5[K5]	2	2	1	1	1	1	1
Weightage of the course	12	10	06	07	04	04	05
Weighted percentage of Course contribution to POs	**2.21**	**2.22**	**2.16**	**2.4**	**2.74**	**2.17**	**2.53**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – LOGIC OF LIVING ORGANISMS (12 hrs)

Relationship of Biochemistry and Medicine Blood - Composition of Blood, Blood Coagulation – Mechanism. Hemophilia and Sickle Cell Anaemia Maintenance of pH of Blood – Bicarbonate Buffer, Acidosis, Alkalosis

UNIT II – PEPTIDES AND PROTEINS (12 hrs)

Amino Acids – Nomenclature, Classification – Essential and Nonessential; Synthesis - Gabriel Phthalimide, Strecker; Properties – Zwitter Ion and Isoelectric Point, Electrophoresis and Reactions. Peptides – Peptide Bond – Nomenclature – Synthesis of Simple Peptides – Solution and Solid Phase. Determination of Structure of Peptides, Nterminal Analysis – Sanger's & Edmann Method; C Terminal Analysis - Enzymic Method. Proteins – Classification Based On Composition, Functions and Structure; Properties and Reactions – Colloidal Nature, Coagulation, Hydrolysis, Oxidation, Denaturation, Renaturation; Colour Tests for Proteins; Structure of Proteins – Primary, Secondary, Tertiary And Quaternary. Metabolism of Amino Acids – General Aspects of Metabolism (A Brief Outline); Urea Cycle.

UNIT III – ENZYMES AND VITAMINS (12 hrs)

Nomenclature and Classification, Characteristics, Factors Influencing Enzyme Activity – Mechanism of Enzyme Action – Lock and Key Hypothesis, Koshland's Induced Fit Model. Proenzymes, Antienzymes, Coenzymes and Isoenzymes; Allosteric Enzyme Regulation. Vitamins As Coenzymes – Functions Of TPP, Lipoic Acid, NAD, NADP, FMN, FAD, Pyridoxal Phosphate, Coa, Folic Acid, Biotin, Cyanocobalamin.

UNIT IV – AMINO ACIDS AND HARMONES (12 hrs)

Amino Acids: Components of Nucleic Acids - Nitrogenous Bases And Pentose Sugars, Structure of Nucleosides And Nucleotides, DNA- Structure & Functions; RNA –Types– Structure - Functions; Biosynthesis of Proteins **Hormones:** Adrenalin and Thyroxine – Chemistry, Structure And Functions (No Structure Elucidation).

UNIT V – LIPIDS (12 hrs)

Lipids: Occurrence, Biological Significance of Fats, Classification of Lipids. Simple Lipids – Oils And Fats, Chemical Composition, Properties, Reactions – Hydrolysis, Hydrogenation, Trans-Esterification, Saponification, Rancidity; Analysis of Oils And Fats – Saponification Number, Iodine Number, Acid Value, R.M. Value. Distinction between Animal and Vegetable Fats. Compound Lipids – Lipoproteins - VLDL, LDL, HDL, Chylomicrons – Biological Significance. Cholesterol – Occurrence, Structure, Test, Physiological Activity. Metabolism of Lipids: B-Oxidation of Fatty Acids.

TEXTBOOKS

1. Bahl, B. S, Bhal A, *Advanced Organic Chemistry*, 3rd Edition, S. Chand: New Delhi, 2003.
2. Jain M. K, Sharma, S. C. *Modern Organic Chemistry,* Vishal Publications: New Delhi, 2017.
3. Shanmugam A, *Fundamentals of Biochemistry for Medical Students,* 6th Edition, Published by the author, 1999.
4. Veerakumari L, *Biochemistry*, 1sd Edition, MJP Publications: Chennai, 2004.
5. Jain J. L, *Fundamentals of Biochemistry,* 2nd Edition, New Age International Publication, 2005.

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1. Conn E. E, Stumpf P. K, *Outline of Biochemistry*, 5th Edition, Wiley Eastern: New Delhi, 2002.
2. West E. S, Todd W. R, Mason H. S, Van Bruggen J. T, *Text Book of Biochemistry,* 4th Edition, Macmillan: New York, 1970.
3. Lehninger A. L, *Principles of Biochemistry,* 2nd Edition, CBS Publisher: Delhi, 1993.
4. Rastogi S. C, *Biochemistry*, 2nd Edition, Tata McGraw-Hill: New Delhi, 2003.
5. Chatterjea M. N, Shinde R, *Textbook of Medical Biochemistry*, 5th Edition, aypee Brothers: New Delhi, 2002.

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1. https://swayam.gov.in/courses/4384-biochemistry Biochemistry
2. https://onlinecourses.nptel.ac.in/noc19_cy07/preview

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- V
ELECTIVE COURSE GENERIC/ DISCIPLINE SPECIFIC - V: ENVIRONMENTAL CHEMISTRY (23UCHO52)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- To know the biogeochemical cycle
- To inculcate the composition of air and reactions in atmosphere
- To ensure the sources of water pollution
- To understand the water treatment
- To be aware of environmental issues

Course Outcomes (CO)

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

CO1 [K1]: recognize the composition of air, water and sources of pollution
CO2 [K2]: illustrate effects and sources accountable in the environmental pollution and their control
CO3 [K3]: present factors causing pollution and possible solution
CO4 [K4]: analyze contamination of air and water, water quality parameters and climate change
CO5 [K5]: evaluate the chemical reactions leading to the environmental issues.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	1	1	1	1
CO2[K2]	3	2	1	1	1	1	1
CO3[K3]	2	2	1	2	-	-	1
CO4[K4]	2	2	1	2	1	1	1
CO5[K5]	2	2	1	1	1	1	1
Weightage of the course	12	10	06	07	04	04	05
Weighted percentage of Course contribution to POs	**2.21**	**2.22**	**2.16**	**2.4**	**2.74**	**2.17**	**2.53**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – ENVIRONMENT **(12 hrs)**

Composition of Atmosphere, Temperature Variation of Earth Atmospheric System (Temperature vs. Altitude Curve), Biogeochemical Cycles of C, N, P, S and O System.

UNIT II – ATMOSPHERE **(12 hrs)**

Chemical Composition of Atmosphere – Particles, Ions and Radicals in their Formation, Chemical and Photochemical Reaction in Atmosphere, Smog Formation, Oxides of N, C, S & O and their Effect, Air Pollution and Control.

UNIT III – WATER POLLUTION **(12 hrs)**

Ground and Subsurface Water Contamination – Sources – Ground Water and Ocean Pollution – Eutrophication, Acid Mine Drains, Pesticides and Fertilizers, Dyeing and Tanning.

UNIT IV – AQUATIC CHEMISTRY **(12 hrs)**

Water and its Necessities, Various Water Quality Parameters (DO, BOD, COD) and its Determination, Industrial, Municipal Water Treatment Processes, Waste Water Treatment Procedure (Primary, Secondary & Tertiary), Solid Waste Treatment, Soil Pollution and Noise Pollution.

UNIT V – ENVIRONMENTAL ETHICS **(12 hrs)**

Issues and Possible Solutions – Climate Change, CFC, Green House Effect, Acid Rain, Ozone Layer Depletion, Nuclear Accidents and Holocaust.

TEXTBOOKS

1. Subramanian V, *A Textbook of Environmental Chemistry*, I K International Publishing House, 2011.
2. Ajay Kumar B and Chatwal G. K, *Environmental Chemistry,* Himalaya Publishing House.
3. Peter O Neill. *Environmental Chemistry*, CRC Press, 3rd Edition, 1998.

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1. Balram P, *Text Book Environmental Chemistry*, New Delhi, I K International, 2007.
2. Gilbert M, *Introduction to Environmental Engineering & Science*, New Delhi, 2004.

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2. https://youtu.be/6Ot2t9YyzKU
3. https://youtu.be/Fq6DjCIERtc

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- V
ELECTIVE COURSE GENERIC/ DISCIPLINE SPECIFIC - V: PHOTOCHEMISTRY
(23UCHO53)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- To know about the nature of light and matter
- To gain knowledge on various energies of excited molecules
- To identify the photo-physical pathway and kinetics
- To ensure the photochemical reactions
- To be aware various tools and techniques of photochemical reactions

Course Outcomes (CO)

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

CO1 [K1]: define the terms like electronic state, photosynthesis and excited state energy levels

CO2 [K2]: interpret the basic concepts in in electronic excitation, singlet and triplet states

CO3 [K3]: present the mechanism of photo physical and photo chemical process

CO4 [K4]: discriminate radiative and non-radiative transitions and types of photochemical reactions

CO5 [K5]: resolve the mechanism involved in photo-physical pathways and photochemical reactions.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	1	1	1	1
CO2[K2]	3	2	1	1	1	1	1
CO3[K3]	2	2	1	2	-	-	1
CO4[K4]	2	2	1	2	1	1	1
CO5[K5]	2	2	1	1	1	1	1
Weightage of the course	12	10	06	07	04	04	05
Weighted percentage of Course contribution to POs	**2.21**	**2.22**	**2.16**	**2.4**	**2.74**	**2.17**	**2.53**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – NATURE OF LIGHT AND NATURE OF MATTER (12 hrs)

Introduction - Interaction between Light and Matter – Wave Nature of Radiation – Particle Nature of Radiation –Dual Nature of Matter –Electronic Energy States of Atoms – The Selection Rule-Diatomic and Polyatomic Molecules-Spectroscopic Terms for Electronic States – Orbital Symmetry and Molecular Symmetry – Energy Level for Inorganic Complexes.

UNIT II – PHYSICAL PROPERTIES OF EXCITED MOLECULE (12 hrs)

Nature of Changes on Electronic Excitation – Electronic, Vibrational and Rotational Energies–Potential Energy Diagram-Shapes of Absorption Band – Franck-Condon Principle –Emission Spectra –Environmental Effect on Absorption and Emission Spectra – Excited State Dipole Moment-Excited State Acidity Constant - Excited State Redox Potential –Emission of Polarized Luminescence – Geometry of some Electronically Excited Molecule - Wigner's Spin Conservation.

UNIT III – PHOTO PHYSICAL PROCESS (12 hrs)

Types of Photophysical Pathways – Radiation Less Transition – Internal Conversion and Intersystem Crossing – Fluorescence Emission – Fluorescence and Structure – Triplet States and Phosphorescence Emission–Emission Property and the Electronic Configuration – Photophysical Kinetics of Unimolecular Processes – Diagram – Delayed Fluorescence – The Effect of Temperature on Emission Process.

UNIT IV – PHOTOCHEMICAL PRIMARY PROCESS (12 hrs)

Classification of Photochemical Reactions – Rate Constants and Lifetimes of Reactive Energy State – Effect of Light Intensity on the Rate of Photochemical

Reactions – Types of Photochemical Reactions – Reaction between Hydrogen and Bromine – Reaction between Hydrogen and Iodine.

UNIT V – TOOLS AND TECHNIQUES IN PHOTOCHEMISTRY (12 hrs)

Origin of Life – Mutagenic Effect of Radiation – Photosynthesis – Photo Electrochemistry of Excited State Redox Reaction – Solar Energy Conversion and Storage – Light Source – Measurement of Emission – Techniques for Study of Transient Species in Photochemical Reactions – Laser in Photochemical Kinetics.

TEXTBOOKS

1. Rohatgi Mukherjee K. K, *Fundamentals of Photo Chemistry,* New Age International Publishers: Jalandhar, 2003.
2. Vincenzo Balzani, Paola Ceroni, Alberto Juris, *Photochemistry and Photophysics: Concepts, Research, Applications*, Wiley Publishers, 2014.

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1. Brian Wardle, *Principles and Applications of Photochemistry*, Wiley Publishers, 2009.
2. Ramamurthy V, Kirk S. Schanze, *Organic, Physical, and Materials Photochemistry*, CRC Press, 2019.

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1. https://www.youtube.com/watch?v=PD7mwFhNOtU
2. https://www.youtube.com/watch?v=1E1wXhcMCDI
3. https://www.youtube.com/watch?v=SgTuWj9Tj80

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- V
ELECTIVE COURSE GENERIC/ DISCIPLINE SPECIFIC - VI: INDUSTRIAL CHEMISTRY (23UCHO54)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- To acquire knowledge in classifications and characteristics of fuels
- To get idea about the preparation of cosmetics
- To familiarize the manufacture of sugar, paper, cement and leather and food processing
- To inculcate the applications of abrasives, lubricants and other industrial products
- To gain knowledge on intellectual property rights

Course Outcomes (CO)

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

CO1 [K1]: outline the preparation of fuels, cosmetics, sugar, abrasives and lubricants.

CO2 [K2]: describe about cosmetic products, fuels, lubricants, food preservation, industries of paper, leather, cement and characteristics of abrasives.

CO3 [K3]: explain manufacture of sugar, food spoilages, fuels, leather, pulp, soap, detergents and food additives.

CO4 [K4]: examine the properties of abrasives, fules, cosmetics, lubricants, food additives and manufacture of leather and paper.

CO5 [K5]: discuss the applications of cosmetics, soap and detergents, preservatives, abrasives and intellectual property rights.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	1	-	-	1
CO2[K2]	2	2	2	1	-	1	1
CO3[K3]	2	2	1	1	1	1	1
CO4[K4]	2	2	1	2	1	1	1
CO5[K5]	2	2	2	1	1	1	1
Weightage of the course	11	10	08	06	03	04	05
Weighted percentage of Course contribution to POs	**2.03**	**2.22**	**2.88**	**2.05**	**2.05**	**2.17**	**2.53**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – SURVEY OF INDIAN INDUSTRIES AND MINERAL RESOURCES IN INDIA **(12 hrs)**

Fuels: Classification, Characteristics of Fuels. Solid Fuels: Coal – Classification; Analysis of Coal – Proximate Analysis and Ultimate Analysis; Calorific Value – Determination, Carbonisation of Coal. **Liquid Fuels:** Petroleum – Characteristics; Gasoline Aviation petrol – Knocking in Internal Combustion Engines, Antiknock Agents; Unleaded Petrol- Octane Number, Cetane Number. **Gaseous Fuel:** Advantages Over Solid and Liquid Fuels; Water Gas, Produces Gas, Carbureted Water Gas – Preparations – Uses**. Natural Gas:** LPG – Composition, Advantages, Application; Gobar Gas – Production, Composition, Advantages, Application. Propellants – Rocket Fuels (basic idea).

UNIT II – COSMETICS **(12 hrs)**

Skin Care: Powders, Ingredients; Creams and Lotion- Cleansing, Moisturizing, All Purpose Shaving Cream, Sunscreen; Makeup Preparations. **Dental Care:** Tooth Pastes – Ingredients. **Hair Care:** Shampoos – Types, Ingrediens; Conditioners – Types, Ingredients. **Perfumes:** Natural – Plant Orgin – Parts of the Plant Used, Chief Constituents; Animal Orgin – Amber Gries, Civetone and Musk; Synthetic – Classification – Esters – Amylsalicylate Alcohols – Citrenellol; Terpeneols- Gereniol and Nerol; Ketones – Muskone, Coumarin; Aldehydes – Vanilin. **Soaps and Detergents:** Soaps – Properties, Manufacture of Soap – Batch Process; Types – Transparent Soap, Toilet Soap, Powder Soap and Liquid Soap – Ingredients. Detergents – Definition, Properties – Cleansing Action; Soapless Detergents – Anionic, Cationic and Non-ionic (General Ideal Only); Uses of Detergents as Surfactants. Biodegradability of Soaps and Detergents.

UNIT III–SUGAR AND FOOD PRESERVATION AND PROCESSING (12 hrs)

Sugar Industry: Manufacture from sugar cane; Recovery of sugar from Molasses; Testing and Estimation of Sugar. **Food Preservation and Processing:** Food Spoilage – Causes; Food Preservation – Methods- High Temperature, Low Temperature, Drying, Radiation; Food Additives – Preservatives, Flavours, Coloura, Anti- Oxidants, Sweetening Agents; Hazards of Using Food Additives; Food Standards – Agmark and Codex Alimentarius.

UNIT IV – ABRASIVES, LEATHER AND PAPER INDUSTRY (12 hrs)

Abrasives: Definition, Characteristics, types – Natural and Synthetic; Natural Abrasives – Diamond, Corundum, Emery, Garnet, Quartz – Composition, Uses; Synthetic Abrasives – Carborundum, Aluminium Carbide, Boron Carbide, Boron Nitride, Synthetic Graphite – Composition and Uses. **Leather Industry:** Structure and composition of skin, hide; Manufacture of Leather – Pretanning Process – Curing, Liming, Beating, Pickling, Methods of Tanning – Vegetable, Chrome – One Bath, Two Bath Process; Finishing. **Paper Industry:** Manufacture of Pulp – Mechanical, Chemical Processes; Sulphate Pulp, Rag Pulp; Manufacture of Paper – Beating, refinging, Filling, Sizing, Colouring, Calendaring; Cardboard.

UNIT V – LUBRICANTS, CEMENT INDUSTRY AND IPR (12 hrs)

Lubricants: Definition, Classification – Liquid, Semi Solid, Solid and Synthetic; Properties- Viscosity Index, Flash Point, Cloud Point, Pour Point, Aniline Point and Drop Point; Greases – Properties, Types; Cutting Fluids, Selection of Lubricants. **Cement Industry:** Cement- Types, Raw Materials; Manufacture – Wet Process, Constituent of Cement, Setting of Cement; Properties of Cement - Quality, Setting Time, Soundness, Strength; Mortar, Concrete, RCC; Curing and Decay of Concrete. **Intellectual Property Rights:** Introduction to Intellectual Property Rights – Patents – Factors for Patentability – Novelty, Non Obviousness, Industrial Applications – Patent Offices in India; Trademark – Types of Trademarks – Certification Marks, Logos, Brand Names, Signatures, Symbols and Service Marks.

TEXTBOOKS

1. Sharma B. K, *Industrial Chemistry*, 9th Edition, Goel Publishing House: Meerut, 1998.
2. Wilkison J. B. E and Moore R. J, *Harry's Cosmeticology*, 7th Edition Chemical Publishers: New York, 1982.
3. Alex V. Ramani, *Food Chemistry*, MJP Publishers: Chennai, 2009.
4. Jayashree Ghosh, *Applied Chemistry*, Chand: New Delhi, 2006.
5. Srilakshmi B, *Food Science,* 4th Edition, New Age International Publication, 2005.

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1. Jain P. C and Jain M, *Engineering Chemistry*, 16th Edition, Dhanapet Rai: Delhi, 1992.
2. George Howard, *Principles and Practice of Perfumes and Cosmetics,* Stanley Therones, Cheltenham: UK, 1987.
3. Thankamma Jacob, *Foods, Drugs and Cosmetics – A Consumer Guied,* Macmillam: London, 1997.
4. Shankuntlamanay N and Shadaksharaswamy M, *Food Facts and Principles*, 3rd Edition, New Age Publication, 2008.
5. Neeraj P and Khushdeep D, *Intellectual Property Rights*, PHI Learning, 2014.

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1. http:/swayam.gov.in
2. https://www.youtube.com/watch?v=YkmPi7T8TXA
3. https://www.youtube.com/watch?v=dgjZEI9PXCs
4. https://www.youtube.com/watch?v=HTIzwP8BKC8

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- V
ELECTIVE COURSE GENERIC/ DISCIPLINE SPECIFIC - VI: GEO CHEMISTRY
(23UCHO55)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- To acquire knowledge in carbon, earth and life
- To get idea about the organic matter in geosphere
- To familiarize the composition of coal and kerosene
- To inculcate the petroleum generation
- To gain knowledge on carbon cycle

Course Outcomes (CO)

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

CO1 [K1]: describe the origin of elements and organic compounds through carbon cycle

CO2 [K2]: illustrate the origin of life from organic matter by various processes

CO3 [K3]: apply the basic concepts of geochemistry to understand the evolution of life and other organic matter

CO4 [K4]: analyze geochemical processes to understand the origin of material for life

CO5 [K5]: deduce different types of carbon cycles to enrich the knowledge in the formation of coal, petroleum, life and other organic matter.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	1	-	-	1
CO2[K2]	2	2	2	1	-	1	1
CO3[K3]	2	2	1	1	1	1	1
CO4[K4]	2	2	1	2	1	1	1
CO5[K5]	2	2	2	1	1	1	1
Weightage of the course	11	10	08	06	03	04	05
Weighted percentage of Course contribution to POs	**2.03**	**2.22**	**2.88**	**2.05**	**2.05**	**2.17**	**2.53**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I - CARBON, EARTH AND LIFE (12 hrs)

Carbon-Basic Requirements of Life – Chemical Elements – Origin of Elements–First Organic Compounds – Origin of Life – Young Earth – Raw Material for Life–Evolution of Life and the Atmosphere-Geological Record of Oxygen Level –Major Contributors of Sedimentary Organic Matter – Evolution of Marine Life – Evolution of Terrestrial Life – Evolution of Life and Atmosphere.

UNIT II - ORGANIC MATTER AND GEOSPHERE (12 hrs)

Carbohydrates – Amino acids – Proteins – Lipids – Tannins – Geochemical implication of Compositional Variation – Diagenesis – Introduction – Microbial Degradation of Organic Matter – Geo Polymer Formation – Humic Material – Classification – Composition and Structure – Formation of Humic Substances.

UNIT III - COAL AND KEROGEN (12 hrs)

Coal – Classification and Composition – Petrology – Van Krevelan Diagrams – Formation – Peatification – Bio Chemical Stage of Coalification – Geo Chemical Stage of Coalification. Kerogen – Introduction – Formation – Bio markers – Sulphur Incorporation – Geo Graphical Distribution of Coal and Kerogen.

UNIT IV - CATEGENESIS AND METAGENESIS (12 hrs)

Petroleum Generation – Kerogen Maturity – Petroleum Composition– Major Hydrocarbons in Oils – Bio Markers – Movement of Hydrocarbons from Kerogen – Mechanism of Expulsion – Secondary Migration – Post Generation Alteration of Petroleum – Migration – Bio Degradation – Water Washing – Thermo Chemical Sulphate Reduction – Gas diffusion – Carbon dioxide.

UNIT V - CARBON CYCLE **(12 hrs)**

Global Carbon Cycle–Bio Chemical Sub Cycle – Marine Bio Chemical Cycle – Geo Chemical Sub Cycle – Feed Back Mechanism of Long form Carbon Cycle – Changes in Carbon Reservoirs over Geo Logical Time – Secondary Preservation of Organic Carbon –Human Influences on the Carbon Cycle – Greenhouse Gas Sources and Fluxes – Atmospheric Concentrations of Carbon dioxide and Methane.

TEXTBOOKS

1. Stephen Killops and Vanessa Killops. *Introduction to Organic Geo Chemistry*, Blackwell Publishing House, 2005.
2. Todd D. K, *Groundwater Hydrology*, Wiley reprint, 3rd Edition, 2007.

REFERENCE

Book

1. Sabbins, *Remote Sensing - Principles and Applications*, Waveland press, 3rd Edition, 2007.

Web Sources

1. https://youtu.be/5xwhXnwf5fI
2. https://youtu.be/bLbhFuFlBKc

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- V
ELECTIVE COURSE GENERIC/ DISCIPLINE SPECIFIC - VI: ANALYTICAL CHEMISTRY (23UCHO56)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- To acquire knowledge in carbon, earth and life
- To get idea about the organic matter in geosphere
- To familiarize the composition of coal and kerosene
- To inculcate the petroleum generation
- To gain knowledge on carbon cycle

Course Outcomes (CO)

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

CO1 [K1]: identify the analytical techniques on spectroscopy method, thermal analysis and separation techniques

CO2 [K2]: relate the spectroscopic analytical techniques to the all relevant compounds (or) substances

CO3 [K3]: formulate the structure of the compounds by these studied analytic techniques

CO4 [K4]: analyze the functional groups present in the different compounds or substances

CO5 [K5]: assess the properties of the compounds or substances, nature of the solubility by analytical techniques.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	1	-	-	1
CO2[K2]	2	2	2	1	-	1	1
CO3[K3]	2	2	1	1	1	1	1
CO4[K4]	2	2	1	2	1	1	1
CO5[K5]	2	2	2	1	1	1	1
Weightage of the course	11	10	08	06	03	04	05
Weighted percentage of Course contribution to POs	**2.03**	**2.22**	**2.88**	**2.05**	**2.05**	**2.17**	**2.53**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – QUALITATIVE AND QUANTITATIVE ASPECTS OF ANALYSIS (12 hrs)

Tools in Analytical Chemistry and their Applications, Sampling, Evaluation of Analytical Data, Errors, Accuracy and Precision, Statistical Test of Data; F, Q and t-Test, Rejection of Data, and Confidence Intervals.

UNIT II – SPECTROSCOPY (12 hrs)

Origin of Spectra, Interaction of Radiation with Matter, Fundamental Laws of Spectroscopy and Selection Rules, Validity of Beer-Lambert's Law. Vibration Spectroscopy: Basic Principles of Instrumentation, Sampling Techniques. Application of IR Spectroscopy for Characterization through Interpretation of Data, Effect and Importance of Isotope Substitution. UV-Visible Spectrometry: Basic Principles of Instrumentation, Principles of Quantitative Analysis Using Estimation of Metal Ions from Aqueous Solution, Determination of Composition of Metal Complexes using Job's Method of Continuous Variation and Mole Ratio Method.

UNIT III – THERMAL ANALYSIS (12 hrs)

Theory, Methodology, Instruments and Applications of Thermogravimetric Analysis (TGA/DTA), and Differential Scanning Calorimetry (DSC).

UNIT IV – ELECTROANALYTICAL METHODS (12 hrs)

Classification of Electroanalytical Methods, Basic Principle of p^H Metric, Potentiometric and Conductometric Titrations. Techniques used for the Determination of Equivalence Points - Determination of pKa Values.

UNIT V – SEPARATION TECHNIQUES (12 hrs)

Solvent Extraction: Classification, Principle and Efficiency of the Technique. Mechanism of Extraction: Extraction by Solvation and Chelation. Technique of Extraction: Batch, Continuous and Counter Current Extractions. Qualitative and Quantitative Aspects of Solvent Extraction: Extraction of Metal Ions from Aqueous Solution, Extraction of Organic Species from the Aqueous and Nonaqueous Media. Chromatography Techniques: Classification and Principles of Chromatography – Paper, Column, Thin Layer Chromatography, Gas-Liquid Chromatography, HPLC - Qualitative and Quantitative Aspects of Chromatographic Methods of Analysis using LC, GLC, TLC and HPLC.

TEXTBOOKS

1. Jeffery G. H, Bassett J, Mendham J, and Denney R. C, Vogel A I, *Quantitative Chemical Analysis*, 6th Edition, Pearson, 2009.
2. Willard H. H, Merritt L. L, and Dean J. A, *Instrumental Methods of Analysis*, 7th Edition, California, USA: Wardsworth Publishing, 1988.
3. Christian G. D, *Analytical Chemistry*, 6th Edition, John Wiley & Sons: New York, 2004.

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Books

1. Khopkar S. M, *Basic Concepts of Analytical Chemistry*, 2nd Edition, New Age, 1998.
2. Skoog D. A, Holler F. J, and Nieman T. A, *Principles of Instrumental Analysis*, 5th Edition, Brooks & Cole, 1997.
3. Harris D. C, *Exploring Chemical Analysis*, 9th Edition, New York: W.H. Freeman, 2016.

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1. https://www.youtube.com/watch?v=5rUVYWfZOb8
2. https://www.youtube.com/watch?v=MQm94pvvsuM
3. https://nptel.ac.in/courses/103/105/103105060/
4. https://www.youtube.com/watch?v=7jOSbtR8mTs

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

UG PROGRAMME

SEMESTER – V

VALUE EDUCATION (23UVED51)

(From 2023 - 2024 Batch onwards)

HOURS/WEEK: 2(L-2, T-) **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX. MARKS: 100**

Course Objectives

- To inculcate the values towards personal development
- To know the social values for the global development
- To ensure the modern challenges of Adolescent
- To be aware of human right
- To enrich the knowledge to control the mind

Course Outcomes (CO)

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

CO1[K1]: identify the basic human values and ethics necessary for harmonious human relationship

CO2 [K2]: explain the significance of social values and religious tolerance to live in peace

CO3[K3]: articulate the life-changing principles of brotherhood, honesty, loyalty and community solidarity

CO4[K4]: analyse emotional, social, spiritual attribute to acquire well balanced personality

CO5[K5]: assess the importance of harmonious living in the multi-cultural pluralistic society

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	1	-	1	1	-	2
CO2 [K2]	2	1	-	1	2	1	2
CO3 [K3]	2	1	-	1	2	1	1
CO4 [K4]	1	1	1	1	2	1	1
CO5 [K5]	1	1	-	1	2	1	1
Weightage of the course	08	05	01	05	09	04	07
Weighted percentage of Course contribution to POs	**1.47**	**1.11**	**0.36**	**1.71**	**6.16**	**2.17**	**3.54**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – CONCEPT OF HUMAN VALUES, VALUE EDUCATION TOWARDS PERSONAL DEVELOPMENT (6 hrs)

Aim of Education and Value Education; Evolution of Value Oriented Education; Concept of Human Values; Types of Values; Components of Value Education**. Personal Development:** Self Analysis and Introspection; Sensitization Towards Gender Equality, Physically Challenged, Intellectually Challenged. Respect to - Age, Experience, Maturity, Family Members, Neighbours, Co-Workers. **Character Formation towards Positive Personality:** Truthfulness, Constructivity, Sacrifice, Sincerity, Self-Control, Altruism, Tolerance, Scientific Vision.

UNIT II – VALUE EDUCATION TOWARDS NATIONAL AND GLOBAL DEVELOPMENT (6 hrs)

National and International Values: Constitutional or national values - Democracy, socialism, secularism, equality, justice, liberty, freedom and fraternity. Social Values - Pity and probity, self-control, universal brotherhood. Professional Values - Knowledge thirst, sincerity in profession, regularity, punctuality and faith. Religious Values - Tolerance, wisdom, character. Aesthetic values - Love and appreciation of literature and fine arts and respect for the same. National Integration and international understanding.

UNIT III – IMPACT OF GLOBAL DEVELOPMENT ON ETHICS AND VALUES (6 hrs)

Conflict of cross-cultural influences, mass media, cross-border education, materialistic values, professional challenges and compromise. Modern Challenges of Adolescent Emotions and behavior; Sex and spirituality: Comparision and competition; positive and negative thoughts. Adolescent Emotions, arrogance, anger, sexual instability, selfishness, defiance

UNIT IV – THERAUPATIC MEASURES (6 hrs)

Control of the mind through

1. Simplified physical exercise
2. Meditation – Objectives, types, effect on body, mind and soul
3. Yoga – Objectives, Types, Asanas
4. Activities: (i) Moralisation of Desires (ii) Neutralisation of Anger (iii)Eradication of Worries (iv)Benefits of Blessings

UNIT V – HUMAN RIGHTS (6 hrs)

Concept of Human Rights – Indian and International Perspectives - Evolution of Human Rights - Definitions under Indian and International documents - **Broad classification of Human Rights and Relevant Constitutional Provisions -** Right to Life, Liberty and Dignity - Right to Equality

- Right against Exploitation - Cultural and Educational Rights - Economic Rights - Political Rights - Social Rights - **Human Rights of Women and Children -** Social Practice and Constitutional Safeguards - Female Foeticide and Infanticide - Physical assault and harassment - Domestic violence - Conditions of Working Women - **Institutions for Implementation -** Human Rights Commission – Judiciary - Violations and Redressel - Violation by State - Violation by Individuals - Nuclear Weapons and terrorism - Safeguards.

REFERENCES

BOOKS

1. Pitchaikani Prabhaharan, A. Babu Franklin, M.Archana Devi, *Value education*, Sri Kaliswari College (Autonomous), Sivakasi, 2017.
2. Subramanyam, K. *Values in Education*, Ramana Publications, 1995
3. Swamy Chidbhavananda, *Indian National Education*, Publication by Ramakirshna Tapovanam.

Web Sources

1. https://www.youtube.com/watch?v=ruKY3GqBvYQ.
2. https://www.republicworld.com/technology-news/science/15-famous-indian-scientists-list-know-what-were-their-innovations.html.
3. https://www.youtube.com/watch?v=M9_l9DDvEsw.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- V
INTERNSHIP/ INDUSTRIAL TRAINING (23UCHJ52)
(From 2023-2024 Batch onwards)

HOURS/WEEK: -	**INT. MARKS: 25**
CREDITS : 2	**EXT. MARKS: 75**
DURATION : 25 Days	**MAX. MARKS: 100**

Course Objectives

- To learn and develop new skills relevant to the field of study or career interests.
- To understand different departments, roles, and functions within the organization to broaden knowledge and explore potential career paths.
- To apply the knowledge gained in academic studies to real-world scenarios.
- To bridge the gap between classroom learning and professional life.
- To gain exposure to different tasks, projects, and challenges relevant to the chosen field.

Course Outcomes (CO)

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

CO1 [K1]: Identify different career paths within the industry and gain insights into potential future roles.

CO2 [K3]: apply theoretical concepts and academic knowledge to real-world situations and challenges encountered during the internship.

CO3 [K4]: analyse problems, generate innovative solutions, and make informed decisions.

CO4 [K5]: evaluate how to manage time effectively and prioritize tasks to meet deadlines and deliver quality work.

CO5 [K6]: create a portfolio of the work, projects, and achievements during the internship.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	2	-	1	1	1	2
CO2 [K3]	2	3	-	1	-	1	2
CO3 [K4]	2	2	-	2	-	1	1
CO4 [K5]	-	2	1	-	-	1	1
CO5 [K6]	1	3	3	3	-	1	2
Weightage of the course	08	12	04	07	01	05	08
Weighted percentage of Course contribution to POs	**1.47**	**2.67**	**1.44**	**2.4**	**0.68**	**2.72**	**4.04**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

Rules and Regulations

1. Each Student has to undergo 25 days institutional/industry based training during the fourth semester summer vacation.
2. Internships could be undertaken in different media organizations, industries and educational institutions which should be approved by the department.
3. Students should keep a detailed record of activities performed and hours spent in training and report the same to the Faculty Coordinator/Mentor/Guide regularly about the progress of internship on weekly basis
4. At the end of the internship, the student must submit a full-fledged detailed internship report (not exceeding 20 pages) along with attendance certificate
5. The Internship carries 100 marks out of which 25 marks for Internal and 75 Marks for External.
6. The viva voce board shall consist of the Head of the Department and the Internal Examiner (Senior Faculty member)
7. The training programme shall be evaluated as per the following pattern

Internal (25 Marks)	**External (75 Marks)**
Training Review: 15 Marks	Training Report :25 Marks
Daily Log Report: 5 Marks	Viva Voce : 50 Marks
PPT Presentation :5 Marks	

EACH INTERNSHIP REPORT WILL FOLLOW THE FORMAT DESCRIBED:

- Title Page
- College Certificate Page
- Internship Certificate provided by the internship institution
- Declaration Page
- Acknowledgement
- Company Profile
- Organizational structure of the concern
- Weekly work plan
- List of figures, List of Tables
- Index
- Chapters

List of Chapters

1. Introduction
2. Nature of work
3. Role in the organization
4. Questionnaires and Observations about work
5. Operating Environment
6. Detailed Description of Technology used
7. Implementation
8. Conclusion
9. Appendix

Text Format in the report: Times New Roman 12 with 1.5 line Margins 1.5" left and 1" all other

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- VI
CORE COURSE - XIII: ORGANIC CHEMISTRY - II (23UCHC61)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 6 **INT. MARKS: 25**
CREDITS : 4 **EXT. MARKS: 75**
DURATION : 90 hrs **MAX. MARKS: 100**

Course Objectives

- To know the classification, isolation and discussing the properties of alkaloids and terpenes
- To understand the preparation and properties of saccharides
- To gain knowledge about biomolecules
- To ensure the different molecular rearrangement
- To acquire knowledge on preparation and properties of organo metallic compounds

Course Outcomes (CO)

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

CO1[K1]: detail the structure of carbohydrate, alkaloids and the principle of green chemistry

CO2[K2]: explain the structure and configuration of carbohydrates, types of rearrangements, special reagents in organic synthesis and applications of green chemistry.

CO3[K3]: determine the structural elucidation of alkaloids and terpenoids and applications of reagents in organic synthesis and green chemistry.

CO4[K4]: classify carbohydrates, alkaloids and terpenes and other important types of rearrangement compounds.

CO5[K5]: justify the various reagents used in various rearrangement reactions and green synthesis

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	1	1	1	-
CO2[K2]	3	2	2	1	1	1	1
CO3[K3]	3	3	2	1	1	1	1
CO4[K4]	3	3	2	2	-	1	1
CO5[K5]	3	3	2	2	-	-	1
Weightage of the course	15	13	10	07	03	04	04
Weighted percentage of Course contribution to POs	**2.76**	**2.89**	**3.6**	**2.4**	**2.05**	**2.17**	**2.02**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – ALKALOIDS (18 hrs)

Classification, Isolation, General Properties – Hofmann Exhaustive Methylation; Structure Elucidation – Coniine, Piperine, Nicotine. **Terpenes:** Classification, Isoprene Rule, Isolation and StructuralElucidation of Citral, Alpha Terpineol, Menthol, Geraniol and Camphor.

UNIT II – CARBOHYDRATES (18 hrs)

Carbohydrates: Definition and Classification of Carbohydrates with Examples. Relative Configuration of Sugars. Determination of Configuration (Fischer'sProof). Definition of Enantiomers, Diastereomers, Epimers and Anomers with Suitable Examples. **Monosaccharides** – Configuration – D and L Hexoses – Aldohexoses and Ketohexoses. Glucose, Fructose – Occurrence, Preparation, Properties, Reactions, Structural Elucidation, Uses. Interconversions of Sugar Series – Ascending, Descending, Aldose to Ketose And Ketose to Aldose. **Disaccharides** – Sucrose, Lactose, Maltose - Preparation, Properties and Uses (No Structural Elucidation). **Polysaccharides** – Source, Constituents and Biological Importance of Homopolysaccharides- Starch and Cellulose, Heteropolysaccharides – Hyaluronic Acid, Heparin.

UNIT III – Molecular rearrangements: (18 hrs)

Molecular Rearrangement: Type of rearrangements, Mechanism for Benzidine, Favorskii, Clasien, Fries, Hofmann, Curtius, Schmidt and Beckmann, Pinacol-pinacolone rearrangement

UNIT IV – SPECIAL REAGENTS IN ORGANIC SYNTHESIS (18 hrs)

AIBN, 9BBN, BINAP/BINOL, BOC, DABCO, DCC, DIBAL, DMAP,NBS/NCS, NMP, PCC, TBHP, TEMPO **Organometallic compounds in Organic Synthesis**: Preparation, Properties and applications: Grignard Reagents, Organo Lithium Compounds, Ziegler – Natta,Wilkinson, Metal Carbonyl, Zeiss's Salt

UNIT V – GREEN CHEMISTRY (18 hrs)

Green Chemistry: Principles, Chemistry behind Each Principle and Applications in Chemical Synthesis. Green Reaction Media – Green Solvents, Green Reagents and Catalysts; Tools Used like Microwave and Ultra Sound in Chemical synthesis.

TEXTBOOKS

1. Jain M. K, Sharma S. C, *Modern Organic Chemistry*, 4th reprint, Vishal Publishing, 2009.
2. Mukherji S. M and Singh S. P, *Reaction Mechanism in OrganicChemistry*, 3rd Edition, Macmillan India Ltd., 2009
3. Arun Bahl and Bahl B. S, *Advanced organic chemistry*, NewDelhi, S. Chand & Company Pvt. Ltd., Multicolour Edition, 2012.
4. Soni P . L and Chawla H. M, *Text Book of Organic Chemistry*, Sultan Chand & Sons: New Delhi, 29th Edition, 2007.
5. Bandyopadhya C, *An Insight into Green Chemistrym,* 2020

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1. Morrison R. T and Boyd R. N, *Organic Chemistry*, 6th Edition, Pearson Education: Asia, 2012.
2. Graham Solomons T. W, *Organic Chemistry*, 11th Edition, John Wiley & Sons, 2012.
3. Carey Francis A, *Organic Chemistry*, 7th Edition, Tata McGraw-HillEducation Pvt. Ltd., New Delhi, 2009.
4. Finar I. L, *Organic Chemistry, Vol. (1& 2),* 6th Edition, England: WesleyLongman Ltd, 2006.
5. Joule J. A and Smith G. F, *Heterocyclic Chemistry*, 5th Edition, Wiley, 2010.

Web Sources

1. https://www.youtube.com/watch?v=THB1vVT0m_Y&list=PLJyab0VQDBGVVN1SglQtKjnWvVeEDrusM
2. https://www.youtube.com/watch?v=HRFGKLp_HeM
3. https://www.youtube.com/watch?v=HTfNJCXRsdw

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- VI
CORE COURSE - XIV: INORGANIC CHEMISTRY - II (23UCHC62)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 6 **INT. MARKS: 25**
CREDITS : 4 **EXT. MARKS: 75**
DURATION : 90 hrs **MAX. MARKS: 100**

Course Objectives

- To know tracer elements and their role in the biological system.
- To understand iron transport and storage
- To study metallo-enzymes, oxygen transport.
- To realize about silicates and their applications
- To gain knowledge in industrial applications of refractories, alloys, paints and pigments

Course Outcomes (CO)

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

CO1[K1]: explain the importance of tracer elements on biological system, metal ion report, metallo enzymes, silicates and Alloys.

CO2[K2]: explain the Toxicity of metal ions, nitrogen fixation, Bohr effect, Na, K, Ca pump, properties of silicates and plasticizers.

CO3[K3]: identify trace elements, myoglobin, explain the function of VitaminB_{12}, Zn-Cu enzyme, ferredoxin, cluster enzymes, structure of Silicates and nano composite hydrogels.

CO4[K4]: classify and structure of silicates, oils, iron-sulphur proteins, myoglobin and trace elements

CO5[K5]: explain the manufacture of refractories, explosives, paints and pigments, properties of silicates, metallo enzymes, Transferrin and metal toxicity.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	2	2	-	-	1
CO2[K2]	3	2	2	1	-	1	1
CO3[K3]	3	3	2	1	1	1	1
CO4[K4]	3	3	1	1	1	1	1
CO5[K5]	3	3	2	2	1	1	-
Weightage of the course	15	13	09	07	03	04	04
Weighted percentage of Course contribution to POs	**2.76**	**2.89**	**3.24**	**2.4**	**2.05**	**2.17**	**2.02**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – BIOINORGANIC CHEMISTRY (18 hrs)

Essential and Trace Elements – Role of Na^{+}, K^{+}, Mg^{2+}, Ca^{2+}, Fe^{3+}, Cu^{2+} and Zn^{2+} in Biological Systems – Effect of Excess Intake (Toxicity) of Metal Ions – Trace Elements – As, Cd, Pb, Hg.

UNIT II – METAL ION TRANSPORT AND STORAGE (18 hrs)

Iron – Storage, Transport – Transferrin And Ferretin – Iron-Porphyrins – Myoglobin, Haemoglobin – Oxygen Transport – Bohr Effect; Sodium/Potassium Pump – Calcium Pump – Transport And Storage – Copper And Zinc.

UNIT III – METALLO ENZYMES (18 hrs)

Isomerase And Synthetases – Structure of Cyanocobalamin (Vitamin B_{12}) – Nature of Co-C Bond – Metalloenzymes – Functions of Carboxy Peptidase A – Zinc Metalloenzyme – Mechanism and Uses – Zn-Cu Enzyme – Structure And Function – Carbonic Anhydrase – Vitamin B_{12} as Transferase And Isomerase – Iron-Sulphur Proteins – 2Fe-2S – Rubredoxin – 4Fe-2S – Ferridoxin – Iron Sulphur Cluster Enzymes. Invivo and Invitro Nitrogen Fixation – Biological Functions of Nitrogenase and Molybdo Enzymes.

UNIT IV – SILICATES (18 hrs)

Introduction – General Properties of Silicates, Structure – Types of Silicates – Ortho Silicates (Zircon), Pyrosilicates (Thortveitite), Chain Silicates (Pyroxenes) – Ring Silicates (Beryl) – Sheet Silicates (Talc, Mica, Asbestos) – Silicates Having Three Dimensional Structure (Feldspars, Zeolites, Ultramarines)

UNIT V – INDUSTRIAL APPLICATIONS OF INORGANIC COMPOUNDS (18 hrs)

Refractories – Pyrochemical – Explosives – Alloys, Paints And Pigments – Requirements of a Good Paint – Classification – Constituents of Paints – Pigments, Vehicles, Thinners, Driers, Extenders – Anti-Knocking Agents – Anti-Skinning Agents – Plasticizers – Binders – Application – Varnishes – Oils – Spirit – Enamels. Nanocomposite Hydrogels: Synthesis, Characterization and Uses. Industrial Visits and Internship Mandatory.

TEXTBOOKS

1. Puri B. R, Sharma L. R, Kalia K. C, *Principles of Inorganic Chemistry*, 31th Edition., Milestone Publishers & Distributors: Delhi, 2011.
2. Satya Prakash, Tuli G. D, Basu S. K., Madan R. D, *Advanced Inorganic Chemistry*, 18 th Edition, S. Chand & Co: New Delhi, 2009.
3. Lee J. D, *Concise Inorganic Chemistry*, 4th Edition, ELBS William Heinemann: London, 1991.
4. Malik W. V, Tuli G. D, Madan R. D, *Selected Topics in Inorganic Chemistry*, S. Chand and Company Ltd., 2000.
5. De A. K, *Text book of Inorganic Chemistry*, 7th Edition, Wiley East Ltd, 1992

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1. Madan R. D, Sathya Prakash, *Modern Inorganic Chemistry*, 2nd Edition, S. Chand and Company: New Delhi, 2003.
2. Gopalan R, *Inorganic Chemistry for Undergraduates*, Ist Edition, University Press (India) Private Limited: Hyderabad, 2009.
3. Sivasankar B, *Inorganic Chemistry*, Ist Edition, Pearson: Chennai, 2013.
4. Alan G. Sharp, *Inorganic Chemistry*, 3rd Edition, Addition-Wesley: England, 1992.
5. Peter Atkins, Tina Overton, Jonathan Rourke and Mark Weller, *Inorganic Chemistry*, 6th Edition, Oxford University Press, 2014.

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1. https://www.youtube.com/watch?v=g24YrE-FxiM
2. https://www.youtube.com/watch?v=O0WWsStEY9Y
3. https://www.youtube.com/watch?v=Fg6TI8oXdOk

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- VI
CORE COURSE - XV: PHYSICAL CHEMISTRY - II (23UCHC63)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 6 **INT. MARKS: 25**
CREDITS : 4 **EXT. MARKS: 75**
DURATION : 90 hrs **MAX. MARKS: 100**

Course Objectives

- To understand phase diagram of one and two component systems
- To gain knowledge on chemical equilibrium,
- To study the separation techniques for binary liquid mixtures.
- To ensure electrical conductance and transport number.
- To acquire knowledge in galvanic cells, EMF and significance of electro chemical series.

Course Outcomes (CO)

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

CO1[K1]: outline phase diagram, chemical equilibrium, conductance, galvanic cells and applications

CO2[K2]: indicate the concepts in phase diagram, chemical equilibrium and electrochemistry

CO3[K3]: describe separation of binary liquid mixtures, electrical conductance, galvanic cells and applications

CO4[K4]: analyze the phase rule, chemical equilibrium, Nernst distribution law, conductance, galvanic cells and applications

CO5[K5]: interpret two component systems, transport number, theory of conductance, electrochemical series, titrations, calculate cell EMF.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	3	2	1	-	-	1
CO2 [K2]	3	2	2	1	-	1	-
CO3 [K3]	3	2	2	1	1	1	1
CO4 [K4]	3	3	2	2	1	1	-
CO5 [K5]	3	3	2	1	1	1	1
Weightage of the course	15	13	10	06	03	04	03
Weighted percentage of Course contribution to POs	**2.76**	**2.89**	**3.6**	**2.05**	**2.05**	**2.17**	**1.52**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – THE PHASE RULE (18 hrs)

Definition of Terms; Derivation of Phase Rule; Application to One Component Systems – Water and Sulphur – Super Cooling, Sublimation; Two Component Systems – Solid Liquid Equilibria –Simple Eutectic (Lead – Silver and Bismuth - Cadmium), Freezing Mixtures (Potassium Iodide - Water), Compund Formation with- Congurent Melting Points (Magnesium – Zinc and Ferric Chloride – Water System), Peritectic Change (Sodium - Potassium), Solid Solution (Gold – Silver); Copper Sulphate – Water System.

UNIT II – CHEMICAL EQUILIBRIUM (18 hrs)

Law of Mass Action – Thermodynamic Derivation – Relationship Between Kp and Kc – Application to the Homogeneous Equilbria – Dissociation of PCl_5 Gas, N_2O_4 Gas – Equilibrium Constant and Degree of Dissociation – Formation of HI, NH_3 and SO_3 – Heterogeneous Equilibrium – Decomposition of Solid Calcium Carbonate – Lechatlier Principle – Van't Hoff Reaction Isotherm – Temperature Dependence of Equilibrium Constant – Van't Hoff Reaction Isochore – Clayperon Equation- Clausius Clayperon Equation and Its Applications.

UNIT III – BINARY LIQUID MIXTURES (18 hrs)

Ideal Liquid Mixtures – Non Ideal Solutions – Azeotropic Mixtures – Fractional Distillation – Partially Miscible mixtures – Phenol – Water, Triethylamine – Water. Nicotine Water – Effect of Impurities on Critical Solution Temperature; Immiscible Liquids – Steam Distillation; Nernst Distribution Law - Applications.

UNIT IV – ELECTRICAL CONDUCTANCE AND TRANSFERENCE (18 hrs)

Arrhenius Theory of Electrolytic Dissociation – Oswald's Dilution Law, Limitations of Arrhenius Theory; Behavior of Strong Electrolytes – Interionic Effects – Debye Huckel Theory – Onsager Equation (No Derivation), Significance of Onsager Equation, Debye Falkenhagen Effect, Wien Effect. Ionic Mobility – Discharge of Ions on Electrolysis (Hittorf's Theoretical Device), Transport Number – Determination – Hittorf's Method, Moving Boundary Method – Factors Affecting Transport Number – Determination of Ionic Mobility; Kohlrausch's Law – Applications; Molar Ionic Conductance and Viscosity (Walden's Rule); Applications of Conductance Measurements – Determination – of Degree of Dissociation of Weak Electrolyte, Dissociation Constant of Weak Acid and Weak Base, Ionic Product of Water, Solubility and Solubility Product of Sparingly Soluble Salts – Condutometric Titrations – Acid Base Titrations.

UNIT V – GALVANIC CELLS AND APPLICATIONS (18 hrs)

Galvanic Cell, Representation, Reversible and Irreversible Cells, EMF and Its Measurement – Standard Cell; Relationship Between Electrical Energy and Chemical Energy; Sign of EMF and Spontaneity of a Reaction, Thermodynamics and EMF – Calculation of ΔG, ΔH and VS from EMF Data; Reversible Electrodes, Electrode Potential, Standard Electrode Potential, Primary and Secondary Reference Electrodes, Nernst Equation for Electrode Potential and Cell EMF; Types of Electrodes – Metal/Metal Ion, Metal Amalgam/ Metal Ion, Metal, Insoluble Salt/Anion, Gas Electrode, Redox Electrode; Electrochemical Series – Applications of Electrochemical Series. Chemical Cells With and Without Transport. Application of EMF Measurements – Applications of EMF Measurements – Determination of Activity Coefficient of Electrolytes, Transport Number, Valency of Ions, Solubility Product, pH Using Hydrogen Gas Electrode, Quinhydrone Electrode and Glass Electrode, Potentiometric Titrations – Acid Base Titrations, Redox Titrations, Precipitation Titrations, Ionic Product of Water and Degree of Hydrolysis; Redox Indicators – Use of Diphenyamine Indicator in the Titration of Ferrous Iron against Dichromate. Industrial Component – Galvanic Cells – Lead Storage, Ni – Cd, Li and Zn – Air, Al – Air Batteries, Fuel Cells – H_2–O_2 Cell – Efficiency of Fuel Cells. Corrosion – Mechanism, types and Methods of Prevention.

TEXTBOOKS

1. Puri B. R and Sharma L. R, *Principles of Physical Chemistry,* 48th Edition, Shoban Lal Nagin Chand and Co., 2021.
2. Arun Bahl and Bahl B. S and Tuli G. D, *Essential of Physical Chemistry,* 28th Edition, New Delhi: S. Chand & Company, 2019.
3. Peter Atkins, Julio de Paula and James Keeler, *Physical Chemistry,* 11th Edition, Oxford University Press, International 2018.

4. Dogra S. K and Dogra S, *Physical Chemistry through Problems,* 4th Edition, New Age International, 1996.
5. Rajaram J and Kuriacose J. C, *Thermodynamics, Shobam Lal Nagin Chand and Co., 1986.*

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Books

1. Kapoor K. L, *A Textbook of Physical* Chemistry, Macmillam India Ltd, 3rd Edition, 2009.
2. Gilbert W. Castellen, *Physical Chemistry,* Narosa Publishing House, 3rd Edition, 1985*.*
3. Atkins P. W andJulio de Paula, *Physical Chemistry*, Oxford University Press, 7th Edition, 2002.
4. Bajpai D. N, *Advanced Physical Chemistry*, New Delhi, S. Chand & Co. Private Limited, 2001.
6. Puri B. R, Sharma L. R and Pathania M. S. *Principles of Physical Chemistry,* 41th Edition, Shoban Lal Nagin Chand and Co., 2001.

Web Sources

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2. https://swayam.gov.in
3. https://archive.nptel.ac.in/content/storage2/courses/112108150/pdf/PPTs/MTS_07_m.pdf
4. https://www.youtube.com/watch?v=f0udxGcoztE

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- VI
CORE COURSE - XVI: PRACTICAL: PHYSICAL CHEMISTRY – II (23UCHC6P)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS: 25**
CREDITS : 4 **EXT. MARKS: 75**
DURATION : 75 hrs **MAX. MARKS: 100**

Course Objectives

- To understand phase diagram of two component systems
- To learn molecular weight determination
- To develop the skill in electrochemical experiments
- To ensure the distribution law
- To acquire knowledge in preparation of stock solution

Course Outcomes (CO)

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

CO1[K2]: describe the principles and methodology for the practical work

CO2[K3]: apply the principles of phase rule, distribution law and electrochemistry for carrying out the practical work

CO3[K4]: analyze systematically and record the readings in all the experiments

CO4[K5]: evaluate and process the experimentally measured values and compare with graphical data

CO5[K6]: create laboratory skills for safe handling of the equipments and chemicals

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	2	3	1	-	-	1
CO2[K3]	3	2	2	1	1	1	1
CO3[K4]	3	3	2	1	1	1	1
CO4[K5]	3	3	2	2	-	1	1
CO5[K6]	3	3	2	1	1	1	1
Weightage of the course	15	13	11	06	03	04	05
Weighted percentage of Course contribution to POs	**2.76**	**2.89**	**3.96**	**2.05**	**2.05**	**2.17**	**2.53**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

1. Phase Diagram

i. Simple Eutectic – Determination of Eutectic Temperature and Composition of Naphthalene – Diphenyl Amine or Naphthalene – Diphenyl System
ii. Determination of Transition Temperature of a Salt Hydrate.
iii. Determination of Upper Critical Solution Temperature of Phenol – Water System.
iv. Effect of an Electrolyte on Miscibility Temperature of Phenol – Water System.
v. Determination of Concentration of Sodium Chloride Using Phenol – Sodium Chloride System.

2. Distribution Law

i. Determination of Distribution co-efficient of Iodine between Carbon Tetrachloride and Water
ii. Determination of Equilibrium Constant of the Reaction.

$$I_2 + I^- \rightleftharpoons I_3^-$$

iii. Determination of Concentration of the Given Potassium Iodide Solutio Using the Above Equilibrium Constant.

3. Electrochemistry

i. Conductometric Titration of Hydrochloric Acid against Sodium Hydroxide.
ii. Potentiometric Titration of Ferrous Ion against Poassium Dichromate Using Quinhydrone Electrode.

REFERENCES

Books

1. Sindhu P S, *Practicals in Physical Chemistry.* Macmillan India: New Delhi. 2005.
2. Khosla B D Garg and Gulati V C. *A Senior Practical Physical Chemistry.* R. Chand: New Delhi, 2011.

3. Renu Gupta. *Practical Physical Chemistry.* 1st Edition, New Age International: New Delhi. 2017.

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1. https://www.youtube.com/watch?v=HnDYr64FtrQ
2. https://www.youtube.com/watch?v=hFqQzcSCJ38
3. https://www.youtube.com/watch?v=1LoT0J5QsKE

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- VI
ELECTIVE COURSE GENERIC/ DISCIPLINE SPECIFIC - VII: FUNDAMENTALS OF SPECTROSCOPY (23UCHO61)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 75 hrs **MAX. MARKS: 100**

Course Objectives

- To know about electrical and magnetic properties of organic and inorganic compounds
- To identify the basic principles of microwave, UV- Visible, infrared, Raman, NMR and Mass spectrometry
- To understand the instrumentation of microwave, UV-Visible, infrared, Raman, NMR and Mass spectrometry
- To ensure the applications of various spectral technique in structural elucidation
- To improve the skill in solving combined spectral problems

Course Outcomes (CO)

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

CO1[K1]: outline the concept of electrical and magnetic properties of materials, UV, IR, Raman, NMR, PMR, Mass and microwave spectroscopy.

CO2[K2]: illustrate the principles of spectroscopy for the structural elucidation of the molecule.

CO3[K3]: describe the instrumentation of Infrared, UV, IR, Raman, NMR, PMR, Mass and microwave and Raman spectroscopy.

CO4[K4]: discuss the applications of Infrared, UV, IR, Raman, NMR, PMR, Mass and microwave and Raman spectroscopy.

CO5[K5]: interpret to elucidate structure of simple molecules using different Spectroscopy techniques.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	1	1	-	1	1
CO2[K2]	3	2	1	1	-	1	1
CO3[K3]	2	2	1	1	-	1	-
CO4[K4]	2	2	1	2	1	1	1
CO5[K5]	2	2	2	1	1	1	1
Weighage of the course	12	10	06	06	02	05	04
Weighted percentage of Course contribution to POs	**2.21**	**2.22**	**2.16**	**2.05**	**1.37**	**2.72**	**2.02**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – ELECTRICAL AND MAGNETIC PROPERTIES OF MOLECULES (15 hrs)

Dipole Moment – Polar and Non – Polar Molecules – Polarizability of Molecules. Application of dipole moments in the study of Organic of Organic and Inorganic Molecules. Magnetic Permeability, Volume Susceptibility, Mass Susceptibility and Molar Susceptibility; Diamagnetism, Paramagnetism - Determination of Magnetic Susceptibility Using Guoy Balance, Ferromagnetism, Anti- Ferromagnetism. **Microwave spectroscopy**: Rotation spectra – Diatomic Molecules (Rigid Rotator Approximation) Selection Rules – Determination of Bond Length, Effect of Isotopic Substitution – Instrumentation and Applications.

UNIT II – ULTRAVIOLET AND VISIBLE SPECTROSCOPY (15 hrs)

Electronic Spectra of Diatomic Molecules (Born Oppenheimer Approximation) – Vibrational Coarse Structure – Rotational Fine Structure of Electronic Vibration Transitions – Frank Condon Principle – Dissociation in Electronic Transitions – Birge Sponer Method of Evaluation of Dissociation Energy – Pre-Dissociation Transition – $\sigma - \sigma^*$, $\pi - \pi^*$, $n - \sigma^*$, $n - \pi^*$ transitions. Applications of UV – Woodward-Fieser rules as applied to conjugated dienes and α, β-Unsaturated Ketones. Elementary Problems. Colorimetry – Principle and Applications (Estimation of Fe^{3+}).

UNIT III – INFRARED SPECTROSCOPY (15 hrs)

Vibration Spectra – Diatomic Molecules – Harmonic Oscillator and Anharmonic Oscillator; Vibration – Rotation Spectra – Diatomic Molecule as Rigid Rotator and Anharmonic Oscillator (Born Oppenheimer Approximation Oscillator) – Selection Rules, Vibrations of Polyatomic Molecules – Stretching and Bending Vibrations – Applications – Determination of Force Constant, Moment of Inertia and Internuclear Distance – Isotopic Shift – Application of IR Spectra to

simple Organic and Inorganic Molecules(Group Frequencies). Raman Spectroscopy: Rayleigh Scattering and Raman Scattering of Light – Raman Shift – Classical Theory of Raman Effect – Quantum Theory of Raman Effect – Vibrational; Raman Spectrum – Selection Rules – Mutual Exclusion Principle – Instrumentation (Block Diagram) – Application.

UNIT IV – NUCLEAR MAGENTIC RESONANCE SPECTROSCOPY (15 hrs)

PMR – Theory of PMR – Instrumentation – Number of Signals – Chemical Shift – Peak Areas and Proton Counting – Spin – Spin Coupling – Applications. Problems related to Shielding and Deshielding of Protons, Chemical Shifts of Protons in Hydrocarbons, and in Simple Monofunctional Organic Compounds; Spin – Spin Splitting of Neighboring Protons in Vinyl and allyl Systems.

UNIT V – MASS SPETROMETRY (15 hrs)

Principle – Different Kinds of Ionisation – Instrumentation – The Mass Spectrum – Types of Ions – Determination of Molecular Formula- Fragmentation and Structural Elucidation – McLafferty Rearrangement; Retro Diels Alder Reaction – Illustrations with Simple Organic Molecules. Solving Structure Elucidation Problems using Multiple Spectroscopic Data (NMR, MS, IR and UV - Vis).

TEXTBOOKS

1. Gopalan R, Subramaniam P. S and Rengarajan K, *Elements of Analytical Chemistry*. S. Chand: New Delhi, 2003.
2. Usharani S. *Analytical Chemistry*, 1st Edition, Macmillan: India, 2002.
3. BAnwell C. N, Mc Cash E. M, *Fundamentals of Molecular Spectroscopy*, 4th Edition Tata McGraw Hill: New Delhi, 2017.
4. Dash U. N, *Analytical Chemistry Theory and Practice*, Edition, S Chand & Sons, 6th 2005.
5. Sharma B. K, *Spectroscopy,* 22nd Edition, Goel Publishing House, 2011.

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1. Srivastava A. K and Jain P. C *Chemical Analysis an Instrumental Approach*. 3rd Edition, S Chand & Sons: New Delhi, 1997.
2. Robert D. Braun. *Introduction to Instrumental Analysis*. McGraw Hill: New York, 1987.
3. Skoog D A, Crouch S R and Holler F J. *Fundamentals of Analyical Chemistry,* 9th Edition, Harcourt College Publishers: USA, 2013.
4. Madan R. L and Tuli G. D, *Physical Chemistry*, 2nd Edition, S Chand: New Delhi, 2005.

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1. https://www.digimat.in/nptel/courses/video/104108078/L19.html
2. https://www.youtube.com/watch?v=o8zELwp358A

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- VI
ELECTIVE COURSE GENERIC/ DISCIPLINE SPECIFIC - VII: MEDICINAL CHEMISTRY (23UCHO62)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 75 hrs **MAX. MARKS: 100**

Course Objectives

- To know about the classification of drugs
- To identify the nature of drugs
- To understand the application of drugs
- To ensure diagnostic test
- To improve the knowledge in hormones and vitamins

Course Outcomes (CO)

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

CO1 [K1]: identify the different types of drugs, hormones and vitamins

CO2 [K2]: substitute the biological action of drugs in the human body and physiological action of hormones in the human body

CO3 [K3]: report mechanism of drug action, structure and uses of medicines and diagnostic tests

CO4 [K4]: analyse types of drug action, uses of drugs and diagnosis of disease by chemical tests

CO5 [K5]: assess the route of administration, physiological action and biological action of drugs.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	1	1	-	1	1
CO2[K2]	3	2	1	1	-	1	1
CO3[K3]	2	2	1	1	-	1	-
CO4[K4]	2	2	1	2	1	1	1
CO5[K5]	2	2	2	1	1	1	1
Weighage of the course	12	10	06	06	02	05	04
Weighted percentage of Course contribution to POs	**2.21**	**2.22**	**2.16**	**2.05**	**1.37**	**2.72**	**2.02**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – INTRODUCTION TO DRUG (15 hrs)

Drug – Definition - Classification of Drug – Routes of Administration of Drugs – Different Types of Action - Mechanism of Action of Drug – Metabolism of Drugs.

UNIT II – ANALGESICS AND ANTIPYRETICS (15 hrs)

Narcotic Analgesics – Morphine and its Derivatives – Totally Synthetic Analgesics – Pethidine, Methadones**.** Antipyretic Analgesics – Salicylic Acid Derivatives, Indolyl Derivatives, *p*-Aminophenol Derivatives (Medicinal Uses and Structure Only).

UNIT III – CHEMOTHERAPY AND APPLICATION OF FEW DRUGS (15 hrs)

Sulpha Drugs – Sulphadiazine, Prontosil, Prontosil-S – Anti-malarial drug – Quinine, Plasmoquine - Antineoplastic Agents: 5-Fluorouracil, *cis*-platin. Antibiotics: Definition, Penicillin – Tetracycline (Auromycin and Terramycin) – Streptomycin, Chloromyceitin. (Structure not Necessary).

UNIT IV – HORMONES VITAMINS AND ANESTHETICS (15 hrs)

Definition – Classification of Hormones – Physiological Action of Hormone: Testosterone, Progesterone, Thyroxin. Definition – Classification of Vitamins – Biological Role of Vitamins: Vitamin A, B_6, B_{12}, C, D, E, K. Introduction – Therapeutic Use and Structure of Vinyl Ether – Cyclopropane - Chloroform – Halohydrocarbons - Local Anesthetics – Cocaine and its Derivatives. (Structure not Necessary).

UNIT V – CLINICAL CHEMISTRY **(15 hrs)**

Diagnostic Test and Estimation of Sugar, Salt and Cholesterol in Serum, Urine. Detection of Diabetes – Detection of Anaemia – Estimation of Haemoglobin – Detection of Poisons – Antidotes for Poisoning.

TEXTBOOKS

1. Jayashree Ghosh A, *Text Book of Pharmaceutical Chemistry,* 3rd Revised Edition, S. Chand Publishing, 2003.
2. Alagarsamy V, *Text Book of Medicinal Chemistry*, 3rd Edition, CBS Publishers and Distributors Pvt. Ltd., 2019.

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1. Graham L. Partrick, *An Introduction to Medicinal Chemistry II*, 3rd Edition, Oxford University Press, 2005.
2. Nagradi T, *Medicinal Chemistry-A Biochemical Approach*, Oxford University Press, 2004.
3. Taylor J. B, and Kennewell P. D, *Introductory Medicinal Chemistry*, Ellisworth Puplishers, 1985.

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2. https://nptel.ac.in/courses/104/106/104106106/
3. https://www.youtube.com/watch?v=158qBch3fgo
4. https://nptel.ac.in/courses/102/105/102105034/

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- VI
ELECTIVE COURSE GENERIC/ DISCIPLINE SPECIFIC - VII:
GREEN CHEMISTRY (23UCHO63)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 5 **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 75 hrs **MAX. MARKS: 100**

Course Objectives

- To know the principles and concepts of green chemistry
- To identify the basic concepts in sono chemistry
- To understand the microwave technology in green chemistry
- To ensure the green solvents and PTC
- To improve the knowledge in biomass and green technology in sustainable development

Course Outcomes (CO)

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

CO1[K1]: outline the basic principle and methodology involved in the green chemistry

CO2[K2]: explain the ultrasound & microwave assisted and PTC reactions

CO3[K3]: present the concepts of green & sonochemistry, microwave technology and ionic liquids

CO4[K4]: analyse role of green solvents, catalysts and renewable energy involved in the green synthesis

CO5[K5]: predict the synthetic pathway of various organic reactions using greener solvents, catalyst, ionic liquids, biomass and methods

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	1	1	-	1	1
CO2[K2]	3	2	1	1	-	1	1
CO3[K3]	2	2	1	1	-	1	-
CO4[K4]	2	2	1	2	1	1	1
CO5[K5]	2	2	2	1	1	1	1
Weighage of the course	12	10	06	06	02	05	04
Weighted percentage of Course contribution to POs	**2.21**	**2.22**	**2.16**	**2.05**	**1.37**	**2.72**	**2.02**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I - PRINCIPLES AND CONCEPT OF GREEN CHEMISTRY (15 hrs)

Introduction – Concept and Anastas Twelve Principles – Atom Economy Reactions – Rearrangement Reactions-Addition Reactions – Atom Uneconomic-Sublimation – Elimination – Wittig Reactions – Designing a Green Synthesis – Choice of Starting Material – Choice of Reagents– Choice of Catalyst – Choice of Solvents- Green Synthesis of Paracetamol – Nicotinic Acid – Ibuprofen.

UNIT II – SONOCHEMISTRY (15 hrs)

Basic Concepts – Importance of Sonochemistry – Generation of Ultrasound – Magnetostriction Method & Piezoelectric Method – Sonochemical Yield – ltrasound Assisted Reactions – Esterification, Reduction, Coupling Reactions – Strecker Synthesis, Reformatsky Reaction, Substitution Reaction, Cannizzaro Reaction, Barbier Reaction, Oxidation and Saponification.

UNIT III - MICROWAVE INDUCED GREEN TRANSFORMATIONS (15 hrs)

Design for Energy Efficient Transformations – **Microwave Technology in Chemistry:** Microwave Activation – Theory of Microwave Heating – Advantages of Microwave Heating Over Conventional Heating – Specific Effect of MW – Benefits and Limitations of Organic Synthesis under Microwave. **MW Assisted Reactions in Water:** Hydrolysis – Oxidation of Toluene and Alcohol – **MW Assisted Reaction in Organic Solvent:** Esterification – Diels – Alder Reaction – *Ortho*ester Claisen Rearrangement - **Solvent Free Microwave Assisted Reactions:** Deacetylation – Alkylation of Reactive Methylene Group – Synthesis of Anhydride from Dicarboxylic Acid.

UNIT IV - GREEN SOLVENTS AND CATALYSTS FOR SYNTHESIS (15 hrs)

Water as the Universal Solvent - Introduction- Reaction in Aqueous Phase- Peri Cyclic Reactions – Diel's Alder Reaction-Claisen Rearrangement. **Ionic Liquids:** Types, Preparation and Synthetic Applications – Characteristics and Synthetic Applications – Super Critical CO_2 – Polyethylene Glycol – Green Aspects of Catalysis – Use of Phase Transfer Catalysts for Green Synthesis – Mechanism for PTC Reaction – Advantages of PTC over Conventional Synthesis – Synthetic Applications – Darzen Reaction – Williamson's Ether Synthesis – Wittig Reaction – C – Alkylation – N – Alkylation.

UNIT V- RENEWABLE FEEDSTOCK AND SUSTAINABLE DEVELOPMENT (15 hrs)

Introduction – Biomass: Advantages and Disadvantages of Biomass as a Chemical Feedstock – Carbohydrate as a Feedstocks for Chemical Production – Lignin as a Renewable Feedstocks – Energy Conversion – Green Chemistry in Education-Industrial Aspects – Bio-Based Renewable – Green Engineering Education for Sustainability for Developing Countries.

TEXTBOOKS

1. Ahulwalia V. K, *New Trends in Green Chemistry*, Anamaya Publishers, New Delhi, 2nd Edition, 2006.
2. Ahulwalia V. K and Varma R. S, *Green Solvents for Organic Synthesis*, Narosa Publishing House, New Delhi, 2012.
3. Anastas P. T, *Green Chemistry,* Oxford University Press, New Delhi, 2nd Edition, 2006.

REFERENCES

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1. Anastas P. T and Williamson T. C, *Green Chemistry- Frontiers in Benign Chemical Synthesis and Processes,* Oxford University Press, 1998.
2. Mike Lancaster, *Green Chemistry-An Introductory Text*, 2nd Edition, RSC publishing, 2010.

Web Sources

1. https://www.acs.org/content/acs/en/greenchemistry/principles/12-principles-of-green-chemistry.html
2. https://www.youtube.com/watch?v=uLlgbszwlKI

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER- VI
SKILL ENHANCEMENT COURSE - IX: PROFESSIONAL COMPETENCY SKILL: CHEMISTRY FOR COMPETITIVE EXAMINATIONS (23UCHS61)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX. MARKS: 100**

Course Objectives

- To acquire knowledge in fundamentals of organic chemistry
- To gain knowledge in inorganic chemistry
- To know about concepts in physical chemistry
- To gain knowledge problem solving in chemistry
- To be aware of important competitive examination like UPSC, JAM, TNPSC, CUTE.

Course Outcomes (CO)

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

CO1[K1]: describe the basic concepts in organic, inorganic and physical chemistry

CO2[K2]: express the various principles used in organic, inorganic and physical chemistry

CO3[K3]: apply those concepts in the problem solving in organic, inorganic and physical chemistry

CO4[K4]: analyze the various competitive exam question papers

CO5[K5]: evaluate the methodology behind problem solving and critical thinking

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	2	2	2	1	1	1	2
CO2[K2]	2	2	2	1	1	1	1
CO3[K3]	2	2	1	1	1	2	1
CO4[K4]	2	2	1	2	2	1	1
CO5[K5]	2	1	1	1	1	2	2
Weightage of the course	10	10	07	06	06	07	07
Weighted percentage of Course contribution to POs	**1.84**	**2.22**	**2.52**	**2.05**	**4.11**	**3.8**	**3.54**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – PHYSICAL CHEMISTRY (10 hrs)

Atomic and Molecular Structure – Gaseous state – Liquid state – Solid State – Chemical Thermodynamics – Chemical and Phase Equilibria – Electrochemistry – Chemical Kinetics – Adsorption - Spectroscopy

UNIT II – ORGANIC CHEMISTRY (10 hrs)

Basic Concepts in Organic Chemistry and Stereochemistry – Organic Reaction Mechanism and Synthetic Applications – Qualitative Organic Analysis – Natural Product Chemistry – Aromatic and Heterocyclic Chemistry

UNIT III – INORGANIC CHEMISTRY (10 hrs)

Periodic Table – Extraction of Metals – Chemical Bonding and Shapes of Molecules – Main Group elements – Transition Metals – Bioinorganic Chemistry – Instrumental Methods of Analysis – Analytical Chemistry

REFERENCES

Books

1. Atkins P.W, & Paula J, *Physical Chemistry*, 10th Edition, Oxford University Press: New York, 2014.
2. Huheey J. E, *Inorganic Chemistry: Principles of Structure and Reactivity,* 4th Edition, Addison, Wesley Publishing Company: India, 1993.
3. Finar I. L, *Organic Chemistry Vol. (1& 2*), 6th Edition, England: WesleyLongman Ltd., 2006.

Web Source

1. https://www.youtube.com/watch?v=x8zk-YxHP6Y&list=PL8bZZHwl4U15zem4bse_wC3yeugLdd2o5

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
UG Programme
SEMESTER V & VI
PART V – EXTENSION
(From 2023 -2024 Batch Onwards)

HOURS/WEEK: -
CREDIT : 1
DURATION : - **INT. MARKS: 100**

Course Objectives

- To promote community involvement, encourage civic participation, and foster a sense of ownership and responsibility.
- To involve the learners in organizing campaigns, seminars, or public events to educate the public, promote understanding, and advocate for positive change.
- To create platforms for knowledge sharing, partnership development, and collective action.
- To encourage environmental conservation, promote responsible resource management, or foster sustainable livelihoods.
- To raise awareness about social issues, advocate for marginalized groups, or implement programs that promote inclusivity and equal opportunities.

Course Outcomes (CO)

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

CO1[K1]: recognize the importance of community service through training and education

CO2[K2]: interpret ecological concerns, consumer rights, gender issues & legal protection

CO3[K3]: develop team spirit, verbal/nonverbal communication and organizational ethics by participating in community service

CO4[K4]: examine the necessity of professional skills & community-oriented services for a holistic development

CO5[K6]: create awareness on human rights, legal rights, First Aid, Physical fitness and wellbeing

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	-	-	2	2	1	1
CO2 [K2]	2	1	-	2	1	1	1
CO3 [K3]	2	-	-	1	2	2	1
CO4 [K4]	1	1	1	1	2	2	1
CO5 [K6]	1	-	-	1	2	2	1
Weightage of the course	08	02	01	07	09	08	05
Weighted percentage of Course contribution to Pos	**1.47**	**0.44**	**0.36**	**2.4**	**6.16**	**4.35**	**2.72**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

Details of the Courses

1 National Cadet Corps (NCC) – 190 hrs
2 National Service Scheme (NSS) – 240 hrs
3 Physical Education
4 Red Ribbon Club (RRC)
5 Youth Red Cross (YRC)
6 Fine Arts Club
7 Library and Information Service Club
8 Yoga Club
9 ECO Club
10 Consumer Club
11 Human Rights Club
12 Women Empowerment Cell
13 Legal Awareness League

Courses Offered to Other Departments

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Biotechnology
SEMESTER- I
ELECTIVE COURSE GENERIC / DISCIPILINE SPECIFIC – I: BIOLOGICAL CHEMISTRY (23UBTA11)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4(L-3, T-1) **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- To know the basics of atomic orbitals, chemical bonds and hybridization
- To inculcate the concepts of thermodynamics and its applications
- To get an idea about the concepts of nuclear chemistry
- To ensure the importance of chemical industries
- To improve qualitative and analytical methods

Course Outcomes (CO)

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

CO1[K1]: describe the chemical bonding in organic compounds, acids, bases, amino acids, carbohydrates and lipids.

CO2[K2]: explain the concepts hybridization, acids and bases, carbohydrates, lipids and proteins.

CO3[K3]: find out the various reactions in organic compounds, buffer action, metabolism of biomolecules.

CO4[K4]: classify the organic compounds, organic reaction, acids, bases and biomolecules.

CO5[K5]: determine the shapes of orbitals, concentration of solutions and importance of biomolecules.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	1	-	-	1	-
CO2[K2]	3	2	1	1	-	-	-
CO3[K3]	3	2	1	1	1	1	1
CO4[K4]	3	2	1	1	-	-	1
CO5[K5]	3	2	1	1	1	1	-
Weightage of the course	15	10	05	04	02	03	02
Weighted percentage of Course contribution to POs	**2.59**	**2.01**	**1.24**	**1.2**	**0.71**	**1.05**	**0.74**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – CHEMICAL BONDING AND ORGANIC REACTIONS (12 hrs)

Atomic Theory, Formation of Molecules, Electronic Configuration of Atoms **–** S & P Shapes of Atomic Orbitals. Periodic Table, Periodic Classification, Valency. Types of Chemical Bonds. Classification of Organic Compounds. Hybridization in Methane, Ethane, Acetylene, and Benzene. Definition with Examples- Electrophiles, Nucleophiles and Free Radicals. Types of Reactions with an Example: Addition, Substitution, Elimination, Condensation and Polymerization. Electrophilic Substitution Reaction in Benzene, Nitration and Sulphonation.

UNIT II – ACIDS AND BASES (12 hrs)

Acids & Bases Properties and Differences, Concepts of Acids and Bases- Arrhenius, Lowry-Bronsted and Lewis. Concentration of Solution, Ways of Expressing Concentrations of Solutions – Percent by Weight, Normality, Molarity, Molality, Mole Fraction. pH of Solution, pH Scale, Measurement of pH. Buffer Solutions, Properties of Buffers, Henderson – Hasselbalch Equation, Mechanism of Buffer Action of Acidic Buffer and Basic Buffer.

UNIT III – BIOCHEMISTRY (12 hrs)

Importance to Biochemistry-The Chemical Foundation of Life. Water: Its Unique Properties, Ionization of Water, Buffering Action in Biological System, Properties and Characteristics of Water. Classification of Carbohydrates. Properties of Carbohydrates. Ring Structure of Sugars and Conformations of Sugars. Metabolism of Carbohydrates – Glycogenesis, Glycogenolysis, Cori's Cycle, Glycolysis, TCA Cycle, Bioenergetics of Carbohydrate Metabolism.

UNIT IV – LIPIDS **(12 hrs)**

Classification of Lipids. Characteristics, Properties and Biological Importance of Lipids. Metabolism of Fatty Acids, Triglycerides, Phospholipids, Cholesterol. B-Oxidation of Fatty Acids. Classification of Nucleic Acids. Purine and Pyrimidine Bases. Classification of DNA & RNA. Metabolism of Nucleic Acids, Salvage Pathway.

UNIT V – AMINOACIDS AND PROTEINS **(12 hrs)**

Classification and Structure of Amino Acids. Structural Conformation of Proteins. Classification of Proteins. Properties and Biological Importance of Amino Acids and Proteins. Degradation of Amino Acids and Urea Cycle. Vitamins and Hormones. Role of Hormones in Metabolism. ATP Production. Oxidative Phosphorylation, Electron Transport Chain and Photophosphorylation

TEXTBOOKS

1. Soni P. L, *A Textbook of Inorganic Chemistry*, 11th Edition, S. Chand and Sons Publications.
2. Abhilasha Shourie, Shilpa S, Chapadgoankar & Anamika Singh, *Textbook of Biochemistry,* 1st Edition, 2020.
3. Jain J. L, *Fundamentals of Biochemistry,* 7th Edition, S. Chand Publication.
4. Deb A. C, *Fundamentals of Biochemistry,* 7th Edition, New Central Book Agencies,

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Books

1. Lehninger, *Principles of Biochemistry,* 4th Edition, WH Freeman and Company NY, 2013.
2. Murray, *Harper's Biochemistry,* 26th Edition, Appleton and Lange Publishers: Florida USA.
3. Geoffrey L. Zubay, William W. Parson, Dennis E. Vance, *Principles of Biochemistry,* 3rd Edition, W. C. Brown Publishers, 1995.
4. Bahl B. S, Arul Bhal, *Advanced Organic Chemistry*, 23th Edition, S. Chand and company: New Delhi, 2012.

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1. https://archive.nptel.ac.in/courses/104/105/102105034/
2. https://www.digimat.in/nptel/courses/video/104101084/L33.html

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Biotechnology
SEMESTER- I
ELECTIVE COURSE GENERIC / DISCIPILINE SPECIFIC – I: PRACTICAL: BIOLOGICAL CHEMISTRY (23UBTA1P)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 3	**INT. MARKS: 25**
CREDITS : 2	**EXT. MARKS: 75**
DURATION : 45 hrs	**MAX. MARKS: 100**

Course Objectives

- To know the safety in chemistry lab
- To get an idea to handle the glassware
- To gain knowledge in the identification of organic functional groups
- To acquire knowledge for elemental determination
- To understand and differentiate organic compounds with functional groups

Course Outcomes (CO)

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

CO1 [K2]: recognize the analytical procedure to identify the given organic compounds

CO2 [K3]: determine the saturation/unsaturation nature of given organic compounds

CO3 [K4]: inspect the aliphatic/aromatic and nature of given organic compounds

CO4 [K5]: predict elements (other than C, H and O) present in the given compound

CO5 [K6]: perform systematic analysis and report the functional groups present in the given organic compound.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	2	1	-	-	-	1
CO2[K3]	3	2	1	1	-	1	-
CO3[K4]	3	2	1	-	-	1	-
CO4[K5]	3	2	1	1	1	1	1
CO5[K6]	3	2	1	-	1	1	1
Weightage of the course	15	10	05	02	02	04	03
Weighted percentage of Course contribution to POs	**2.59**	**2.01**	**1.24**	**0.6**	**0.71**	**1.4**	**1.02**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

ANALYSIS OF ORGANIC COMPOUNDS

1. Aromatic Mono and Bi carboxylic acids
2. Aromatic Phenol
3. Aromatic Ester
4. Aromatic Amines
5. Aromatic Aldehydes
6. Aromatic Ketones
7. Aliphatic Diamide, Diamide Containing Sulphur
8. Aliphatic Carbohydrate

REFERENCE

Book

1. Furniss B. S., Hannford A. J., Smith P. W. G., Tatchell A. R., *Vogel's Textbook of Practical Organic Chemistry,* Longman Scientific and Technical, England.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Physics
SEMESTER- III
ELECTIVE COURSE GENERIC / DISCIPILINE SPECIFIC – III: CHEMISTY FOR PHYSICAL SCIENCES – I (23UPHA31)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- To know the basics of atomic orbitals, chemical bonds and hybridization
- To inculcate the concepts of thermodynamics and its applications
- To get an idea about the concepts of nuclear chemistry
- To ensure the importance of chemical industries
- To improve qualitative and analytical methods

Course Outcomes (CO)

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

CO1[K1]: describe the principles chemical bonding, nuclear chemistry, thermodynamics and hybridization of organic compounds.

CO2[K2]: explain the concepts involved in Fuels, analytical chemistry, thermodynamics and phase equilibria

CO3[K3]: Find out the use of isotopes, fertilizers and reaction mechanism

CO4[K4]: analyze the MO theory, silicones, heterocycles and therodynamics

CO5[K5]: evaluate the application of chromatography, radioisotopes and phase rule

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	1	-	-	1	-
CO2[K2]	3	2	1	1	-	-	-
CO3[K3]	3	2	1	1	1	1	1
CO4[K4]	3	2	1	1	-	-	1
CO5[K5]	3	2	1	1	1	1	1
Weightage of the course	15	10	05	04	02	03	03
Weighted percentage of Course contribution to POs	**2.64**	**2.55**	**2.34**	**1.61**	**1.96**	**1.48**	**1.69**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – CHEMICAL BONDING AND NUCLEAR CHEMISTRY (12 hrs)

Chemical Bonding: Molecular Orbital Theory **–** Bonding, Antibonding and Non-Bonding Orbitals. Molecular Orbital Diagrams for Hydrogen, Helium, Nitrogen; Discussion of Bond Order and Magnetic Properties. **Nuclear Chemistry:** Fundamental Particles **–** Isotopes, Isobars, Isotones and Isomers **–** Differences between Chemical Reactions and Nuclear Reactions **–** Group Displacement Law. Nuclear Binding Energy **–** Mass Defect **–** Calculations. Nuclear Fission and Nuclear Fusion **–** Differences – Stellar Energy. Applications of Radioisotopes **–** Carbon Dating, Rock Dating and Medicinal Applications.

UNIT II – INDUSTRIAL CHEMISTRY (12 hrs)

Fuels: Fuel Gases: Natural Gas, Water Gas, Semi Water Gas, Carbureted Water Gas, Producer Gas, CNG, LPG And Oil Gas (Manufacturing Details Not Required). Silicones: Synthesis, Properties and Uses of Silicones. Fertilizers: Urea, Ammonium Sulphate, Potassium Nitrate, NPK Fertilizer, Superphosphate, Triple Superphosphate.

UNIT III – FUNDAMENTALS CONCEPTS IN ORGANIC CHEMISTRY (12 hrs)

Hybridization: Orbital Overlap, Hybridization and Geometry of CH_4, C_2H_4, C_2H_2 and C_6H_6. Electronic Effects: Inductive Effect and Consequences on K_a and K_b of Organic Acids and Bases, Electromeric, Mesomeric, Hyper Conjugation and Steric – Examples. Reaction Mechanisms: Types of Reactions–Aromaticity (Huckel's Rule) – Aromatic Electrophilic Substitution; Nitration, Halogenation, Friedel – Craft's Alkylation and Acylation. Heterocyclic Compounds: Preparation, Properties of Pyrrole and Pyridine.

UNIT IV – THERMODYNAMICS AND PHASE EQUILIBRIA (12 hrs)

Thermodynamics: Types of Systems, Reversible and Irreversible Processes, Isothermal and Adiabatic Processes and Spontaneous Processes. Statements of First Law and Second Law of Thermodynamics. Carnot's Cycle and Efficiency of Heat Engine. Entropy and Its Significance. Free Energy Change and Its Importance (No Derivation). Conditions for Spontaneity In Terms Of Entropy and Gibbs Free Energy. Relationship between Gibbs free Energy and Entropy. **Phase Equilibria:** Phase Rule – Definition of Terms in It. Applications of Phase Rule to Water System. Two Component System - Reduced Phase Rule And Its Application To A Simple Eutectic System (Pb-Ag).

UNIT V – ANALYTICAL CHEMISTRY (12 hrs)

Introduction to Qualitative and Quantitative Analysis. Principles of Volumetric Analysis. Separation and Purification Techniques – Extraction, Distillation and Crystallization. Chromatography: Principle and Application of Column, Paper and Thin Layer Chromatography

TEXTBOOKS

1. Veeraiyan V, *Textbook of Ancillary Chemistry,* 1st Edition, High Mount Publishing House: Chennai, 2009.
2. Vaithiyanathan S, *Textbook of Ancillary Chemistry*, Priya Publications: Karur, 2006.
3. Bahl B. S, Arul Bhal, *Advanced Organic Chemistry*, 23rd Edition, S. Chand and company: New Delhi, 2012.
4. Soni P. L and Chawla H. M. *Textbook of Organic Chemistry*, New Delhi: Sultan Chand & Sons, 29th Edition, 2007.

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Books

1. Soni P. L and Mohan Katyal, *Textbook of Inorganic Chemistry*, 20th Edition, Sultan Chand & amp; Sons, 2007.
2. Puri B R, Sharma L. R, Pathania M.S, *Textbook of Physical Chemistry,* 44th Edition, Vishal Publishing Co: New Delhi, 2018.
3. Sharma B K. *Industrial Chemistry*. 16th Edition, Goel Publishing House: Meerut, 2014.

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1. https://www.youtube.com/watch?v=daPAcFFSFdY&list=PLF_7kfnwLFCGzzyaPRyNjSXRRR7W_qmny
2. https://www.youtube.com/watch?v=q5CZUnsWkYQ&list=PLF_7kfnwLFCFijVGjd7zrjtWrxi4-4xeY
3. https://youtu.be/DGYwnbboTtI

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc Physics / B.Sc Botany
SEMESTER III
ELECTIVE COURSE GENERIC / DISCIPILINE SPECIFIC – III: PRACTICAL: CHEMISTY PRACTICAL FOR PHYSICAL SCIENCES – I (23UPHA3P)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX. MARKS: 100**

Course Objectives

- To know the safety in chemistry lab
- To get an idea to handle the glassware
- To understand the basic principle of volumetric analysis
- To acquire knowledge to prepare solutions
- To have hands on experience in the volumetric analysis

Course Outcomes (CO)

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

CO1[K2]: estimate oxalic acid by acidimetric and permanganometric method
CO2[K3]: choose suitable indicator for carrying out volumetric estimation
CO3[K4]: apply acidimetric and alkalimetric method for the quantitative volumetric estimation of acids and bases
CO4[K5]: measure quantitatively the amount of inorganic compound accurately with the help of color change of the indicator
CO5[K6]: plan various volumetric procedures for the estimation of any inorganic compounds

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	2	1	-	-	-	1
CO2[K3]	3	2	1	1	-	1	1
CO3[K4]	3	2	1	-	-	1	-
CO4[K5]	3	2	2	1	1	1	1
CO5[K6]	3	2	2	-	1	1	1
Weightage of the course	15	10	07	02	02	04	04
Weighted percentage of Course contribution to POs	**2.64**	**2.55**	**3.27**	**0.81**	**1.96**	**1.97**	**2.25**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

VOLUMETRIC ANALYSIS

1. Estimation of Sodium Hydroxide using Standard Sodium Carbonate.
2. Estimation of Hydrochloric Acid using Standard Oxalic Acid.
3. Estimation of Ferrous Sulphate using Standard Mohr's Salt.
4. Estimation of Oxalic Acid using Standard Ferrous Sulphate.
5. Estimation of Potassium Permanganate using Standard Sodium Hydroxide.
6. Estimation of Magnesium using EDTA.
7. Estimation of Ferrous Ion using Diphenyl Amine as Indicator.

TEXTBOOK

1. Venkateswaran V, Veerasamy R, Kulandaivalu A. R, *Basic Principles of Practical Chemistry*, 2nd Edition, Sultan Chand & Sons, 1997.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Physics
SEMESTER - IV
ELECTIVE COURSE GENERIC / DISCIPILINE SPECIFIC – IV: CHEMISTY FOR PHYSICAL SCIENCES – II (23UPHA41)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4	**INT. MARKS : 25**
CREDITS : 3	**EXT. MARKS : 75**
DURATION : 60 hrs	**MAX. MARKS: 100**

Course Objectives

- To know the basics of coordination chemistry and water technology
- To get knowledge on carbohydrates and amino acids
- To ensure the basics and applications of electrochemistry
- To acquire knowledge in the basics and applications of kinetics and catalysis
- To understand various photochemical reactions

Course Outcomes (CO)

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

CO1[K1]: describe the principles coordination chemistry, carbohydrates, catalysis, photochemistry and electrochemistry

CO2[K2]: explain the concepts in water technology, amino acids and kinetics

CO3[K3]: apply the Werner's theory, energy of activation and photochemical laws

CO4[K4]: analyze structure of carbohydrate, biomolecules, water components and quantum yield

CO5[K5]: discuss the various cells, order of reactions and aminoacids

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	2	1	-	-	1	-
CO2 [K2]	3	2	1	1	-	-	-
CO3 [K3]	3	2	1	1	1	1	1
CO4 [K4]	3	2	1	1	-	-	1
CO5 [K5]	3	2	1	1	1	1	3
Weightage of the course	15	10	05	04	02	03	03
Weighted percentage of Course contribution to POs	**2.64**	**2.55**	**2.34**	**1.61**	**1.96**	**1.48**	**1.69**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – CO-ORDINATION CHEMISTRY AND WATER TECHNOLOGY (12 hrs)

Co-Ordination Chemistry: Definition Of Terms – IUPAC Nomenclature – Werner's Theory – EAN Rule – Pauling's Theory – Postulates – Applications to $[Ni(CO)_4]$, $[Ni(CN)_4]^{2-}$,$[Co(CN)_6]^{3-}$ – Chelation – Biological Role of Haemoglobin And Chlorophyll (Elementary Idea) – Applications in Qualitative and Quantitative Analysis. Water Technology: Hardness of Water, Determination of Hardness of Water using EDTA Method, Zeolite Method – Purification Techniques – BOD, COD.

UNIT II – CARBOHYDRATES AND AMINO ACIDS (12 hrs)

Carbohydrates: Classification, Preparation and Properties of Glucose, Fructose and Sucrose. Discussion of Open Chain Ring Structures of Glucose and Fructose. Glucose – Fructose Interconversion. Properties of Starch and Cellulose. **Amino Acids:** Classification - Preparation and Properties of Alanine, Preparation Of Dipeptides Using Bergmann Method. RNA and DNA (Elementary Idea Only).

UNIT III – ELECTROCHEMISTRY (12 hrs)

Galvanic Cells – Standard Hydrogen Electrode – Calomel Electrode – Standard Electrode Potentials – Electrochemical Series. Strong And Weak Electrolytes – Ionic Product of Water – pH, pK_a, pK_b – Conductometric Titrations – pH Determination by Colorimetric Method – Buffer Solutions and its Biological Applications – Electroplating – Nickel and Chrome Plating – Types of Cells – Fuel Cells – Corrosion and its Prevention.

UNIT IV – KINETICS AND CATALYSIS (12 hrs)

Order and Molecularity. Integrated Rate Expression for I and II (2A → Products) Order Reactions. Pseudo First Order Reaction, Methods of Determining

Order of a Reaction – Half-Life Period – Catalysis – Homogeneous and Heterogeneous, Catalyst used in Contact and Haber's Processes. Concept of Energy of Activation and Arrhenius equation.

UNIT V – PHOTOCHEMISTRY (12 hrs)

Grothus – Draper's Law and Stark-Einstein's Law of Photochemical Equivalence, Quantum Yield – Hydrogen Chloride reaction. Phosphorescence, Fluorescence, Chemiluminescence and Photosensitization and Photosynthesis (Definition with Examples).

TEXTBOOKS

1. Veeraiyan V. *Textbook of Ancillary Chemistry*. High Mount Publishing House, Chennai, 1st Edition, 2009.
2. Vaithiyanathan S. *Textbook of Ancillary Chemistry*. Priya Publications, Karur, 2006.
3. Bahl B S, Arul Bhal, *Advanced Organic Chemistry*, 23rd Edition, S. Chand and company, New Delhi, 2012.
4. Soni P. L and Chawla H M. *Textbook of Organic Chemistry*, New Delhi: Sultan Chand & Sons, 29th Edition, 2007.

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1. Soni P. L and Mohan Katyal, Textbook of Inorganic *Chemistry,* Sultan Chand & amp; Sons, 20th Edition. 2007.
2. Puri B. R, Sharma L. R, Pathania M.S, *Textbook of Physical Chemistry,* Vishal Publishing Co: New Delhi, 44th Edition, 2018.
3. Sharma B. K, *Industrial Chemistry*, 16th Edition, Goel Publishing House: Meerut, 2014.

Web Sources

1. https://www.youtube.com/watch?v=m5cDbtdokqY
2. https://www.youtube.com/watch?v=j7PYqR1iGMg&list=PLF_7kfnwLFCF_VxKKAhHSLryCsJr3GW71
3. https://www.youtube.com/watch?v=zDok_HKM-aA&list=PLYXnZUqtB3K__uubnuRpEzgoLdZP3LhpY

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc Physics / B.Sc Botany
SEMESTER IV
ELECTIVE COURSE GENERIC / DISCIPILINE SPECIFIC – IV: PRACTICAL: CHEMISTY PRACTICAL FOR PHYSICAL SCIENCES – II (23UPHA4P)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX. MARKS: 100**

Course Objectives

- To know the safety in chemistry lab
- To get an idea to handle the glassware
- To gain knowledge in the identification of organic functional groups
- To acquire knowledge for elemental determination
- To understand and differentiate organic compounds with functional groups

Course Outcomes (CO)

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

CO1[K2]: recognize the analytical procedure to identify the given organic compounds

CO2[K3]: determine the saturation/unsaturation nature of given organic compounds

CO3[K4]: inspect the aliphatic/aromatic and nature of given organic compounds

CO4[K5]: predict elements (other than C, H and O) present in the given compound

CO5[K6]: perform systematic analysis and report the functional groups present in the given organic compound.

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	2	1	-	-	-	1
CO2[K3]	3	2	1	1	-	1	1
CO3[K4]	3	2	1	-	1	1	-
CO4[K5]	3	2	2	1	-	1	1
CO5[K6]	3	2	2	-	1	1	1
Weightage of the course	53	10	07	02	02	04	04
Weighted percentage of Course contribution to POs	**2.64**	**2.55**	**3.27**	**0.81**	**1.96**	**1.97**	**2.25**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

SYSTEMATIC ANALYSIS OF ORGANIC COMPOUNDS

i. The Analysis must be Carried out as Follows:
ii. Functional Group Tests [Phenol, Acids (Mono & Di) Aromatic Primary Amine, Amide (Mono & Di), Aldehyde and Glucose].
iii. Detection of Elements (N, S, Halogens).
iv. To Distinguish between Aliphatic and Aromatic Compounds.
v. To Distinguish – Saturated and Unsaturated Compounds

TEXTBOOK

1. Venkateswaran V, Veerasamy R, Kulandaivalu A. R, *Basic Principles of Practical Chemistry*, 2nd Edition, Sultan Chand & Sons, 1997.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc Botany
SEMESTER- III
ELECTIVE COURSE GENERIC / DISCIPILINE SPECIFIC – III: CHEMISTY FOR BIOLOGICAL SCIENCES – I (23UBYA31)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4 **INT. MARKS: 25**
CREDITS : 3 **EXT. MARKS: 75**
DURATION : 60 hrs **MAX. MARKS: 100**

Course Objectives

- To know the basics of atomic orbitals, chemical bonds, hybridization and fundamentals of organic chemistry
- To get knowledge on nuclear and industrial chemistry
- To ensure the importance of specialty drugs
- To acquire knowledge in the separation and purification techniques
- To understand reaction mechanism

Course Outcomes (CO)

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

CO1[K1]: describe the principles chemical bonding, nuclear chemistry, thermodynamics and hybridization of organic compounds.
CO2[K2]: explain the concepts involved in Fuels, drugs and analytical chemistry
CO3[K3]: Find out the use of isotopes, fertilizers and reaction mechanism
CO4[K4]: analyze the MO theory, silicones, heterocyclic and Anesthetics
CO5[K5]: evaluate the application of chromatography, radioisotopes and drugs

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K1]	3	2	1	-	-	1	-
CO2[K2]	3	2	1	1	-	-	-
CO3[K3]	3	2	1	1	1	1	1
CO4[K4]	3	2	1	1	-	-	1
CO5[K5]	3	2	1	1	1	1	-
Weightage of the course	15	10	05	04	02	03	02
Weighted percentage of Course contribution to POs	**2.35**	**1.99**	**1.25**	**0.91**	**0.68**	**1.05**	**0.65**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – CHEMICAL BONDING AND NUCLEAR CHEMISTRY (12 hrs)

Chemical Bonding: Molecular Orbital Theory – Bonding, Antibonding and Non-Bonding Orbitals. M. O Diagrams for Hydrogen, Helium, Nitrogen; Discussion of Bond Order and Magnetic Properties. **Nuclear Chemistry:** Fundamental Particles – Isotopes, Isobars, Isotones and Isomers – Differences between Chemical Reactions and Nuclear Reactions – Group Displacement Law. Nuclear Binding Energy – Mass Defect – Calculations. Nuclear Fission and Nuclear Fusion – Differences – Stellar Energy. Applications of Radioisotopes – Carbon Dating, Rock Dating and Medicinal Applications.

UNIT II – INDUSTRIAL CHEMISTRY (12 hrs)

Fuels: Fuel Gases: Natural Gas, Water Gas, Semi Water Gas, Carbureted Water Gas, Producer Gas, CNG, LPG And Oil Gas (Manufacturing Details Not Required). **Silicones:** Synthesis, Properties and Uses of Silicones. **Fertilizers:** Urea, Ammonium Sulphate, Potassium Nitrate NPK Fertilizer, Superphosphate, Triple Superphosphate.

UNIT III – FUNDAMENTALS CONCEPTS IN ORGANIC CHEMISTRY (12 hrs)

Hybridization: Orbital Overlap, Hybridization and Geometry of CH_4, C_2H_4, C_2H_2 and C_6H_6. Polar Effects: Inductive Effect and Consequences on K_a and K_b of Organic Acids and Bases, Electromeric, Mesomeric, Hyper Conjugation and Steric – Examples and Explanations. **Reaction Mechanisms:** Types of Reactions – Aromaticity – Aromatic Electrophilic Substitution; Nitration, Halogenation, Friedel – Craft's Alkylation and Acylation. Heterocyclic Compounds: Preparation, Properties of Pyrrole and Pyridine.

UNIT IV – DRUGS AND SPECIALITY CHEMICALS (12 hrs)

Definition, Structure and uses: Antibiotics viz.,Penicillin, Chloramphenicol And Streptomycin; Anaesthetics viz., Chloroform And Ether; Antipyretics viz., Aspirin, Paracetamol And Ibuprofen; Artificial Sweeteners viz., Saccharin, Aspartame And Cyclamate; Organic Halogen Compounds Viz., Freon, Teflon.

UNIT V – ANALYTICAL CHEMISTRY (12 hrs)

Introduction to Qualitative and Quantitative Analysis. Principles of Volumetric Analysis. Separation and Purification Techniques – Extraction, Distillation and Crystallization. Chromatography: Principle and Application of Column, Paper and Thin Layer Chromatography

TEXTBOOKS

1. Veeraiyan V, *Textbook of Ancillary Chemistry*, 1st Edition, High Mount Publishing House: Chennai, 2009

2. Vaithiyanathan S, *Textbook of Ancillary Chemistry*, Priya Publications: Karur, 2006.
3. Bahl B. S, Arul Bhal, *Advanced Organic Chemistry*, 23rd Edition, S. Chand and company: New Delhi, 2012.
4. Soni P. L and Chawla H M. *Textbook of Organic Chemistry*, 29th Edition, New Delhi: Sultan Chand & Sons, 2007.

REFERENCES

Books

1. Soni P. L and Mohan Katyal, Textbook of Inorganic Chemistry, 20th Edition, Sultan Chand & amp; Sons, 2007.
2. Puri B. R, Sharma L. R, Pathania M. S, *Textbook of Physical Chemistry,* 44th Edition, Vishal Publishing Co: New Delhi, 2018.
3. Sharma B. K. *Industrial Chemistry*. 16th Edition, Goel Publishing House: Meerut, 2014.

Web Sources

1. https://www.youtube.com/watch?v=daPAcFFSFdY&list=PLF_7kfnwLFCGzzyaPRyNjSXRRR7W_qmny
2. https://www.youtube.com/watch?v=q5CZUnsWkYQ&list=PLF_7kfnwLFCFijVGjd7zrjtWrxi4-4xeY
3. https://youtu.be/DGYwnbboTtI

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc Physics / B.Sc Botany
SEMESTER III
ELECTIVE COURSE GENERIC / DISCIPILINE SPECIFIC – III: PRACTICAL: CHEMISTY PRACTICAL FOR BIOLOGICAL SCIENCES – I (23UBYA3P)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX. MARKS: 100**

Course Objectives

- To know the safety in chemistry lab
- To get an idea to handle the glassware
- To understand the basic principle of volumetric analysis
- To acquire knowledge to prepare solutions
- To have hands on experience in the volumetric analysis

Course Outcomes (CO)

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

CO1[K2]: estimate oxalic acid by acidimetric and permanganometric method
CO2[K3]: choose suitable indicator for carrying out volumetric estimation
CO3[K4]: apply acidimetric and alkalimetric method for the quantitative volumetric estimation of acids and bases
CO4[K5]: measure quantitatively the amount of inorganic compound accurately with the help of color change of the indicator
CO5[K6]: plan various volumetric procedures for the estimation of any inorganic compounds

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1[K2]	3	2	1	-	-	-	1
CO2[K3]	3	2	1	1	-	1	-
CO3[K4]	3	2	1	-	-	1	-
CO4[K5]	3	2	1	1	1	1	1
CO5[K6]	3	2	1	-	1	1	1
Weightage of the course	15	10	05	02	02	04	03
Weighted percentage of Course contribution to POs	**2.35**	**1.99**	**1.25**	**0.46**	**0.68**	**1.39**	**0.97**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

VOLUMETRIC ANALYSIS

1. Estimation of Sodium Hydroxide using Standard Sodium Carbonate.
2. Estimation of Hydrochloric Acid using Standard Oxalic Acid.
3. Estimation of Ferrous Sulphate using Standard Mohr's Salt.
4. Estimation of Oxalic Acid using Standard Ferrous Sulphate.
5. Estimation of Potassium Permanganate using Standard Sodium Hydroxide.
6. Estimation of Magnesium using EDTA.
7. Estimation of Ferrous Ion using Diphenyl Amine as Indicator.

TEXTBOOK

1. Venkateswaran V, Veerasamy R, Kulandaivalu A. R, *Basic Principles of Practical Chemistry*, 2nd Edition, Sultan Chand & Sons, 1997.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc Botany
SEMESTER- IV
ELECTIVE COURSE GENERIC / DISCIPILINE SPECIFIC – IV: CHEMISTY FOR BIOLOGICAL SCIENCES – I (23UBYA41)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 4	**INT. MARKS: 25**
CREDITS : 3	**EXT. MARKS: 75**
DURATION : 60 hrs	**MAX. MARKS: 100**

Course Objectives

- To know the basics of coordination chemistry and water technology
- To get knowledge on carbohydrates
- To ensure the basics and applications of electrochemistry
- To acquire knowledge in the basics and applications of amino acids
- To understand various photochemical reactions

Course Outcomes (CO)

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

CO1[K1]: describe the principles coordination chemistry, carbohydrates, catalysis, photochemistry and electrochemistry

CO2[K2]: explain the concepts in water technology, amino acids and elements in biosystem

CO3[K3]: apply the Werner's theory, color reaction of amino acids and photochemical laws

CO4[K4]: analyze structure of carbohydrate, biomolecules, water components and quantum yield

CO5[K5]: discuss the various cells, order of reactions and amino acids

CO-PO Mapping table (Course Articulation Matrix)

PO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	2	1	-	-	1	-
CO2 [K2]	3	2	1	1	-	-	-
CO3 [K3]	3	2	1	1	1	1	1
CO4 [K4]	3	2	1	1	-	-	1
CO5 [K5]	3	2	1	1	1	1	-
Weightage of the course	15	10	05	04	02	03	02
Weighted percentage of Course contribution to POs	**2.35**	**1.99**	**1.25**	**0.91**	**0.68**	**1.05**	**0.65**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

UNIT I – CO-ORDINATION CHEMISTRY AND WATER TECHNOLOGY (12 hrs)

Co-ordination Chemistry: Definition of Terms – IUPAC Nomenclature – Werner's Theory – EAN rule – Pauling's Theory – Postulates – Applications to $[Ni(CO)_4]$, $[Ni(CN)_4]^{2-}$,$[Co(CN)_6]^{3-}$ – Chelation – Biological Role of Haemoglobin and Chlorophyll (elementary idea) – Applications in Qualitative and Quantitative Analysis. Water Technology: Hardness of Water, Determination of Hardness of Water using EDTA Method, Zeolite Method – Purification Techniques – BOD, COD.

UNIT II – CARBOHYDRATES (12 hrs)

Classification, Preparation and Properties of Glucose and Fructose. Discussion of Open Chain Ring Structures of Glucose and Fructose. Glucose – Fructose Interconversion. Preparation and Properties of Starch and Cellulose.

UNIT III – AMINO ACIDS AND ESSENTIAL ELEMENTS OF BIOSYSTEM (12 hrs)

Classification – Preparation and Properties of Alanine, Preparation of Dipeptides using Bergmann Method – Proteins – Classification – Structure – Colour Reactions – Biological functions – Nucleosides – Nucleotides – RNA and DNA – Structure. Essentials of Trace Metals in Biological System-Na, Cu, K, Zn, Fe, Mg.

UNIT IV – ELECTROCHEMISTRY (12 hrs)

Galvanic Cells – Standard Hydrogen Electrode – Calomel Electrode – Standard Electrode Potentials – Electrochemical Series. Strong and Weak Electrolytes – Ionic Product of Water – pH, pKa, pKb. Conductometric titrations – pH Determination by Colorimetric Method – Buffer Solutions and its Biological

Applications – Electroplating – Nickel and Chrome Plating – Types of Cells – Fuel Cells – Corrosion and its Prevention.

UNIT V – PHOTOCHEMISTRY (12 hrs)

Grothus – Draper's Law and Stark-Einstein's Law of Photochemical equivalence, Quantum yield – Hydrogen chloride reaction. Phosphorescence, Fluorescence, Chemiluminescence and Photosensitization and Photosynthesis (Definition with Examples).

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1. Veeraiyan V, *Textbook of Ancillary Chemistry*, 1st Edition, High Mount Publishing House: Chennai, 2009
2. Vaithiyanathan S, *Textbook of Ancillary Chemistry*, Priya Publications: Karur, 2006.
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2. Puri B. R, Sharma L. R, Pathania M. S, *Textbook of Physical Chemistry,* 44th Edition, Vishal Publishing Co: New Delhi, 2018.
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3. https://www.youtube.com/watch?v=zDok_HKM-aA&list=PLYXnZUqtB3K__uubnuRpEzgoLdZP3LhpY

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc Physics / B.Sc Botany
SEMESTER IV
ELECTIVE COURSE GENERIC / DECIPINE SPECIFIC – IV: PRACTICAL: CHEMISTY PRACTICAL FOR BIOLOGICAL SCIENCES – II (23UBYA4P)
(From 2023-2024 Batch onwards)

HOURS/WEEK: 2 **INT. MARKS: 25**
CREDITS : 2 **EXT. MARKS: 75**
DURATION : 30 hrs **MAX. MARKS: 100**

Course Objectives

- To know the safety in chemistry lab
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- To gain knowledge in the identification of organic functional groups
- To acquire knowledge for elemental determination
- To understand and differentiate organic compounds with functional groups

Course Outcomes (CO)

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

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CO2[K3]: determine the saturation/unsaturation nature of given organic compounds

CO3[K4]: inspect the aliphatic/aromatic and nature of given organic compounds

CO4[K5]: predict elements (other than C, H and O) present in the given compound

CO5[K6]: perform systematic analysis and report the functional groups present in the given organic compound.

CO-PO Mapping table (Course Articulation Matrix)

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CO2[K3]	3	2	1	2	-	1	1
CO3[K4]	3	3	2	2	-	1	1
CO4[K5]	2	3	3	1	-	2	2
CO5[K6]	2	2	3	1	-	2	2
Weightage of the course	13	13	10	07	-	07	07
Weighted percentage of Course contribution to POs	**2.35**	**2.58**	**2.51**	**1.6**	**0**	**2.44**	**2.26**

Based on the Level of Contribution ('3' -High, '2' -Medium, '1' -Low, '-' No Correlation)

SYSTEMATIC ANALYSIS OF ORGANIC COMPOUNDS

vi. The Analysis must be Carried out as Follows:
vii. Functional Group Tests [Phenol, Acids (Mono & Di) Aromatic Primary Amine, Amide (Mono & Di), Aldehyde and Glucose].
viii. Detection of Elements (N, S, Halogens).
ix. To Distinguish between Aliphatic and Aromatic Compounds.
x. To Distinguish – Saturated and Unsaturated Compounds

TEXTBOOK

1. Venkateswaran V, Veerasamy R, Kulandaivalu A. R, *Basic Principles of Practical Chemistry*, 2nd Edition, Sultan Chand & Sons, 1997.