

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 2021-2022 Batch onwards)

Department of Chemistry

UG Programme

Approved in the Academic Council - XIII held on 11/08/2021

Curriculum Design and Development Cell
Annexure L

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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	Mrs. L. T. Parvathi Head & Assistant Professor, Department of Chemistry Sri Kaliswari College (Autonomous), Sivakasi.
2.	University Nominee	Dr. R. Mayil Murugan Assistant Professor, Department of Physical Chemistry, Madurai Kamaraj University, Madurai.
3.	Academic Expert 1	Dr. T. Esakki Durai Principal Incharge, Associate Professor, Department of Chemistry, Devanga Arts College (Autonomous), Aruppukottai.
4.	Academic Expert 2	Dr. S. Arunachalam Associate Professor, Department of Chemistry, Kalasalingam Academy of Research and Education (Deemed to be University), Anand Nagar, Krishnankoil.
5.	Industrialist	Mr. R. Kumar Sujitha Chemicals, Mettur Dam, Salem.
6.	Alumnus	Dr. S. Arunachalam Associate Professor, Department of Chemistry, Kalasalingam Academy of Research and Education (Deemed to be University), Anand Nagar, Krishnankoil.
Members		
7.	Mr. S. Alagappan	Guest Faculty in Chemistry
8.	Mrs. M. Murugalakshmi	Assistant Professor of Chemistry
9.	Mrs. C. Thangapriya	Assistant Professor of Chemistry
10.	Mrs. M. Sankareswari	Assistant Professor of Chemistry
11.	Mrs. R. Vijayalekshmi	Assistant Professor of Chemistry
12.	Mr. M. Nazeer	Assistant Professor of Chemistry
13.	Dr. J. Sherin	Assistant Professor of Chemistry
14.	Dr. S. Sangilipandi	Assistant Professor of Chemistry

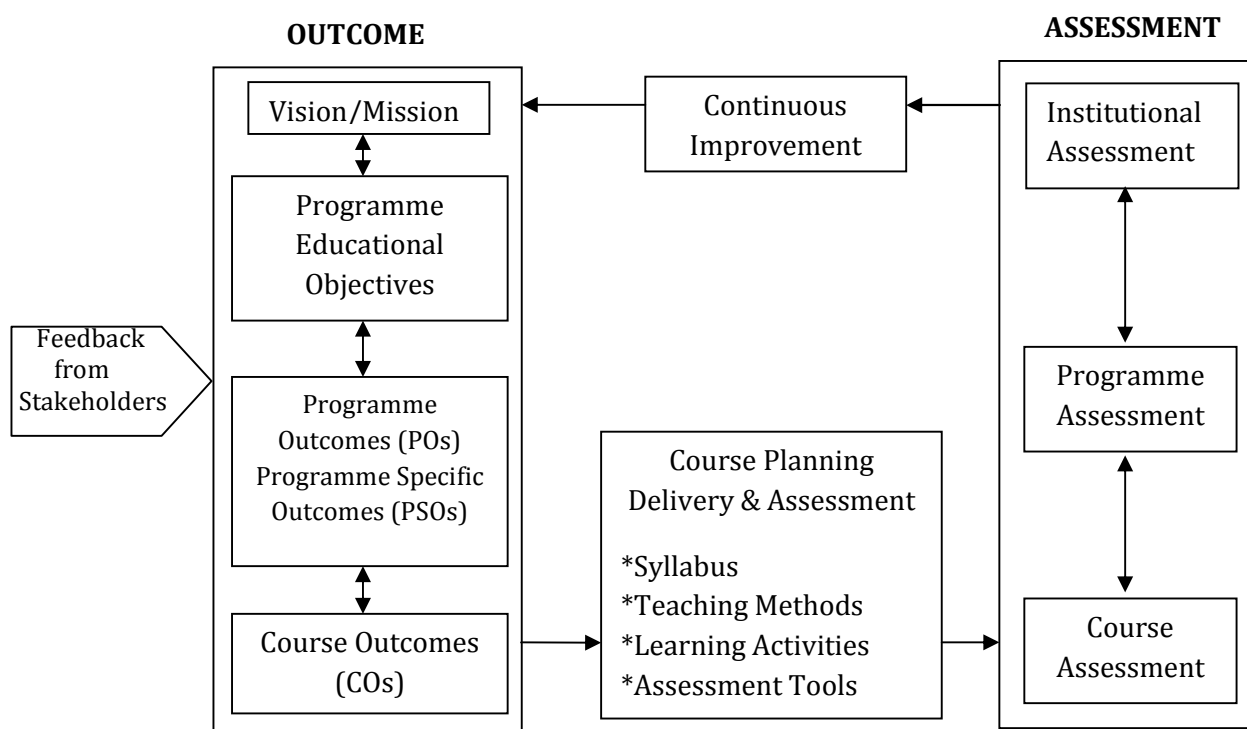
SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
(Affiliated to Madurai Kamaraj University, Re-accredited with A Grade (CGPA 3.11) by NAAC)
DEPARTMENT OF CHEMISTRY
UG Programme - B.Sc. Chemistry
GUIDELINES FOR OUTCOME-BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM
(From 2021-2022 Batch onwards)

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.

P05: 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.

P06: 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.

P07: 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

PSO \ PO	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
P01	✓						
P02		✓					
P03			✓				
P04				✓			
P05					✓		
P06						✓	
P07							✓

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

PEO \ PO	PEO1	PEO2	PEO3	PEO4	PEO5
P01	✓	✓			✓
P02		✓	✓		
P03		✓	✓		✓
P04	✓	✓		✓	
P05		✓	✓	✓	✓
P06		✓	✓	✓	
P07				✓	✓

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
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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 2021 - 2024 may be permitted to write their examinations in this pattern up to April 2029.

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

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

For all Theory Courses : Internal Marks: 40; External Marks: 60

For all Practical Courses, Project and Internship: Internal Marks: 50; External Marks: 50

Internal Mark Distribution for Theory Courses

Assessment Type	Marks	Scheme of Assessment
Internal Test	15 marks	Two Internal Tests and 1 Model Exam will be conducted and average of the best two will be considered
Written Assignment	5 marks	One Written Assignment will be given
E-Assignment/ Case Studies/ Reviews/ Field Assignments/ Poster Presentations/ Portfolios	5 marks	Any one of the Assignments will be given
Quiz	5 marks	One Quiz Test will be conducted
Viva/ Oral Exam/ Group Discussion/ Role Play	10 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	40 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	40 marks	End result of the Practical
Viva -Voce	10 marks	Oral Mode Test

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

Internal Test – 30 Marks – 1 hr Duration

S. No.	Type of Questions	Marks
1.	Objectives type Questions: Multiple Choice – 4 questions Answer in a Word/Sentence – 4 questions	04 04
2.	Short Answer – 3 questions – either or type	3x4=12
3.	Long Answer – 1 question – either or type	1x10=10

Summative Examinations – 60 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	5x4=20
3.	Long Answer 3 questions – either or type	3x10=30

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,

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

$$\text{Percentage attainment of each Course outcome for Internal Assessment tools} = \text{Average of percentage attainment of all Internal Assessment tools}$$

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

$$\text{Percentage Attainment of Course outcome for Internal Assessment tools} = \text{Average of percentage attainment of all COs}$$

$$\text{Percentage Attainment of Course outcome for Summative Examinations} = \text{Average of percentage attainment of all COs}$$

Final Direct Assessment of Course outcome Attainment

For Theory Courses

$$\text{Percentage Attainment of Course outcome through Direct Assessment} = (0.6 \times \text{percentage attainment of CO for internal assessment tool}) + (0.4 \times \text{percentage attainment of CO for summative examinations})$$

For Practical Courses

$$\text{Percentage Attainment of Course outcome through Direct Assessment} = 0.7 \times \text{percentage attainment of CO for Internal Assessment tools} + 0.3 \times \text{percentage attainment of CO for Summative Examinations}$$

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

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

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

Final Assessment of CO attainment

$$\text{Average Course attainment} = 0.7 \times \text{Direct assessment of CO attainment} + 0.3 \times \text{Indirect assessment of CO attainment}$$

Expected Level of Attainment for each of the Course Outcomes

CO	Level of Attainment
Above 70%	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.

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

Expected Level of Attainment for each of the Programme Outcomes

PO	Level of Attainment
Above 70%	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

PEO	Level of Attainment
Above 70 %	Excellent
60 - 70 %	Very good
50 - 60 %	Good
40 - 50 %	Satisfactory
Below 40 %	Not Satisfactory

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
B.Sc., DEGREE PROGRAMME IN CHEMISTRY
CURRICULUM STRUCTURE
OUTCOME BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM
(For those who have joined in June 2021 and later)

S. No	Subject	Sem I	Sem II	Sem III	Sem IV	Sem V	Sem VI	Credits
I	Tamil / Hindi / French	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 (3)	4 (4) 4P (3)	4 (4) 4P (3)	4 (3) 4P (3)	5 (5) 5 (5) 5P (4) 5P (4)	5 (5) 5 (5) 5 (5) 5P (4) 4P (3)	67
	Allied Courses	6 (5)	6 (5)	4 (4) 2P (1)	4 (3) 2P (1)	-	-	20
	Major Elective Courses	-	-	-	-	4 (3) 4 (3)	4 (3)	9
	Self-paced Learning (Swayam Course)	-	-	-	(2)	-	-	2
IV	Ability Enhancement Compulsory Course AECC 1.Environmental Studies	2 (1)	-	-	-	-	-	1
	2. Value Education	-	1 (1)	-	-	-	-	1
	Non-Major Elective Courses	-	-	2 (1)	2 (1)	-	-	2
	Skill Enhancement Courses	2 (1)	2 (2)	2 (2)	2 (2)	2 (2)	2 (2)	11
	Internship					(1)		1
	Disaster Management		1 (1)					1
V	Extension	-	-	-	(1)	-	-	1
Total Hours /Credits (Per week)		30 (20)	30 (22)	30 (21)	30 (23)	30 (27)	30 (27)	140 180

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DEPARTMENT OF CHEMISTRY
UG Programme - B.Sc. Chemistry
CURRICULUM PATTERN
OUTCOME-BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM
(From 2021-2022 Batch onwards)
PROGRAMME CODE - UCH

Semester	Part	Course Code	Course Name	Hours	Credits
I	I	21UTAL11	Tamil/Hindi/French - I	6	3
	II	21UENL11	Communicative English - I	6	3
	III	21UCHC11	Core Course - I: General Chemistry - I	4	4
		21UCHC1P	Core Course - II: Practical: Organic and Inorganic Chemistry	4	3
		21UCHA11	Allied Course - I: Mathematics - I	6	5
	IV	21UESR11	Ability Enhancement Compulsory Course - I: Environmental Studies	2	1
		21UCHS11	Skill Enhancement Course - I: Science Communication and Popularization	2	1
Total				30	20
II	I	21UTAL21	Tamil/Hindi/French - II	6	3
	II	21UENL21	Communicative English - II	6	3
	III	21UCHC21	Core Course - III: General Chemistry - II	4	4
		21UCHC2P	Core Course - IV: Practical: Organic and Physical Chemistry	4	3
		21UCHA21	Allied Course - II: Mathematics - II	6	5
	IV	21UVED21	Ability Enhancement Compulsory Course - II: Value Education	1	1
		21UCHS21	Skill Enhancement Course - II: Biofertilizers	2	2
		21UDMG21	Disaster Management	1	1
Total				30	22
III	I	21UTAL31	Tamil/Hindi/French - III	6	3
	II	21UENL31	Communicative English - III	6	3
	III	21UCHC31	Core Course - V: General Chemistry - III	4	4
		21UCHC3P	Core Course - VI: Practical: Analytical Chemistry	4	3
		21UCHA31	Allied Course - III: Physics - I	4	4
	IV	21UCHA3P	Allied Course - III: Practical : Physics - I	2	1
		21UCHN31	Non-Major Elective Course - I: Chemistry in day-to-day life	2	1
21UCHS31	Skill Enhancement Course - III: Computer Application in Chemistry	2	2		
Total				30	21
IV	I	21UTAL41	Tamil/Hindi/French - IV	6	3
	II	21UENL41	Communicative English - IV	6	3
	III	21UCHC41	Core Course - VII: General Chemistry - IV	4	3

		21UCHC4P	Core Course - VIII: Practical: Inorganic Semi-micro Qualitative Analysis	4	3	
		21UCHA41	Allied Course - IV: Physics – II	4	4	
		21UCHA4P	Allied Course - IV: Practical : Physics – II	2	1	
		21UCHSM41 21UCHSM42	Self-Paced Learning (Swayam Course) 1. Introductory Organic Chemistry 2. Quantitative Methods in Chemistry		2	
	IV	21UCHN41	Non-Major Elective Course - II: Industrial Chemistry	2	1	
		21UCHS41	Skill Enhancement Course - IV: Fermentation Science and Technology	2	2	
	V		Extension		1	
Total				30	23	
V	III	21UCHC51	Core Course - IX: Organic Chemistry – I	5	5	
		21UCHC52	Core Course - X: Inorganic Chemistry – I	5	5	
		21UCHC5P	Core Course - XI: Practical: Physical Chemistry - I	5	4	
		21UCHC5Q	Core Course - XII: Practical: Organic Analysis and Estimation	5	4	
		21UCHO51 21UCHO52 21UCHO53	Major Elective Course - I: 1. Electrochemistry 2. Photochemistry 3. Geochemistry	4	3	
	21UCHO54 21UCHO55 21UCHO56	Major Elective Course - II: 1. Biochemistry 2. Environmental Chemistry 3. Nanochemistry	4	3		
	IV	21UCHS51	Skill Enhancement Course - V: Personality Development	2	2	
	V	21UCHJ51	Internship	-	1	
	Total				30	27
	VI	III	21UCHC61	Core Course - XIII: Organic Chemistry – II	5	5
21UCHC62			Core Course - XIV: Inorganic Chemistry – II	5	5	
21UCHC63			Core Course - XV: Physical Chemistry	5	5	
21UCHC6P			Core Course - XVI: Practical: Physical Chemistry – II	5	4	
21UCHC6Q			Core Course - XVII: Practical: Gravimetry and Complex Preparation	4	3	
21UCHO61 21UCHO62 21UCHO63		Major Elective Course - III: 1. Organometallic Chemistry and Biological role of metals 2. Analytical Chemistry 3. Medicinal Chemistry	4	3		
IV		21UCHS61	Skill Enhancement Course - VI: Analytical Clinical Biochemistry	2	2	
Total				30	27	

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DEPARTMENT OF CHEMISTRY
UG Programme - B.Sc. Chemistry
OUTCOME-BASED EDUCATION WITH CHOICE BASED CREDIT SYSTEM
(From 2021-2022 Batch onwards)

PROGRAMME ARTICULATION MATRIX (PAM)

Semester	Course Code	Course Name	P01	P02	P03	P04	P05	P06	P07
I	21UTAL11	Tamil/Hindi/French - I	10	7	2	8	2	2	2
	21UENL11	Communicative English - I	10	7	2	8	2	2	3
	21UCHC11	Core Course - I: General Chemistry - I	15	11	5	5	3	4	3
	21UCHC1P	Core Course - II: Practical: Organic and Inorganic Chemistry	15	12	5	6	3	4	3
	21UCHA11	Allied Course - I: Mathematics - I	15	10	4	4	1	5	2
	21UESR11	Ability Enhancement Compulsory Course - I: Environmental Studies	8	5	1	7	8	5	5
	21UCHS11	Skill Enhancement Course - I: Science Communication and Popularization	12	10	6	3	3	3	2
II	21UTAL21	Tamil/Hindi/French - II	10	8	2	8	2	2	2
	21UENL21	Communicative English - II	10	8	2	8	2	2	3
	21UCHC21	Core Course - III: General Chemistry - II	15	12	5	6	3	4	3
	21UCHC2P	Core Course - IV: Practical: Organic and Physical Chemistry	15	12	6	6	3	5	3
	21UCHA21	Allied Course - II: Mathematics - II	15	10	4	4	1	5	2
	21UVED21	Ability Enhancement Compulsory Course - II: Value Education	8	5	1	5	9	4	7
	21UCHS21	Skill Enhancement Course - II: Biofertilizers	14	10	4	4	1	4	2
	21UDMG21	Disaster Management	7	8	2	5	2	4	8
III	21UTAL31	Tamil/Hindi/French - III	10	8	2	8	2	2	2
	21UENL31	Communicative English - III	10	8	3	9	3	3	2
	21UCHC31	Core Course - V: General Chemistry - III	15	11	6	6	3	4	3
	21UCHC3P	Core Course - VI: Practical: Analytical Chemistry	15	12	6	6	3	4	3

	21UCHA31	Allied Course -III: Physics – I	13	11	5	6	1	5	3
	21UCHA3P	Allied Course - III: Practical : Physics– I	10	11	5	4	3	6	3
	21UCHN31	Non-Major Elective Course - I: Chemistry in day to day life	9	5	0	8	0	5	5
	21UCHS31	Skill Enhancement Course - III: Computer Application in Chemistry	14	11	4	4	1	4	2
IV	21UTAL41	Tamil / Hindi – IV	10	8	2	9	2	2	2
	21UENL41	Communicative English – IV	10	9	3	8	2	3	3
	21UCHC41	Core Course - VII: General Chemistry – IV	15	12	5	7	3	4	3
	21UCHC4P	Core Course - VIII: Practical: Inorganic Semi-micro Qualitative Analysis	15	12	6	7	3	4	3
	21UCHA41	Allied Course - IV: Physics – II	13	11	5	6	1	5	3
	21UCHA4P	Allied Course - IV: Practical : Physics – II	10	11	5	4	3	6	3
	21UCHSM41	Self-Paced Learning (Swayam Course) 1. Introductory Organic Chemistry - I	15	11	5	7	2	2	3
	21UCHSM42	2. Quantitative Methods in Chemistry							
	21UCHN41	Non-Major Elective Course - II: Industrial Chemistry	9	5	0	8	0	5	5
	21UCHS41	Skill Enhancement Course - IV: Fermentation Science and Technology	15	11	5	4	2	2	1
		Extension	8	2	1	7	9	8	5
V	21UCHC51	Core Course - IX: Organic Chemistry – I	15	13	5	7	3	4	3
	21UCHC52	Core Course - X: Inorganic Chemistry – I	15	13	5	6	3	4	3
	21UCHC5P	Core Course - XI: Practical: Physical Chemistry – I	15	12	6	6	3	4	3
	21UCHC5Q	Core Course - XII: Practical: Organic Analysis and Estimation	15	13	6	6	3	4	3
	21UCHO51	Major Elective Course - I: 1. Electrochemistry	15	12	6	6	3	4	3
	21UCHO52	2. Photochemistry							
	21UCHO53	3. Geochemistry							
	21UCHO54	Major Elective Course - II: 1. Biochemistry	15	13	5	6	3	4	4
21UCHO55	2. Environmental Chemistry								
21UCHO56	3. Nano Chemistry								
21UCHS51	Skill Enhancement Course - V: Personality Development	14	10	5	2	3	3	3	
	21UCHJ51	Internship	8	12	4	7	1	5	8

VI	21UCHC61	Core Course - XIII: Organic Chemistry – II	15	12	6	7	3	4	3
	21UCHC62	Core Course - XIV: Inorganic Chemistry – II	15	13	6	6	3	4	3
	21UCHC63	Core Course - XV: Physical Chemistry	15	12	7	6	3	4	3
	21UCHC6P	Core Course - XVI: Practical: Physical Chemistry – II	15	12	6	7	3	4	3
	21UCHC6Q	Core Course - XVII: Practical: Gravimetry and Complex Preparation	15	13	7	6	3	4	2
	21UCHO61	Major Elective Course - III: 1. Organometallic Chemistry and Biological role of metals	15	14	6	6	2	4	3
	21UCHO62	2. Analytical Chemistry							
	21UCHO63	3. Medicinal Chemistry							
21UCHS61	Skill Enhancement Course - VI: Analytical Clinical Biochemistry	13	9	5	4	3	4	2	
Total Weightage of all Courses Contributing to PO			610	487	204	293	130	189	153

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 2021-2022 Batch onwards)

PROGRAMME ARTICULATION MATRIX – WEIGHTED PERCENTAGE

Semester	Course Code	Course Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7
I	21UTAL11	Tamil/Hindi/French – I	1.64	1.44	0.98	2.73	1.54	1.06	1.31
	21UENL11	Communicative English – I	1.64	1.44	0.98	2.73	1.54	1.06	1.96
	21UCHC11	Core Course - I: General Chemistry – I	2.46	2.26	2.45	1.71	2.31	2.12	1.96
	21UCHC1P	Core Course - II: Practical: Organic and Inorganic Chemistry	2.46	2.46	2.45	2.05	2.31	2.12	1.96
	21UCHA11	Allied Course - I: Mathematics – I	2.46	2.05	1.96	1.37	0.77	2.65	1.31
	21UESR11	Ability Enhancement Compulsory Course - I: Environmental Studies	1.31	1.03	0.49	2.39	6.15	2.65	3.27
	21UCHS11	Skill Enhancement Course - I: Science Communication and Popularization	1.97	2.05	2.94	1.02	2.31	1.59	1.31
II	21UTAL21	Tamil/Hindi/French – II	1.64	1.64	0.98	2.73	1.54	1.06	1.31
	21UENL21	Communicative English – II	1.64	1.64	0.98	2.73	1.54	1.06	1.96
	21UCHC21	Core Course - III: General Chemistry – II	2.46	2.46	2.45	2.05	2.31	2.12	1.96
	21UCHC2P	Core Course - IV: Practical: Organic and Physical Chemistry	2.46	2.46	2.94	2.05	2.31	2.65	1.96
	21UCHA21	Allied Course - II: Mathematics – II	2.46	2.05	1.96	1.37	0.77	2.65	1.31
	21UVED21	Ability Enhancement Compulsory Course - II: Value Education	1.31	1.03	0.49	1.71	6.92	2.12	4.58
	21UCHS21	Skill Enhancement Course - II: Biofertilizers	2.3	2.05	1.96	1.37	0.77	2.12	1.31
21UDMG21	Disaster Management	1.15	1.64	0.98	1.71	1.54	2.12	5.23	
III	21UTAL31	Tamil/Hindi/French – III	1.64	1.64	0.98	2.73	1.54	1.06	1.31
	21UENL31	Communicative English – III	1.64	1.64	1.47	3.07	2.31	1.59	1.31
	21UCHC31	Core Course - V: General Chemistry – III	2.46	2.26	2.94	2.05	2.31	2.12	1.96
	21UCHC3P	Core Course - VI: Practical: Analytical Chemistry	2.46	2.46	2.94	2.05	2.31	2.12	1.96

	21UCHA31	Allied Course - III: Physics – I	2.13	2.26	2.45	2.05	0.77	2.65	1.96
	21UCHA3P	Allied Course - III: Practical : Physics – I	1.64	2.26	2.45	1.37	2.31	3.17	1.96
	21UCHN31	Non-Major Elective Course - I: Chemistry in day-to-day life	1.48	1.03	0	2.73	0	2.65	3.27
	21UCHS31	Skill Enhancement Course - III: Computer Application in Chemistry	2.3	2.26	1.96	1.37	0.77	2.12	1.31
IV	21UTAL41	Tamil / Hindi – IV	1.64	1.64	0.98	3.07	1.54	1.06	1.31
	21UENL41	Communicative English – IV	1.64	1.85	1.47	2.73	1.54	1.59	1.96
	21UCHC41	Core Course - VII: General Chemistry – IV	2.46	2.46	2.45	2.39	2.31	2.12	1.96
	21UCHC4P	Core Course - VIII: Practical: Inorganic Semi-micro Qualitative Analysis	2.46	2.46	2.94	2.39	2.31	2.12	1.96
	21UCHA41	Allied Course - IV: Physics – II	2.13	2.26	2.45	2.05	0.77	2.65	1.96
	21UCHA4P	Allied Course - IV: Practical: Physics – II	1.64	2.26	2.45	1.37	2.31	3.17	1.96
	21UCHSM41	Self-Paced Learning (Swayam Course) 1. Introductory Organic Chemistry - I	2.46	2.26	2.45	2.39	1.54	1.06	1.96
	21UCHSM42	2. Quantitative Methods in Chemistry							
	21UCHN41	Non-Major Elective Course - II: Industrial Chemistry	1.48	1.03	0	2.73	0	2.65	3.27
	21UCHS41	Skill Enhancement Course - IV: Fermentation Science and Technology	2.46	2.26	2.45	1.37	1.54	1.06	0.65
		Extension	1.31	0.41	0.49	2.39	6.92	4.23	3.27
V	21UCHC51	Core Course - IX: Organic Chemistry – I	2.46	2.67	2.45	2.39	2.31	2.12	1.96
	21UCHC52	Core Course - X: Inorganic Chemistry – I	2.46	2.67	2.45	2.05	2.31	2.12	1.96
	21UCHC5P	Core Course - XI: Practical: Physical Chemistry – I	2.46	2.46	2.94	2.05	2.31	2.12	1.96
	21UCHC5Q	Core Course - XII: Practical: Organic Analysis and Estimation	2.46	2.67	2.94	2.05	2.31	2.12	1.96
	21UCHO51	Major Elective Course - I: 1. Electrochemistry	2.46	2.46	2.94	2.05	2.31	2.12	1.96
	21UCHO52	2. Photochemistry							
	21UCHO53	3. Geochemistry							
	21UCHO54	Major Elective Course - II: 1. Biochemistry	2.46	2.67	2.45	2.05	2.31	2.12	2.61
21UCHO55	2. Environmental Chemistry								
21UCHO56	3. Nano Chemistry								
21UCHS51	Skill Enhancement Course - V: Personality Development	2.3	2.05	2.45	0.68	2.31	1.59	1.96	
	21UCHJ51	Internship	1.31	2.46	1.96	2.39	0.77	2.65	5.23

VI	21UCHC61	Core Course - XIII: Organic Chemistry – II	2.46	2.46	2.94	2.39	2.31	2.12	1.96
	21UCHC62	Core Course - XIV: Inorganic Chemistry – II	2.46	2.67	2.94	2.05	2.31	2.12	1.96
	21UCHC63	Core Course - XV: Physical Chemistry	2.46	2.46	3.43	2.05	2.31	2.12	1.96
	21UCHC6P	Core Course - XVI: Practical: Physical Chemistry – II	2.46	2.46	2.94	2.39	2.31	2.12	1.96
	21UCHC6Q	Core Course - XVII: Practical: Gravimetry and Complex Preparation	2.46	2.67	3.43	2.05	2.31	2.12	1.31
	21UCHO61	Major Elective Course - III: 1. Organometallic Chemistry and Biological role of metals	2.46	2.87	2.94	2.05	1.54	2.12	1.96
	21UCHO62	2. Analytical Chemistry							
	21UCHO63	3. Medicinal Chemistry							
21UCHS61	Skill Enhancement Course - VI: Analytical Clinical Biochemistry	2.13	1.85	2.45	1.37	2.31	2.12	1.31	
Total Weighted Percentage of Course Contribution to POs			100	100	100	100	100	100	100

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF TAMIL
UG Programme - B.A./B.SC./BCA
SEMESTER - I

பொதுத்தமிழ் - I (21UTAL11)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 6
CREDITS : 3
DURATION : 90 hrs

INT. MARKS: 40
EXT. MARKS: 60
MAX.MARKS: 100

நோக்கம்

தற்கால இலக்கியவகைமைகளை அறிமுகப்படுத்தும் நோக்கில் இத்தாள் வடிவமைக்கப்பட்டுள்ளது.

கற்றலின் பயன்கள்

இத்தாளை வெற்றிகரமாக முடித்தவுடன் மாணவர்கள்,

C01 [K1]: நவீன இலக்கியவகைமைகளை அடையாளம் காண்பர்.

C02 [K2]: மொழி இலக்கண அறிவினைப் புரிந்துகொண்டு பிழை இன்றி எழுதும் திறன் பெறுவர்.

C03 [K3]: இக்கால இலக்கியங்களின் கருத்தம்சங்களைத்ம் வாழ்நிலையோடு பொருத்திப்பார்ப்பர்.

C04 [K5]: நவீன இலக்கியங்கள் படைப்பதற்கு அடிப்படையாக அமைந்த முறைமை குறித்து மதிப்பீடு செய்து அவற்றை விமர்சிப்பர்.

C05 [K6]: உலகளாவிய கவிதை நாடகப் படைப்புகளைக் கற்றுப் படைப்பர்.

CO-PO Mapping Table (Course Articulation Matrix)

CO \ PO	P01	P02	P03	P04	P05	P06	P07
C01 [K1]	2	2	-	2	-	-	-
C02 [K2]	2	2	-	2	-	-	-
C03 [K3]	2	1	-	2	1	-	-
C04 [K5]	2	1	1	1	1	1	1
C05 [K6]	2	1	1	1	-	1	1
Weightage of the course	10	7	2	8	2	2	2
Weighted percentage of Course Contribution to POs	1.64	1.44	0.98	2.73	1.54	1.06	1.31

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

கூறு I**(18 hrs)**

மரபுக்கவிதை: மரபுக்கவிதையின் தோற்றமும் வளர்ச்சியும், **பாரதியார்:** யாமறிந்தமொழிகளிலே, பகைவனுக்கு அருள்வாய். **பாரதிதாசன்:** வீரத்தமிழன், தொழிலாளர் விண்ணப்பம். **கவிமணி:** ஒற்றுமையே உயிர்நிலை. **நாமக்கல் கவிஞர்:** பெண் மனம். **முடியரசன்:** தமிழ்தான் என் பேர். **கண்ணதாசன்:** யாத்திரை. **பட்டுக்கோட்டை:** சின்னப்பயலே.

கூறு II**(18 hrs)**

புதுக்கவிதை: புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும் - ஹைக்கூவின் தோற்றமும் வளர்ச்சியும். **அப்துல் ரகுமான்** - பாருக்குள்ளேநல்லநாடு. **நா.காமராசர்:** கண். **மு.மேத்தா:** கால்களால் நடந்தகதை. **வைரமுத்து:** ஐந்துபெரிது ஆறு சிறிது, **பா.விஜய்:** பேனாபேசுச்சு. **கனிமொழி:** கருவறைவாசனை. **ஹைக்கூ கவிதை:** இ.பரிமளம் - அமுதபாரதி - பா.உதயகண்ணன் - இரா.இரவி - மணிவேலன் - புதுவைசீனு. தமிழ்மணி - புதுவைத்தமிழ்நெஞ்சன் - அறிவுமதி - ஸ்ரீரசா - தங்கம் மூர்த்தி - புதுக்கவிதை - ஹைக்கூ படைப்பதற்குப் பயிற்சி அளித்தல்.

கூறு III**(18 hrs)**

நாடகம்: நாடகத்தின் தோற்றமும் வளர்ச்சியும், புராண இலக்கியநாடகங்கள் - **ஜெயந்திநாகராஜன்:** திருநாவுக்கரசர் - திருஞானசம்பந்தர்.

கூறு IV**(18 hrs)**

நாடகம்: புராண இலக்கியநாடகங்கள் - ஜெயந்திநாகராஜன் 1. மாணிக்கவாசகர் 2. கண்ணப்பநாயனார் 3. மெய்ப்பொருள் நாயனார், நாடகம் படைப்பதற்குப் பயிற்சி அளித்தல்.

கூறு V**(18 hrs)**

இலக்கணம் : முதல், சார்பெழுத்துக்கள் - மொழிமுதல், மொழி இறுதிஎழுத்துக்கள் - வல்லினம் மிகும், மிகா இடங்கள்.

பாடநூல்கள்

1. தொகுப்பு நூல், தமிழியல்துறை, ஸ்ரீ காளீஸ்வரிகல்லூரி (தன்னாட்சி), சிவகாசி.
2. ஜெயந்திநாகராஜன். புராண இலக்கியநாடகங்கள், தாமரைப்பளிகேஷன்ஸ், சென்னை, 2014.
3. வாசுதேவன், கா.பன்முகநோக்கில் தமிழ் இலக்கியவரலாறு, தேவன் பதிப்பகம், திருச்சிராப்பள்ளி, 2017.

பார்வை நூல்கள்

1. சுதந்திரமுத்து, மு. படைப்புக் கலை, அறிவுப் பதிப்பகம், சென்னை, 2008.
2. பாக்கியமேரி. தமிழ் இலக்கியவரலாறு, நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை, 2011.
3. ஸ்ரீதரன், என். பிழையின்றித் தமிழ் எழுதுவோம், ஸ்ரீ நந்தினிபதிப்பகம், சென்னை, 2008.

வலைப்பதிவுகள் (Web Sources)

1. <https://youtu.be/6mrdbprILo8>
2. <https://youtu.be/QYizo6YwBXl>
3. <https://youtu.be/-oUmlDvHvQg>
4. <https://youtu.be/3sY76BTiqPQ>
5. <https://youtu.be/xLosPsql6W0>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF ENGLISH
UG Programme - B.A./B.Com./ B.B.A./B.SC./BCA
SEMESTER- I
COMMUNICATIVE ENGLISH - I (21UENL11)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 6

CREDITS : 3

DURATION : 90 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course helps the learners to develop their communication skills in English through listening, speaking, reading, and writing practices.

Course Outcomes (CO)

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

CO1 [K1]: relate and state ideas by reading and listening to simple recorded conversations and fables

CO2 [K2]: demonstrate communicative skills through simple Descriptions, Requests and Instructions

CO3 [K3]: apply knowledge of word power and grammar rules in Formal and Informal letter writings

CO4 [K4]: analyze fairy tales and folk tales to develop language skills through literature

CO5 [K6]: construct grammatically correct and meaningful simple sentences in English

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 [K6]	2	1	1	1	-	1	1
Weightage of the course	10	07	02	08	02	02	03
Weighted percentage of Course contribution to POs	1.64	1.44	0.98	2.73	1.54	1.06	1.96

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

UNIT I - LISTENING AND SPEAKING (18 hrs)

A. Listening

Listening to simple conversations in everyday contexts

Listening to fables

Listening to News Bulletin

B. Speaking

Introducing oneself and others

Describing persons, places, things, daily routines, health and symptoms

Asking for time and date

Asking for directions and giving directions

Giving instructions and seeking clarifications

Making requests and responding to requests

Thanking someone and responding to thanks

UNIT II - READING AND WRITING (18 hrs)

A. Reading

Interpreting pictures/maps/pie-charts/tables/flow charts /diagrams

Skimming or scanning through the texts

B. Writing

Hints Developing

Story Completion/ completing the story based on given outline.

Letter Writing: Informal letters- Family, Friends and Relatives

Formal letters: Leave letters and Apology Letter

UNIT III - WORD POWER (18 hrs)

Prefixes and Suffixes

Homophones and Homonyms

Words related to Parts of the Body & their functions, Cries of Animals, Young

Ones of Animals

Connotative and Denotative words

Contextual Usage of words

Puzzles and Anagrams

UNIT IV - GRAMMAR (18 hrs)

Nouns-Kinds, Number and Gender

Pronouns-Kinds

Adjectives- Kinds

Verbs-Regular and Irregular verbs, Transitive and Intransitive Verbs

Adverbs- Kinds and Position of Adverbs

UNIT V - LANGUAGE THROUGH LITERATURE (18 hrs)

Fairy Tales, Folk Tales and Legendary Heroes

Fairy Tales

The Pied Piper of Hamelin

The Ugly Duckling

Hansel and Gretel

Folk Tales

Alibaba and the Forty Thieves

Aladdin and the Magic Lamp

The Town Mouse and the Country Mouse

Legendary Heroes

Chhatrapati Shivaji Maharaj- Shivaji's great escape

Mahatma Gandhi- Mohandas takes a spelling test

Tenali Raman- The Stolen Brinjal

Akbar and Birbal- Re-Union

TEXTBOOKS

1. Carthy Mc., and Felicity O'Dell. *English Vocabulary in Use (Upper intermediate)*. UK: Cambridge University Press, 2005.
2. Pillai, Radhakrishna, and K. Rajeevan. *Spoken English for You (Level One)*. Chennai: Emerald Publishers, 2009.
3. Sreelekshmi. *Folk Tales- A WonderWorld of 150 Stories for Children*. Kerala: SL Publishers, 2004.

REFERENCES

Books

1. Babu, Sundara. *Leo's Tenali Raman Stories*. Chennai: Leo Book Publishers, 2015.
2. Kalyani V. *Fairy Tales 1*. Kerala: Sisco Publishers, 2004.
3. *Life Skills (Jeevan Kaushal) Facilitators' Guidelines*. New Delhi: University Grants Commission, 2021.
4. Sadanand, Kamalesh and Susheela Punitha. *Spoken English- A Foundation Course for Speakers of Tamil*. Mumbai: Orient Blackswan, 2009.
5. Taylor, Grant. *English Conversation Practice*. New Delhi: Tata McGraw Hill Publishers, 2001.

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2. <https://kathakids.com/great-personalities/stories-of-mahatma-gandhi/>
3. <https://www.infoplease.com/dictionary/brewers/animals-cries>
4. <https://www.zooborns.com/zooborns/baby-animal-names.html>
5. <https://learnenglish.britishcouncil.org/general-english/stories>
6. <https://www.talkenglish.com/lessonindex.aspx>
7. <https://www.englishhelper.com/>
8. <https://www.englishpage.com/>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER - I
CORE COURSE - I: GENERAL CHEMISTRY - I (21UCHC11)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK : 4

CREDITS : 4

DURATION : 60 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course explains the IUPAC nomenclature, reaction mechanism of organic compounds and principle of bonding, periodicity, metallurgy, preparation, properties and uses of hydrogen and s-block elements.

Course Outcomes (CO)

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

CO1 [K1]: recognize the IUPAC nomenclature and bonding of organic compounds, periodic properties, position of hydrogen and s-block elements in the periodic table and metallurgical processes

CO2 [K2]: outline classification of organic compounds, atomic structure, properties of compounds of s – block elements and metallurgy

CO3 [K3]: determine the name of organic compounds, stability of reaction intermediates, variation of periodic properties of hydrogen and s-block elements and extraction of metals

CO4 [K4]: distinguish classification, hybridization and geometry of organic compounds, properties of hydrides and compounds of s-block elements and basic metallurgical operations

CO5 [K4]: discriminate the influence of electronic effects , principles governing electron filling, anomalous behavior of s-block elements and general methods involved in the extraction of metals.

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	2	-	1	-
CO3 [K3]	3	2	1	-	1	-	1
CO4 [K4]	3	2	1	2	1	1	1
CO5 [K4]	3	3	1	1	1	1	1
Weightage of the course	15	11	5	5	3	4	3
Weighted percentage of course	2.46	2.26	2.45	1.71	2.31	2.12	1.96

contribution to POs							
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Based on the level of contribution ('3'-High, '2'-Medium, '1'-Low '-' No Correlation)

UNIT I – CLASSIFICATION AND NOMENCLATURE OF ORGANIC COMPOUNDS

(12 hrs)

Classification of Organic Compounds - Based on the Nature of Carbon Skeleton and Functional Groups - Classification of C And H Atoms of Organic Compounds (Primary/Secondary/Tertiary) -IUPAC System of Nomenclature of Common Organic Compounds (Upto C-10) - Alkanes, Alkenes, Alkynes, Cycloalkanes, Bicycloalkanes with and without Bridges and Aromatic Compounds - Naming of Organic Compounds with One Functional Group - Halogen Compounds, Alcohols, Phenol, Aldehydes, Ketones, Carboxylic Acids and Its Derivatives, Cyano Compounds, Amines, Nitro Compounds (Both Aliphatic And Aromatic) - Naming of Compounds with Two Functional Groups - Naming of Compounds with More than One Carbon Chain - Dissociation of Bonds – Homolysis and Heterolysis - Radicals, Carbocations, Carbanions - Electrophiles and Nucleophiles.

UNIT II – BONDING IN ORGANIC MOLECULES

(12 hrs)

Hybridization and Geometry - Bond Angle, Bond Length, Bond Strength of C-H and C-C Bonds -Van Der Waal's Interactions, Inter & Intra Molecular Forces and their Effects on Physical Properties - Electronic Effects - Inductive Effect, Resonance Effect - Drawing of Resonance Structures - Conditions for Resonance - Stability of Resonance Structures, Hyper Conjugation, Electromeric Effect, Steric Effect - Steric Overcrowding - Steric Inhibition of Resonance - Steric Relief (With Examples). Influence of Electronic Effects - Dipole Moment - Relative Strengths of Acids and Bases - Stability of Olefins - Stability of Radicals, Carbocations and Carbanions.

UNIT III – PERIODIC PROPERTIES

(12 hrs)

Atomic Orbitals – Quantum Numbers - Principal, Azimuthal, Magnetic and Spin Quantum Numbers and Their Significance - Principles Governing the Occupancy of Electrons in Various Quantum Levels- Pauli's Exclusion Principle – Hund's Rule- Aufbau Principle, (n+1) Rule - Stability of Half-Filled and Completely Filled Orbitals- Inert Pair Effect. Periodic Properties – Classification of Elements as s, p, d and f-Block Elements – Variation of Atomic Volume – Atomic and Ionic Radii – Ionization Potential – Electron Affinity and Electronegativity along Period and Groups – Variation of Metallic Characters - Factors Affecting the Periodic Properties. Periodic Table Anomalies and Variations in Atomic Radius, Ionic Radius, Electronic Configuration, Electron Affinity and Electro Negativity, Ionization Energy

UNIT IV – HYDROGEN AND S-BLOCK ELEMENTS

(12 hrs)

Hydrogen: Position in Periodic Table – Resemblance with Alkali Metals – Resemblance with the Halogens – Preparation, Properties and Uses – Nascent Hydrogen

– Active Hydrogen –Atomic Hydrogen – Ortho and Para Hydrogen – Heavy Hydrogen or Deuterium – Tritium – Heavy Water. **Hydrides:** Classification - Types of Hydrides - Ionic Hydrides - Metallic Hydrides - Complex Hydrides – NaBH_4 and LiAlH_4 - Preparation, Properties, and its Uses.

S-Block Elements: S-Block Elements – General Characteristics - Chemical Properties of the Metals: Reaction with Water, Air, Nitrogen; Uses of S-Block Metals and their Compounds-Compounds of S-Block Metals: NaOH , H_2O_2 , KOH , KNO_3 , Ca(OH)_2 , CaCO_3 , NaHCO_3 . Anomalous Behaviour of Li and Be, Extraction of Beryllium and Sodium-Preparation of Gypsum and Its Role in Setting of Cement – Preparation and Properties of Plaster of Paris.

UNIT V – METALLURGY

(12 hrs)

Occurrence of Metals: Basic Metallurgical Operations and Metallurgy Process – General Methods Involved in Extraction of Metals - Concentration of Ores – Froth Floatation, Magnetic Separation, Calcination, Roasting, Smelting, Flux, Aluminothermic Process. Extraction Processes – Chemical Reduction – Electrolytic Reduction – Metal Displacement – Refining Methods – Distillation – Fractional Crystallization – Electrolysis. Zone Refining – Van ArkelDe Boer Methods – Electrolytic Refining– Ion Exchange Method – Muffle Furnace – Chemical Properties – Important Compounds and Uses of Cr, Mn, Co, Ni and Zn.

TEXTBOOKS

1. Lee J. D., *Concise Inorganic Chemistry*. Wiley Publication, 5th Edition, 2008.
2. Bruice P. Y. and Prasad K. J. R. *Essential Organic Chemistry*. New Delhi: Pearson Education, 1st Edition, 2008.
3. Arun Bahl and Bahl B. S. *A Textbook of Organic Chemistry*. S. Chand publication, 22nd Edition, 2016.
4. Puri B. R., Sharma L. R. and Kalia K. C. *Principles of Inorganic Chemistry*. Vishal Publishing Company, 52th Edition, 2016.

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1. Francis A. Carey and Richard J. Sundberg. *Advanced Organic Chemistry Part A: Structure and Mechanisms*. Boston, MA: Springer Publisher, 2007.
2. Cotton F. A. and Wilkinson G., *Advanced Inorganic Chemistry*. Singapore: John Wiley & Sons, 5th Edition, 2003.

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2. <https://careerendeavour.in/wp-content/uploads/2016/04/GOC-IIT-JAM-MATERIAL.pdf>
3. <https://www.youtube.com/watch?v=ETnHQIpxxY>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER - I
CORE COURSE - II: PRACTICAL: ORGANIC AND INORGANIC CHEMISTRY
(21UCHC1P)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK : 4

CREDITS : 3

DURATION : 60 hrs

INT. MARKS: 50

EXT. MARKS: 50

MAX. MARKS: 100

Preamble

This lab course enables the students to acquire practical skill on crystallisation, melting point and boiling point measurement, quantitative estimation of inorganic compound by different volumetric methods.

Course Outcomes (CO)

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

CO1 [K2]: demonstrate crystallization of organic compounds, preparation of solutions having different strengths and volumetric analysis

CO2 [K3]: determine purity of organic compound, crystallization and amount of inorganic substances by quantitative analysis

CO3 [K4]: analyse physical constants and mixture of inorganic compounds quantitatively by different volumetric methods

CO4 [K5]: predict boiling point by capillary method and molarity and normality of solutions

CO5 [K6]: perform purification by crystallization, melting and boiling point of organic compounds and estimation of inorganic compounds.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K2]	3	2	1	-	-	1	1
CO2 [K3]	3	2	1	1	-	1	1
CO3 [K4]	3	2	1	1	1	1	-
CO4 [K5]	3	3	1	2	1	-	-
CO5 [K6]	3	3	1	2	1	1	1
Weightage of the course	15	12	5	6	3	4	3
Weighted percentage of course contribution to POs	2.46	2.46	2.45	2.05	2.31	2.12	1.96

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

ORGANIC CHEMISTRY PRACTICAL

1. Purification of Organic Compounds by Crystallization Using the following Solvents
a) Water b) Alcohol c) Alcohol-Water
2. Determination of the Melting Points of given Organic Compounds and Unknown Organic Compounds (using Kjeldahl Method and Electrically Heated Melting Point Apparatus)
3. Determination of Boiling Point of Liquid Compounds (Boiling Point Lower than and more than 100 °C by Distillation and Capillary Method).

INORGANIC CHEMISTRY PRACTICAL

1. **Preparation of Solutions of Different Molarity and Normality**
2. **Akalimetry and Acidimetry**
 - a) Estimation of HCl
 - b) Estimation of Na₂CO₃
 - c) Estimation of Carbonate and Hydroxide present together in Mixture
 - d) Estimation of Carbonate and Bicarbonate present together in a Mixture
3. **Redox titration**
 - a) Estimation of Oxalic acid
 - b) Estimation of FAS
4. **Dichrometry**
 - a) Estimation of Ferrous Ion
 - b) Estimation of Ferric Ion using External Indicator
4. **Iodometry (class work only)**
 - a) Estimation of Potassium Dichromate
 - b) Estimation of Copper
5. **Complexometry (class work only)**
Estimation of Zinc by EDTA Titration

REFERENCES

Books

1. Furniss B. S., Hannford A. J., Smith P. W. G. and Tatchell A. R., *Vogel's Textbook of Practical Organic Chemistry*. Longman Scientific and Technical, England, 5th Edition, 1989.
2. Jeffery G. H., Bassett J., Mendham J. and Denney R. C., *Vogel's Quantitative Chemical Analysis*, England. Longman Scientific and Technical, 5th Edition 1989.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF MATHEMATICS
UG Programme - B.Sc. Chemistry
SEMESTER - I
ALLIED COURSE - I: MATHEMATICS - I (21UCHA11)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 6

CREDITS : 5

DURATION : 90 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course introduces the learners to some mathematical tools and methods that can be apply to problems in Physics and Chemistry.

Course Outcomes (CO)

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

CO1 [K2]: express the relation between roots and coefficients of polynomial equations

CO2 [K2]: calculate the derivative, integral, Laplace transform of functions

CO3 [K3]: solve algebraic and transcendental equations numerically

CO4 [K4]: investigate homogeneous function and Euler's theorem

CO5 [K5]: determine the appropriate Fourier series expansion for functions.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K2]	3	2	-	1	-	1	-
CO2 [K2]	3	2	1	1	-	1	-
CO3 [K3]	3	2	1	1	-	1	-
CO4 [K4]	3	2	1	1	-	1	1
CO5 [K5]	3	2	1	-	1	1	1
Weightage of the course	15	10	04	04	01	05	02
Weighted percentage of Course contribution to POs	2.46	2.05	1.96	1.37	0.77	2.65	1.31

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

UNIT I (18 hrs)

Theory of Equations: Introduction – Formation of Equations – Relation between Roots and Coefficients. **Algebraic and Transcendental Equations:** Introduction – Errors in Numerical Computation – Iteration Method – Bisection Method.

UNIT II (18 hrs)

Regula Falsi Method – Newton-Raphson Method. **Differentiation:** Higher Derivatives – n^{th} Derivative of some Standard Functions.

UNIT III (18 hrs)

Leibnitz's Theorem – Partial Differentiation – Homogeneous Function and Euler's Theorem.

UNIT IV (18 hrs)

Evaluation of Integrals: Evaluation of Definite Integrals – Integration by Parts. **Fourier Series:** The Cosine and Sine Series.

UNIT V (18 hrs)

Laplace Transform: Introduction – Laplace Transform – Inverse Laplace Transform.

TEXTBOOKS

1. Arumugam S., Thangapandi A. and Somasundaram A. *Issac Numerical Methods*. Chennai: Scitech Publications (India) Pvt. Ltd, 2007. **(UNITS I & II)**
2. Arumugam S. and Thangapandi A. *Issac. Calculus*. Palayamkottai: New Gamma Publishing House, 2014. **(UNITS II, III & IV)**
3. Arumugam S. and Thangapandi A. *Issac. Ancillary Mathematics Paper II (Revised)*. Palayamkottai: New Gamma Publishing House, 2004. **(UNIT V)**

REFERENCES

Books

1. Narayanan S. and Manicavachagom Pillay T. K. *Calculus - Volume III*. Chennai: S.Viswanathan (Printers & Publishers), PVT., LTD, Revised 18th Edition, 2016.
2. Vittal P. R. *Differential Equations, Fourier Series and Laplace Transforms, Probability*. Chennai: Margham Publications, Third Revised Edition, 2002.
3. Kalavathy S. *Numerical Methods*. Chennai: Vijay Nicole Imprints Private Limited., 2004.

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1. https://www.pearsonschoolsandcolleges.co.uk/secondary/Mathematics/16plus/AdvancingMathsForAQA2ndEdition/Samples/SampleMaterial/Chap01_FP1.pdf,
2. <https://www.cliffsnotes.com/study-guides/calculus/calculus/the-derivative/higher-order-derivatives>
3. <https://byjus.com/jee/higher-order-derivatives-of-functions-in-parametric-form/>

4. <https://theengineeringmaths.com/wp-content/uploads/2017/08/Chapter-1-Successive-Differentiation-.pdf>
5. <https://tutorial.math.lamar.edu/classes/calci/integrationbyparts.aspx>
6. <https://khitguntur.ac.in/shmat/M-II%20Unit%203%20material.pdf>
7. https://www.math.tamu.edu/~francis.narcowich/m414/m414_notes/m414_half_intervals.html
8. <https://lecturenotes.in/m/28397-jay-bhatt-professor-of-mathematics-hgce-ch-5-laplace-transform?reading=true>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
UG PROGRAMME
SEMESTER - I
ABILITY ENHANCEMENT COMPULSORY COURSE - I: ENVIRONMENTAL STUDIES
(21UESR11)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK : 2
CREDIT : 1
DURATION : 30 hrs

INT. MARKS: 40
EXT. MARKS: 60
MAX. MARKS: 100

Preamble

This course familiarizes the learners with the essentials of Environmental Studies by focusing on variety of environmental issues and factors affecting environment.

Course Outcomes (CO)

On successful completion of the course, the learners will 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, Food Web and Bio geochemical

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 [K4]: examine 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 [K4]	1	1	-	1	2	1	1
Weightage of the course	08	5	1	7	08	05	05
Weighted percentage of Course contribution to POs	1.31	1.03	0.49	2.39	6.15	2.65	3.27

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

UNIT I (6 hrs)

Structure of earth and its components: Atmosphere – Lithosphere – Hydrosphere – Biosphere. Renewable and non-renewable resources – Forest, water and energy resources.

UNIT II (6 hrs)

Ecosystem: Concept of ecosystem – Terrestrial and aquatic. Structure and function – Energy flow in the ecosystem – Food chain and food web – Ecological pyramids – Bio-geo chemical cycle – carbon and nitrogen cycle.

UNIT III (6 hrs)

Biodiversity: Introduction – Definition: genetic, species and ecosystem diversity. Indian Biodiversity Hotspots. Threats to biodiversity – Conservation of Biodiversity – In-situ and Ex-situ conservation strategies. IUCN Red list Categories.

UNIT IV (6 hrs)

Pollution: Definition – causes – effects and control measures of Air – Water – Noise – soil – nuclear pollution. Global issues – Global warming – acid rain – Ozone layer depletion. Water conservation – rain water harvesting and water recycling – solid waste management.

UNIT V (6 hrs)

Human Population and Environment: Population growth, variation among nations. Road safety awareness. Environment and human health. Human Rights. HIV/AIDS. Women and Child Welfare. Role of Information Technology in Environment and human health. Contribution of students and teachers in adoption of villages and steps to be taken for green villages.

TEXTBOOKS

1. Dharmaraj J., *Text book of Environmental studies*, S. Chand and Co. New Delhi, 1995.
2. Susila Appadurai. *Environmental Studies*, New Century Book House, 2012.

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Books

1. Agarwal K. C., *Environmental Biology*, Nidi publication Ltd, Bikaner, 2001.
2. Odum E. P., *Fundamentals of Ecology*, W.B. Saunders Co. USA, 1971.
3. Miller T. G., *Environmental sciences*, Wadsworth Publishing Co, New Delhi. 2004.

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2. <https://www.youtube.com/watch?v=QewEi2U1jLs>
3. <https://byjus.com/biology/endemic-species/>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER - I
SKILL ENHANCEMENT COURSE - I: SCIENCE COMMUNICATION AND
POPULARIZATION (21UCHS11)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK : 2

CREDIT : 1

DURATION : 30 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course explains science communication in human development and science popularization through internet communication and public sensitization.

Course Outcomes (CO)

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

CO1 [K1]: identify the basic ideas and skills on science communications and internet resources

CO2 [K2]: illustrate science outreach through internet, social media and useful web media

CO3 [K2]: demonstrate science communication by visual media, internet, talks and public sensitization

CO4 [K3]: present popular science talks and role of science and technology in human life

CO5 [K4]: analyse science communication and popularization by different communication media.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	2	1	-	-	1	1
CO2 [K2]	3	2	1	1	-	-	-
CO3 [K2]	2	2	1	1	1	1	-
CO4 [K3]	2	2	1	1	1	-	1
CO5 [K4]	2	2	2	-	1	1	-
Weightage of the course	12	10	6	3	3	3	2
Weighted percentage of Course contribution to POs	1.97	2.05	2.94	1.02	2.31	1.59	1.31

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

UNIT I – SCIENCE COMMUNICATION (6 hrs)

Need for Science Journalism: Science has Potential for Breaking News, Impact on Human Life, Impact on Technology. Role of Science and Technology in Human Development. Framing Policies at National and International Levels. Writing and Communicating Popular Articles Effectively.

UNIT II – VISUAL MEDIA SCIENCE COMMUNICATION (6 hrs)

Basics of Visual Media, Science Outreach Through Visual Media: Creating Science Documentaries, Creating the Outline and Expanding, Scripts, Making of Script, Model of Script Writing - Development of Script Writing - Spot Script Writing, Citing Authentic Sources.

UNIT III – INTERNET SCIENCE COMMUNICATION (6 hrs)

Science Outreach Through Internet: Research Gate – Google Scholar – Mendeley– Blogs – Science Blogs – Nature Blogs – YouTube – RSC – Scifinder - Pub Med – Scopus - Chemspider - Web of Science - ACS Pub.

UNIT IV – SCIENCE OUTREACH TALKS (6 hrs)

Tactics for Providing a Charismatic and Effective Public Talk – Public Speaking Skills - , Use of Metaphors – Figure of Speech, Speaking in Context - Intrapersonal, Interpersonal, and Public Speaking Context - Popular Talks of Scientists – ACS - RSC - IAS

UNIT V – PUBLIC SENSITIZATION (6 hrs)

Science Outreach for Biodiversity Conservation – Climate Change - Nature Conservation - Sensitization of Public - The Statement of the Problem - The Purpose of the Study.

TEXTBOOKS

1. Larry Gross, *Introduction: Sol Worth and the Study of Visual Communication-1*. University of Pennsylvania Press, 1981.
2. Dale Carnegie. *The Quick and Easy Way to Effective Speaking-Modern Techniques for Dynamic Communication*, 1888.

REFERENCES**Books**

1. Maria E Gigante. *Introducing Science through Images: Cases of Visual Popularization (Studies in Rhetoric/Communication)*, University of South Carolina Press, 2018.
2. Julius Loewenstein. *Public speaking-speaking like a professional*. Independently published, 2019.

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1. <https://nptel.ac.in/courses/102/104/102104061/>
2. <https://nptel.ac.in/courses/124/107/124107002/>
3. <https://nptel.ac.in/courses/106/105/106105084/>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF TAMIL
UG Programme - B.A/B.SC/BCA
SEMESTER - II
பொதுத்தமிழ் - II (21UTAL21)
(From 2021-2022 Batch onwards)

HOURS / WEEK: 6
CREDITS : 3
DURATION : 90 hrs

INT. MARKS: 40
EXT. MARKS: 60
MAX. MARKS: 100

நோக்கம்

சமய இலக்கியம் தோன்றியதற்கான காலப்பின்னணி மற்றும் சமயம் சார்ந்த இலக்கியங்களை மாணவர்களுக்கு அறிவுறுத்தலும், பல்வேறு காலகட்ட சிறுகதை இலக்கியங்களை எடுத்துரைக்கும் நோக்கோடு அமைக்கப்பட்டுள்ளது.

கற்றலின் பயன்கள்

இத்தானை வெற்றிகரமாக முடித்தவுடன் மாணவர்கள்,

C01 [K1]: பல்வேறுசமயம் சார்ந்த இலக்கியவரலாற்றினை அறிவர்.

C02 [K2]: இறை உருவங்களையும் புராணக்கருத்துக்களையும் கூறுவர்.

C03 [K3]: சமயப்பாடல்களின் அமைப்பினையும் நோக்கத்தினையும் தெளிவாக விளக்குவர்.

C04 [K4]: தமிழ்ச் சிறுகதைகளின் பொருண்மைகளைப்பாகுபடுத்துவர்.

C05 [K4]: சொல்லிலக்கணத்தைப் புரிந்துகொண்டுபிழையின்றிஎழுதும் திறனைப் பெறுவர்.

CO-PO Mapping Table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
C01 [K1]	2	1	-	1	-	-	-
C02 [K2]	2	1	-	1	1	-	-
C03 [K3]	2	2	-	2	-	1	-
C04 [K4]	2	2	1	2	1	-	1
C05 [K4]	2	2	1	2	-	1	1
Weightage of the Course	10	8	2	8	2	2	2
Weighted percentage of Course Contribution to POs	1.64	1.64	0.98	2.73	1.54	1.06	1.31

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

கூறு I**(18 hrs)**

சைவ இலக்கியவரலாறு - **திருஞானசம்பந்தர்:** முதல் திருமுறை- திருப்பிரமபுரம் - தோடுடையசெவியன் (10 பாடல்கள்). **திருநாவுக்கரசர்:** நான்காம் திருமுறை - திருவதிகைவீரட்டானம் - கூற்றாயினவாறுவிலக்ககலீர் (10 பாடல்கள்).**சுந்தரர்:** ஏழாம் திருமுறை - திருவெண்ணெய்நல்லூர் பதிகம் - பித்தாபிறைசூடி (10 பாடல்கள்). **மாணிக்கவாசகர்:** குயிற்பத்து (10 பாடல்கள்).

கூறு II**(18 hrs)**

வைணவ இலக்கியவரலாறு - **ஆண்டாள்:** திருப்பாவைமுழுவதும் (30 பாடல்கள்) - **நம்மாழ்வார்:** நான்காம் திருமொழி - நான்காம் பத்து - மண்ணையிருந்துதுழாவி.

கூறு III**(18 hrs)**

கிறிஸ்தவ, இஸ்லாமிய இலக்கியவரலாறு - **கண்ணதாசன்:**இயேசுகாவிமம் - மலைப்பொழிவு (முழுவதும்) - **குணங்குடியார்:** நந்தீஸ்வரக்கண்ணி (51 பாடல்கள்).

கூறு IV**(18 hrs)**

சிறுகதைதோற்றம் வளர்ச்சி (தேர்ந்தெடுக்கப்பட்ட 10 சிறுகதைகள்) - **புதுமைப்பித்தன்:**அகல்யை..பி.எஸ். ராமையா: நட்ஷத்திரக் குழந்தைகள் **த.ஜெயகாந்தன்:** அக்ரஹாரத்துப்பூனை. **வண்ணதாசன்:**ஒருசிறு இசை.**வண்ணநிலவன்:**கரையும் உருவங்கள்..**கு.அழகிரிசாமி:** அன்பளிப்பு. **விஞ்ஞானி:** முன்னை இட்டதீ.**ஆதவன்:** கறுப்புஅம்பாகதை. **மேலாண்மைபொன்னுச்சாமி:** அன்பெழுத்து. **நாஞ்சில் நாடன்:** சூடியபூ சூடற்க

கூறு V**(18 hrs)**

இலக்கணம்: சொல்விளக்கம்,சொற்பாடுபாடு (பெயர்ச்சொல், வினைச்சொல், இடைச்சொல்,உரிச்சொல்) - அறுவகைவினா - எண்வகைவிடை - மொழிப்பயிற்சி: மயங்கொலிப்பிழைகள் (லகர,ளகர,ழகரவேறுபாடு,ரகர,றகரவேறுபாடு - ணகர,னகரவேறுபாடு).

பாடநூல்கள்

1. *தொகுப்புநூல்*, தமிழியல்துறை, ஸ்ரீ காளீஸ்வரிகல்லூரி (தன்னாட்சி), சிவகாசி.
2. வாசுதேவன்,கா. *பன்முகநோக்கில் தமிழ் இலக்கியவரலாறு*, தேவன் பதிப்பகம், திருச்சிராப்பள்ளி, பன்னிரெண்டாம் பதிப்பு: 2017.

பார்வை நூல்கள்

1. அப்துல்ரகுமான் (குறிப்புரை).*குணங்குடியார்பாடற்கோவை*, மணிவாசகர்பதிப்பகம், சென்னை, 2002.
2. பாக்கியமேரி. *தமிழ் இலக்கியவரலாறு*, நியூ செஞ்சுரி புக் ஹவுஸ், சென்னை, நான்காம் பதிப்பு: 2011.
3. ஜெகதீரட்சகன், எஸ்.*நாலாயிரதிவ்யப் பிரபந்தம்*, முல்லை நிலையம், சென்னை, முதற்பதிப்பு: 1993.
4. ஸ்ரீமத் கந்தசாமித்தம்பிரான் சாமிகள் (பதி.ஆ.). *மூவர் தேவாரம்*, ஞானசம்பந்தம் பதிப்பகம், மயிலாடுதுறை, இரண்டாம் பதிப்பு: 1997.

வலைப்பதிவுகள் (Web Sources)

1. <https://youtu.be/FPINGftQnAo>
2. <https://youtu.be/Rj0S6KOruvA>
3. <https://youtu.be/Z8xgO8ff44g>
4. <https://youtu.be/PxeeauHz5CQ>
5. <https://youtu.be/TLU6MO9YEka>
6. https://podhutamizh.blogspot.com/2017/09/blog-post_42.html
7. https://youtu.be/vZ1FrQuhn_w

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF ENGLISH
UG Programme - B.A./B.Com./ B.B.A./B.SC./BCA
SEMESTER - II
COMMUNICATIVE ENGLISH - II (21UENL21)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 6

CREDITS : 3

DURATION : 90 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course helps the learners to develop their communication skills in English through listening, reading, speaking and writing practices.

Course Outcomes (CO)

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

CO1 [K1]: relate and state ideas by reading and listening to recorded interviews and news

CO2 [K2]: demonstrate effective speaking skills by offering suggestions, seeking permission and reporting ongoing activities

CO3 [K3]: apply knowledge of word power and grammar rules through proverb expansion and paragraph writings

CO4 [K4]: analyze simple poems and short stories to develop language skills through literature

CO5 [K6]: construct grammatically correct and logically coherent paragraphs

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	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 the course	10	08	02	08	02	02	03
Weighted percentage of Course contribution to POs	1.64	1.64	0.98	2.73	1.54	1.06	1.96

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

UNIT I - LISTENING AND SPEAKING (18 hrs)

A. Listening

Listening to interviews

Listening to news reading

Listening to instructions-download apps in mobile handsets, cooking, sending e-mail

B. Speaking

Inviting person, offering suggestion and seeking permission

Making complaints and asking apology

Expressing likes, dislikes, hopes, wishes, regrets, sympathy, offering condolences, compliments and praising

Reporting conversations, facts, meetings/interviews, ongoing activities and future plans

Talking about the weather, past & future events, interesting plans and arrangements

UNIT II - READING AND WRITING (18 hrs)

A. Reading

Reading advertisements

Reading notices

Reading short passages

B. Writing

Proverb Expansion

Paragraph Writing

Essay writing

UNIT III - WORD POWER (18 hrs)

Synonyms & Antonyms

Misspelt words

Words related to- House, Clothing, Food, Education, Speaking, Holidays and Sports

UNIT IV - GRAMMAR (18 hrs)

Preposition and its kinds

Conjunction and its kinds

Articles

Tenses

UNIT V - LANGUAGE THROUGH LITERATURE (18 hrs)

A. Poetry

Sarojini Naidu - The Queen's Rival

John Masefield - Laugh and be Merry

Alfred Noyes - The Highwayman

B. Short Story

- Somerset Maugham - The Ant and the Grasshopper
Katherine Mansfield - A Cup of Tea

TEXTBOOKS

1. Carthy Mc., and Felicity O'Dell. *English Vocabulary in Use (Upper intermediate)*. UK: Cambridge University Press, 2005.
2. Pillai, Radhakrishna and K.Rajeevan. *Spoken English for You (Level One)*. Chennai: Emerald Publishers, 2009.
3. Pillai, Radhakrishna. *Emerald English Grammar and Composition*. Chennai: Emerald Publishers, 2016.

REFERENCES

Books

1. *Life Skills (Jeevan Kaushal) Facilitators' Guidelines*. New Delhi: University Grants Commission, 2021.
2. Radha, Alamelu et.al. *Situational Grammar and Composition*. Chennai: New Century Book House Pvt. Ltd, 2008.
3. Sadanand, Kamalesh and Susheela Punitha. *Spoken English- A Foundation Course for speakers of Tamil*. Mumbai: Orient Blackswan, 2009.
4. Subramanian A.E. *Gifts to Posterity*. Chennai: Anu Chitra Publications, 2003.
5. Taylor, Grant. *English Conversation Practice*. New Delhi: Tata McGraw Hill Publishers, 2001.
6. Tilak, Raghukul. *Sarojini Naidu Selected Poems*. New Delhi: Educational Publishers, 2009.

Web Sources

1. <https://allpoetry.com/Laugh-and-be-Merry>
2. <https://lincolnprep.wildapricot.org/resources/Reading%20Selections%20for%20Reading%20Competition/The%20Highwayman.pdf>
3. <https://learnenglish.britishcouncil.org/general-english/stories>
4. <https://www.talkenglish.com/lessonindex.aspx>
5. <https://www.englishhelper.com/>
6. <https://www.englishpage.com/>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER - II
CORE COURSE - III: GENERAL CHEMISTRY - II (21UCHC21)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK : 4

CREDITS : 4

DURATION : 60 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble-

This course enables the students to gain knowledge on the preparation and properties of aliphatic and alicyclic compounds, gaseous and liquid states, chemical equilibrium and catalysis.

Course Outcomes (CO)

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

CO1 [K1]: describe the concepts of aliphatic and alicyclic compounds, states of matter, chemical equilibrium and kinetics of the reaction

CO2 [K2]: illustrate gas laws, physical properties of liquids, principles and applications of chemical equilibrium and rate of reaction for decomposition reaction

CO3 [K3]: present preparation and properties of organic compounds, behavior of gases and liquids, application of chemical equilibrium and order of the reaction

CO4 [K4]: distinguish organic compounds, states of matter, equilibrium constants and rate of the reaction

CO5 [K4]: compare the properties of organic compounds, gases, liquids, order of reaction through various methods.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	2	1	1	-	-	1
CO2 [K2]	3	2	1	1	-	1	-
CO3 [K3]	3	2	1	1	1	1	1
CO4 [K4]	3	3	1	1	1	1	-
CO5 [K4]	3	3	1	2	1	1	1
Weightage of the course	15	12	5	6	3	4	3
Weighted percentage of Course contribution to POs	2.46	2.46	2.45	2.05	2.31	2.12	1.96

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

UNIT I – ALIPHATIC COMPOUNDS (12 hrs)

Alkane - Preparation of Alkane from Alkene, Alkyne, Alkyl Halide, Carboxylic Acid and Grignard Reagent-Chemical Properties-Halogenation, Nitration, Sulfonation, Oxidation and Cracking (Mechanism Included).

Alkene – Preparation of Alkene from Alcohols, Alkyl Halide, Alkyne, Vinyl dihalide, Chemical Properties – Addition of Hydrogen, Halogens, Halogen Acids, Hypohalous Acid, Oxidation with KMnO_4 , Ozone, Silver Catalyst.

Alkyne – Preparation of Alkyne from Vicinal Dihalide, Trihalide, Calcium Carbide, primary Halide- Chemical Properties– Addition of Hydrogen, Halogens, Halogen Acids, Hypohalous Acid, Water, Hydrogen Cyanide, Oxidation of Alkynes with KMnO_4 , Ozone.

UNIT II – ALICYCLIC COMPOUNDS (12 hrs)

Cycloalkanes: Nomenclature - Preparation from Dihalide, Alkenes, Calcium Salt and Esters of Dicarboxylic Acid, Aromatic Hydrocarbons- Physical Properties- Chemical Properties –Substitution Reactions with Cl_2 and Br_2 - Ring-Opening Reactions- Addition of HBr , HI , H_2 , Cl_2 and Br_2 – Oxidation- Stability of Cycloalkanes - Baeyer's Strain Theory and its modification.

UNIT III – STATES OF MATTER (GAS AND LIQUID) (12 hrs)

Gaseous State: Gas laws - Postulates and Derivation of the Kinetic Gas Equation-Types of Velocities - Mean, Root Mean Square, Most Probable Velocities (Definition Only) - Collision Frequency – Mean Free Path- Real Gases - Deviation of Real Gas from Ideal Behavior - Derivation of Vander Waal's Equation and its Significance.

Liquid State: Physical Properties of Liquids – Vapour Pressure –Surface Tension – Viscosity – Viscosity Coefficient- Effect of temperature on viscosity and surface tension-Determination of Viscosity.

UNIT IV – CHEMICAL EQUILIBRIUM (12 hrs)

The Law of Mass Action- Thermodynamic Treatment of Law of Mass Action- Relationship between K_p and K_c - Application of Law of Mass Action to Homogeneous System, Dissociation of PCl_5 and N_2O_4 - Application of Law of Mass Action to Heterogeneous System-Calcium Carbonate – Le Chatelier Principle and its Applications.

UNIT V – CHEMICAL KINETICS (12 hrs)

Basic Concepts: Reaction Kinetics - First Order Reaction – Derivation of Integrated First Order Rate Equation – Catalytic Decomposition of Hydrogen Peroxide – Decomposition of Dinitrogen Pentoxide – Half-Life Period. Pseudo First Order Reaction: Definition – Inversion of Cane Sugar – Hydrolysis of Ester by Acid. Second Order Reaction: Integrated Rate Expression of Second Order Reaction (When the Reactants are Same, When the Reactants are Different) – Half-Life Period. Third Order Reaction: Integrated Rate Expression of Third Order Reaction – Half-Life Period. Method for Determining Order: Differential Method – Integral Method – Graphical Method – Isolation Method Temperature: Influence of Temperature on the Rate of Reaction -

Arrhenius Rate Equation and its Significance. Theory of Reaction Rates: Collision Theory of Bimolecular Collision Theory.

TEXTBOOKS

1. Finar I. L., Organic Chemistry, Vol I, Pearson Education, India, 6th Edition, 2002.
2. Arun Bhal and Bhal B. S., *A Textbook of Organic Chemistry*. New Delhi: S. Chand and Company, 2019.
3. Arun Bhal and Bhal B. S., *Essential of Physical Chemistry*. New Delhi: S. Chand and Company, 2013.

REFERENCES

Books

1. Bruice P. Y., and Prasad K. J. R., *Essential Organic Chemistry*. New Delhi: Pearson Education, 1st Edition, 2008.
2. Puri B. R., Madan S. Pathania and Sharma L. R., *Textbook of Physical Chemistry*. Jalandhar: Vishal Publishing and Company, 2008.
3. Soni P. L., *Textbook of Organic Chemistry*, New Delhi: S. Chand and Company, 2008.

Web Sources

1. <https://www.youtube.com/watch?v=jeUW6h2oVEY>
2. https://www.youtube.com/watch?v=x_V11yWjfug
3. <https://www.youtube.com/watch?v=S9hYaf4b0x0>

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

CORE COURSE - IV: PRACTICAL: ORGANIC AND PHYSICAL CHEMISTRY (21UCHC2P)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK : 4

CREDITS : 3

DURATION : 60 hrs

INT. MARKS: 50

EXT. MARKS: 50

MAX. MARKS: 100

Preamble

This lab course enables the students to acquire practical skill on measuring viscosity, surface tension and synthesis of organic compounds.

Course Outcomes (CO)

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

CO1 [K2]: infer physical constants and preparation of organic compounds

CO2 [K3]: determine surface tension, viscosity, pH and synthetic route for the preparation of organic compounds

CO3 [K4]: analyse effect of pH by adding acid or base and observe the yield of synthesized organic compounds

CO4 [K4]: employ suitable method for the synthesis of organic compounds and knowledge of physical constant for their estimation

CO5 [K5]: measure the surface tension, pH and viscosity of given solution.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K2]	3	2	1	1	-	1	-
CO2 [K3]	3	2	1	1	-	1	-
CO3 [K4]	3	2	1	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	6	6	3	5	3
Weighted percentage of Course contribution to POs	2.46	2.46	2.94	2.05	2.31	2.65	1.96

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

PREPARATION OF ORGANIC COMPOUNDS

1. Bromination – Preparation of Parabromoacetanilide from Acetanilide.
2. Benzoylation – (i) Preparation of Benzanilide from Aniline.
(ii) Preparation Phenyl Benzoate from Phenol
3. Hydrolysis -Preparation of Benzoic Acid from Benzamide and Ethyl Benzoate.
4. Preparation of Glucosazone from glucose

PHYSICAL CHEMISTRY PRACTICAL

1. Determination of Surface Tension by Drop Count Method.
2. Determination of Viscosity of Aqueous solution of
 - (i) Polymer
 - (ii) Ethanol
 - (iii) Sugar at Room Temperature
3. Effect of pH on the Addition of HCl / NaOH to Solution of Acetic Acid Sodium Acetate and their Mixtures.
4. Preparation of Buffer Solution of Different pH.
 - (i) Sodium Acetate - Acetic Acid
 - (ii) Ammonium Chloride - Ammonium Hydroxide

REFERENCES

Books

1. Renu Gupta. *Practical Physical Chemistry*. Kerala: New Age International (P) Ltd. Publishers, 2017.
2. Furniss B. S., Hannford A. J., Smith P. W. G., and Tatchell A. R., *Vogel's Textbook of Practical Organic Chemistry*, Longman Scientific and Technical, England, 5th Edition, 1989.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF MATHEMATICS
UG Programme - B.Sc. Chemistry
SEMESTER - II
ALLIED COURSE - II: MATHEMATICS - II (21UCHA21)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 6

CREDITS : 5

DURATION : 90 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course introduces the learners to some mathematical tools and methods that can be apply to problems in Physics and Chemistry.

Course Outcomes (CO)

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

CO1 [K2]: indicate the binomial series representation of functions and the exponential series

CO2 [K2]: explain gradient of a scalar valued function, divergence and curl of a vector valued function and its properties, rank of a matrix

CO3 [K3]: compute inverse of a matrix using Cayley-Hamilton theorem, eigen values and eigen vectors of a square matrix

CO4 [K4]: appraise equivalent definitions of a group, properties of a group

CO5 [K5]: determine the mathematical function that has the best fit to a series of data points.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K2]	3	2	-	1	-	1	-
CO2 [K2]	3	2	-	1	-	1	-
CO3 [K3]	3	2	2	1	-	1	-
CO4 [K4]	3	2	1	1	-	1	1
CO5 [K5]	3	2	1	-	1	1	1
Weightage of the course	15	10	04	04	01	05	02
Weighted percentage of Course contribution to POs	2.46	2.05	1.96	1.37	0.77	2.65	1.31

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

UNIT I **(18 hrs)**

Summation of Series: Binomial Series – Exponential Series.

UNIT II **(18 hrs)**

Vector Calculus: Introduction – Vector Algebra – Differentiation of Vectors – Gradient – Velocity and Acceleration – Divergence and Curl.

UNIT III **(18 hrs)**

Matrices: Introduction – Matrices – Simultaneous Linear Equations – Cayley Hamilton Theorem – Eigen Values and Eigen Vectors.

UNIT IV **(18 hrs)**

Groups: Definition and Examples – Elementary Properties of a Group – Equivalent Definitions of a Group – Permutation Groups.

UNIT V **(18 hrs)**

Straight Lines: Equation of a Straight Line. **Curve Fitting:** Introduction – Linear Law – Method of Group Averages – Method of Least Squares.

TEXTBOOKS

1. Arumugam S. and Thangapandi A. Issac. *Ancillary Mathematics Paper I (Revised)*. Palayamkottai: New Gamma Publishing House, 2002. **(UNITS I & V)**
2. Arumugam S. and Thangapandi A. Issac. *Ancillary Mathematics Paper II (Revised)*. Palayamkottai: New Gamma Publishing House, 2004. **(UNIT II)**
3. Arumugam S. and Thangapandi A. Issac. *Ancillary Mathematics Paper III*. Palayamkottai: New Gamma Publishing House, 2006. **(UNITS III & IV)**
4. Arumugam S., Thangapandi A. Issac and Somasundaram A. *Numerical Methods*. Chennai: Scitech Publications (India) Pvt. Ltd, Second Edition, 2007. **(UNIT V)**

REFERENCES

Books

1. Manicavachagom Pillay T. K., Natarajan T. and Ganapathy K. S., *Algebra- Volume II*. Chennai: S.Viswanathan (Printers & Publishers) Pvt. Ltd., 2006.
2. Arumugam S. and Thangapandi A. Issac. *Modern Algebra*. Chennai: Scitech Publications (India) Pvt.Ltd, 2008.
3. Arumugam S. and Thangapandi A. Isaac. *Algebra Theory of Equations, Theory of Numbers and Trigonometry*. Palayamkottai: New Gamma Publishing House, 2011.

Web Sources

1. <https://www.esaral.com/exponential-and-logarithmic-functions-class-12-iit-jeeexponential-and-logarithmic-functions-notes-for-class-12-iit-jee/>
2. <https://faculty.math.illinois.edu/~r-ash/Algebra/Chapter1.pdf>
3. https://www.whitman.edu/mathematics/calculus_online/section16.05.html
4. <https://www.sjsu.edu/me/docs/hsu-Chapter%203%20Vectors%20and%20Vector%20Calculus%20pdf.pdf>
5. <https://byjus.com/maths/eigen-values/>

6. https://groupprops.subwiki.org/wiki/Equivalence_of_definitions_of_group
7. <https://ncert.nic.in/ncerts/l/keep210.pdf>
8. <https://nptel.ac.in/content/storage2/courses/122104019/numerical-analysis/Rathish-kumar/least-square/r1.htm>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
UG PROGRAMME
SEMESTER - II
ABILITY ENHANCEMENT COMPULSORY COURSE – II: VALUE EDUCATION
(21UVED21)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK : 1
CREDIT : 1
DURATION : 15 hrs

INT. MARKS: 40
EXT. MARKS: 60
MAX. MARKS: 100

Preamble

This course aims to promote the values of peace, non-violence, religious tolerance and secular thinking among the learners and equip the learners for a harmonious living in the multi-cultural pluralistic society.

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 [K4]:** examine the importance of harmonious living in the multi-cultural pluralistic society.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	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 [K4]	1	1	-	1	2	1	1
Weightage of the course	08	05	01	05	09	04	07
Weighted percentage of Course contribution to POs	1.31	1.03	0.49	1.71	6.92	2.12	4.58

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

UNIT I – VALUES AND INDIVIDUAL (3 hrs)

Meaning of values – classification of values – Need for value education – Personal values like adaptability, courage, cheerfulness, dignity of labour and self control – Self discipline - Self Confidence - Self initiative - Social values like sacrifice, forgiveness, Honesty, good manners, tolerance, friendship, hospitality, cooperation and civic sense – Moral values like purity, dedication, punctuality, loyalty, truthfulness and sense of duty.

UNIT II – VALUES AND SOCIETY (3 hrs)

Definition of society – democracy – secularism – socialism – Human rights – social integration – Social Justice – Role models: Akbar, Balagangadhar Tilak, Abdul Kalam, Mother Theresa.

UNIT III – VALUES AND RELIGIONS (3 hrs)

Values in Hinduism, Christianity, Islam and Buddhism – Need for religious harmony inter faith dialogue – Role Models: Vivekananda, Narayana Guru, Aravindar, Tagore, Vallalar Ramalingar, Gandhi.

UNIT IV – VALUES AND NATIONAL INTEGRATION (3 hrs)

Secularism and National Integration – Message from the life of Gandhiji, Nehru, Bharathi, Subash Chandra Bose, Sarojini Naidu etc.

UNIT V – VALUES AND SCIENCE (3 hrs)

Indian Gurus – Indian Scientists – Indian Universities – Indian Mathematicians and World Scientists – Science and Religion – Science, Technology development and values – Science and Human values.

TEXTBOOK

1. Pitchaikani Prabhakaran, A. Babu Franklin, M.Archanadevi, *Value education*, Sri Kaliswari College (Autonomous), Sivakasi, 2017.

REFERENCES

BOOKS

1. Subramanyam, K. *Values in Education*, Ramana Publications, 1995.
2. Swamy Chidbhavananda, *Indian National Education*, Publication by Ramakirshna Tapovanam.
3. அறிஞர் குழு (தொகுப்பு). *வாழ்வியல் விழுமியங்கள்*, உலக சமுதாய சேவா சங்கம், ஆழியாறு.

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 - II

SKILL ENHANCEMENT COURSE - II: BIOFERTILIZERS (21UCHS21)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK : 2

CREDITS : 2

DURATION : 30 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This paper enables the students to gain knowledge in processing, production and application of bio fertilizers.

Course Outcomes (CO)

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

C01 [K1]: outline types, production and field application of bio fertilizers

C02 [K2]: explain nitrogen fixing microorganisms, soil fertility and organic farming

C03 [K3]: make use of the knowledge of bio fertilizers and soil fertility in organic farming

C04 [K4]: classify the types of nitrogen fixing and phosphate solubilizing microorganism, methods of making, biogas, bio compost and vermicomposting

C05 [K4]: examine the bio fertilizers in rice and crop cultivation.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	P01	P02	P03	P04	P05	P06	P07
C01 [K1]	3	2	-	1	-	-	-
C02 [K2]	3	2	1	-	-	1	-
C03 [K3]	3	2	1	1	-	1	-
C04 [K4]	3	2	1	1	1	1	1
C05 [K4]	2	2	1	1	-	1	1
Weightage of the course	14	10	4	4	1	4	2
Weighted percentage of Course contribution to POs	2.3	2.05	1.96	1.37	0.77	2.12	1.31

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

UNIT I – BIOFERTILIZERS (6 hrs)

Biofertilizers – Introduction – Types of Biofertilizers – Application of Biofertilizers – Nitrogen Fixing Microorganism (Symbiotic & a symbiotic) – Phosphate Solubilising Microorganisms – Fungi, Mycorrhizae.

UNIT II – ALGAE (6 hrs)

Cyanobacteria (Blue Green Algae), Azolla and Anabaena Azollae Association, Nitrogen Fixation, Blue Green Algae and Azolla in Rice Cultivation.

UNIT III – MYCORRHIZAL (6 hrs)

Mycorrhizal Association, Types of Mycorrhizal Association, Taxonomy, Occurrence and Distribution, Phosphorous Nutrition, Growth and Yield – Colonization of VAM – Colonization – Isolation and Inoculation, Production of VAM and its Growth and Yield of Crop Plants.

UNIT IV – SOIL FERTILITY (6 hrs)

Soil Fertility and Fertilizers – Soil Microbiology and Biofertilizers – Biogas Production from Organic Biofertilizers – Biogas from Liquid Biofertilizers Derived from Banana & Coffee Processing.

UNIT V – ORGANIC FARMING (6 hrs)

Organic Farming – Green Manuring & Organic Fertilizers, Recycling of Biodegradable Municipal, Agricultural & Industrial Wastes – Bio Compost Making Methods, Types and Method of Vermicomposting – Field Application.

TEXTBOOKS

1. Somani L. L., Shilpkar P., and Shilpkar D., *Biofertilizers Commercial Production*. Agrotech Publisher, 2011.
2. Subba Rao N. S., *Soil Microorganism and Plant Growth*. New Delhi: Oxford & IBH Publishing Co. Pvt. Ltd, 1995.

REFERENCES

Books

1. Mahendra Rai., *Handbook of Microbial Biofertilizers*, New York: The Haworth Press, Inc, 2005.
2. Kannian S., *Biotechnology of Biofertilizers*, Texas: CHIPS, 2003.
3. *The Complete Technology Book on Vermiculture and Vermicompost*. NIIR, New Delhi: Asia Pacific Business Press Inc., 2004.

Web Sources

1. <https://youtu.be/n9ApzeroSqY>
2. <https://youtu.be/zQvkT0vQdZ0>
3. <https://www.youtube.com/watch?v=8PkKKeb8Up0>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
UG PROGRAMME
SEMESTER – II
DISASTER MANAGEMENT (21UDMG21)
(From 2021-2022 Batch onwards)

HOURS/WEEK : 1
CREDIT : 1
DURATION : 15 hrs

INT. MARKS : 40
EXT. MARKS : 60
MAX. MARKS : 100

Preamble

This course introduces the learners to know the causes and impact of disasters and the agencies for disaster management in India.

Course Outcomes (CO)

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

CO1 [K1]: outline the causes and impact of disasters

CO2 [K2]: explain the features of national policy on disaster management

CO3 [K3]: present the issues in rehabilitation

CO4 [K4]: classify the mitigation measures

CO5 [K5]: assess the role of the agencies for disaster management.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	P01	P02	P03	P04	P05	P06	P07
CO1 [K1]	2	1	1	1	-	2	2
CO2 [K2]	2	1	-	1	-	-	1
CO3 [K3]	1	2	1	1	-	-	2
CO4 [K4]	1	2	-	1	1	2	2
CO5 [K5]	1	2	-	1	1	-	1
Weightage of the course	07	08	02	05	02	04	08
Weighted percentage of Course contribution to POs	1.15	1.64	0.98	1.71	1.54	2.12	5.23

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

UNIT I (3 hrs)

Introduction – Disaster – Hazards – Causes and Impact of Disasters – Levels of Disaster – Casual Factors of Disaster – Phases of a Disaster.

UNIT II (3 hrs)

Disaster Mitigation – Risk Reduction Measures – Mitigation Actions – Disaster Management Cycle – Classification of Mitigation Measures.

UNIT III (3 hrs)

Disaster Preparedness and Planning – Objectives – Strategies – Elements of Disaster Preparedness – Principles of Disaster Planning.

UNIT IV (3 hrs)

Disaster Rehabilitation – Issues in Rehabilitation – Objectives – Approaches – Elements of a Rehabilitation Programme.

UNIT V (3 hrs)

Framework Disaster Management in India – Features of National Policy on Disaster Management – Primary and Secondary Relief Functions of Central Government – Disaster Management Act 2005 – Agencies for Disaster Management: India Red Cross Society, NIDM – Bharat Scouts and Guides, India Paramilitary Forces.

TEXTBOOK

1. Satish Modh. *Introduction to Disaster Management*. New Delhi: Macmillan Publishers India Limited, 1st Edition, 2015.

REFERENCES

Books

1. Balamurugan P K and Ajith Kumar S. *Disaster Management*. Chennai: New Century Book House Private Limited, 1st Edition, 2020.
2. Dasgupta R. *Disaster Management and Rehabilitation*. New Delhi: Mittal Publications, 1st Edition, 2010.
3. Narayanan B. *Disaster Management*. New Delhi: A.P.H. Publishing Corporation, 1st Edition, 2009.

Web Sources

1. <https://nptel.ac.in/courses/105/104/105104183/>
2. <https://nidm.gov.in/>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF TAMIL
UG Programme - B.A/B.Sc/BCA
SEMESTER - III
பொதுத்தமிழ் - III (21UTAL31)
(From 2021-2022 Batch onwards)

HOURS / WEEK: 6
CREDITS : 3
DURATION : 90 hrs

INT. MARKS: 40
EXT. MARKS: 60
MAX. MARKS: 100

நோக்கம்

காப்பியம், சிற்றிலக்கியம் ,உரைநடை உள்ளிட்ட இலக்கியவகைகளை அறிமுகம் செய்து, அவற்றைச் சமூக,சமயச் சூழலில் விளங்கவைத்து,யாப்பு,அணி உள்ளிட்டமொழிக் கட்டமைப்புகளை உணர்த்தி, உரைநடை மூலம்படைப்பாளராகும் தகுதியைப் பெறவைத்து, பல்வேறுநிகழ்வுகளில் நடைபெறும் போட்டிகளில் பங்கேற்கச் செய்யும் வகையில் இத்தாள் வடிவமைக்கப்பட்டுள்ளது.

கற்றலின் பயன்கள்

இத்தானை வெற்றிகரமாக முடித்தவுடன் மாணவர்கள்,

C01 [K1]: காப்பியங்களில் கூறப்பட்டுள்ள வாழ்வியல் நெறிகளாகிய அறம், பொருள், இன்பம், வீடு ஆகியவற்றைப் பற்றி அறிவர்.

C02 [K2]: செய்யுட்களில் இடம்பெறும் அணிநலன்களைக் காண்பர்.

C03 [K3]: யாப்புமரபைக் கற்றுணர்ந்து கவிதையை இனம் காணும் ஆற்றலைப் பெறுவர்.

C04 [K4]: சிற்றிலக்கியங்கள் உணர்த்தும் சமூகத்தையும் விழுமியத்தையும் விவாதிக்கும் திறனைப் பெறுவர்.

C05 [K4]: சமயங்கள் உணர்த்தும் அறக்கருத்துக்களைப் பகுப்பாய்வுசெய்வர்.

CO-PO Mapping Table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
C01 [K1]	2	1	-	1	-	-	-
C02 [K2]	2	1	-	1	-	-	-
C03 [K3]	2	2	-	2	1	-	-
C04 [K4]	2	2	1	2	-	1	1
C05 [K4]	2	2	1	2	1	1	1
Weightage of the Course	10	8	2	8	2	2	2
Weighted percentage of Course Contribution to POs	1.64	1.64	0.98	2.73	1.54	1.06	1.31

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

கூறு I**(18 hrs)**

காப்பியம் I: காப்பிய இலக்கியவரலாறு, சிலப்பதிகாரம் - அடைக்கலக்காதை (முழுவதும்) - மணிமேகலை - பளிக்கறைபுக்ககாதை (முழுவதும்) - சீவகசிந்தாமணி - காந்தர்வதத்தையார் இலம்பகம் (தேர்ந்தெடுக்கப்பட்ட 15 பாடல்கள்) - சிலைத்தொழிற் (657), கருங்கொடிப் புருவம் (658), திருமலர்க் கமலத் (662), விடுகணைவிசையின் (701), கழித்தவேலேறு (715), தடங்கணாள் பணியினால் (716), சுரந்துவானம் (717), நீர்நின் றளகிற் (718), கல்சேர் பூண்கொள் (719), இருநிலமடந்தை (720), தீந்தொடைநரம்பின் (721), பணிவரும் (722), விண்ணவர் வியப்ப (729), பருந்தும் நிழலும் (730), பண்ணொன்றுபாட (735)

கூறு II**(18 hrs)**

காப்பியம் II: திருவிளையாடற்புராணம் - கடல் சுவறவேல்விட்ட படலம் முழுவதும் - (19 பாடல்கள்) - கம்பராமாயணம் - ஆரணியகாண்டம் - சவரிபிறப்புநீங்கு படலம் முழுவதும் (9 பாடல்கள்) - பாரதிதாசன் - சஞ்சீவிபர்வதத்தின் சாரல் (முழுவதும்)

கூறு III**(18 hrs)**

சிறுநிலக்கியம்: சிறுநிலக்கியவரலாறு, காரைக்காலம்மையார் - அற்புதத் திருவந்தாதி - (1-15 பாடல்கள்) - மீனாட்சியம்மைபிள்ளைத்தமிழ்-வருகைப்பருவம் (10 பாடல்கள்) - முக்கூடற்பள்ளு - குடிமை - பெருமை (12-22 பாடல்கள்)

கூறு IV**(18 hrs)**

உரைநடை: உரைநடையின் தோற்றமும் வளர்ச்சியும், சொல்லின் செல்வன் - க.நஞ்சையன், படிப்பது எப்படி? - ம.திருமலை, தொல்காப்பியத்தில் கோளியல் நெறி - ச.பாரிஜாதம், பாவேந்தரின் சமுதாயப் பார்வை - பாக்கியமேரி, இசையும் இயல்பும் - கி.ஈஸ்வரி, கம்பராமாயணத்தில் உறவுகள் - பெ.மகேஸ்வரி

கூறு V**(18 hrs)**

யாப்பு: பாவின் பொதுவிலக்கணமும் வகைகளும் (வெண்பா - ஆசிரியப்பா - கலிப்பா - வஞ்சிப்பா) **அணிகள்:** உவமையணி - உருவகஅணி - பிறிதுமொழிதல் அணி - வேற்றுமையணி - தற்குறிப்பேற்ற அணி - சிலேடைஅணி

பாடநூல்

1. தொகுப்பு நூல், தமிழியல் துறை, ஸ்ரீ காளீஸ்வரிகல்லூரி (தன்னாட்சி), சிவகாசி.

பார்வைநூல்கள்

1. சீனிவாசன், ரா. சீவகசிந்தாமணி, அணியகம், சென்னை, 2000.
2. தமிழண்ணல். புதியநோக்கில் தமிழ் இலக்கியவரலாறு, மீனாட்சி புத்தகநிலையம், மதுரை, 2008.
3. ஜகந்நாதன். கி.வா. தமிழ்க் காப்பியங்கள் (ஆராய்ச்சி), அமுதநிலையம் லிமிடெட், சென்னை, 1991.

வலைப்பதிவுகள்(Web Sources)

1. <https://youtu.be/AY7R2D2GGQA>
2. <https://youtu.be/hmqTbZjrnu0>
3. www.tamilvu.org/ta/courses-degree-c031-c0313-html-c0313211-18030
4. <https://ta.m.wikipedia.org/wiki/தமிழில்சிறுநிலக்கியங்கள்>
5. <https://youtu.be/Q7du9EgImBg>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF ENGLISH
UG Programme - B.A./B.SC./BCA
SEMESTER - III
COMMUNICATIVE ENGLISH - III (21UENL31)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 6

CREDITS : 3

DURATION : 90 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course helps the learners to develop their communication skills in English through listening, speaking, reading and writing practices.

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 listening to telephonic conversations

CO2 [K2]: demonstrate effective speaking skills by making speech presentations, discussing television programmes and sports events

CO3 [K3]: apply knowledge of word power and grammar rules through diary writing, dialogue writing and writing newspaper reports

CO4 [K4]: analyze short fiction to develop language skills through literature

CO5 [K6]: construct grammatically correct and logically coherent essays on global problems and environmental issues

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	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 [K6]	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	1.64	1.64	1.47	3.07	2.31	1.59	1.31

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

UNIT I - LISTENING AND SPEAKING (18 hrs)

A. Listening

Listening to short speech
Listening to telephonic conversation
Listening to poetry

B. Speaking

Telephone etiquette in telephone conversation
Answering the Telephone and asking for someone
Making enquiries on the phone, Leaving messages
Presentation: Global Warming, Pollution, Women Empowerment, Communicable Diseases, System of Education, Economy, Industry, Government etc
Discussion: Television Programmes, Lessons, College facilities, Local facilities, Sports-watching or Playing, Types of food, Types of transport.

UNIT II - READING AND WRITING (18 hrs)

Reading: Comprehension Passages: Newspaper articles, Reports and Paraphrase Stories.

Writing: Diary Writing, Dialogue Writing, Report Writing: Newspaper Reports, Field visits, Meetings and Future Plans

UNIT III - WORD POWER (18 hrs)

Portmanteau words
Idioms & Phrases
Words related to- Work, Time, Distance and Dimension, Environment, The Natural World and Global Problems

UNIT IV - GRAMMAR (18 hrs)

Sentence-Subject and Predicate
Kinds of Sentences
Sentence Patterns
Question Words and Framing Questions
Question Tags
Degrees of Comparison
Voice

UNIT V - LANGUAGE THROUGH LITERATURE (18 hrs)

Abridged version of Fiction

Alexandre Dumas	- The Count of Monte Cristo
Charles Dickens	- Oliver Twist
R.M. Ballantyne	- The Coral Island

TEXTBOOKS

1. Dickens, Charles. *Oliver, Twist*. Chennai: Nesting Books Publishing and Distributors (p) Ltd, 2018.
2. Dumas, Alexandre. *The Count of Monte Cristo*. Chennai: Nesting Books Publishing and Distributors (p) Ltd, 2018.
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4. Pillai, Radhakrishna and K.Rajeevan. *Spoken English for You (Level One)*. Chennai: Emerald Publishers, 2009.

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1. *Life Skills* (Jeevan Kaushal) *Facilitators' Guidelines*. New Delhi: University Grants Commission, 2021.
2. Dickens, Charles. *Oliver Twist*. Bangalore: Vasan Publications, 2011.
3. Sadanand, Kamalesh and Susheela Punitha. *Spoken English - A Foundation Course for speakers of Tamil*. Mumbai: Orient Blackswan, 2009.
4. Taylor, Grant. *English Conversation Practice*. New Delhi: Tata McGraw Hill Publishers, 2001.

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1. <https://www.cleverism.com/skills-and-tools/presentation-skills/>
2. <https://www.vappingo.com/word-blog/86-great-examples-of-portmanteau/>
3. <https://blog.hubspot.com/service/phone-etiquette>
4. <https://www.talkenglish.com/lessonindex.aspx>
5. <https://www.englishhelper.com/>
6. <https://www.englishpage.com/>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER - III
CORE COURSE - V: GENERAL CHEMISTRY – III (21UCHC31)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK : 4

CREDITS : 4

DURATION : 60 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course enables the students to gain knowledge in aromaticity, error analysis, colloidal science, photo chemistry and phase equilibrium.

Course Outcomes (CO)

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

CO1 [K1]: define the terms of colloids, error analysis, photochemistry and phase equilibrium

CO2 [K2]: explain reactions of aromatic compounds, properties of colloids and laws of photochemistry

CO3 [K3]: determine orientation effect of substituent present in aromatic compounds, quantum yield of photochemical reactions, the properties of phase equilibria

CO4 [K4]: distinguish activating and deactivating substituent, types of catalyst, adsorption and properties of colloids

CO5 [K4]: deduce stability of aromatic compounds by Huckel's rule, types of photophysical processes and systems with congruent and incongruent melting point.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	2	1	1	-	-	1
CO2 [K2]	3	2	1	1	-	1	-
CO3 [K3]	3	2	1	1	1	1	1
CO4 [K4]	3	2	1	1	1	1	-
CO5 [K4]	3	3	2	2	1	1	1
Weightage of the course	15	11	6	6	3	4	3
Weighted percentage of Course contribution to POs	2.46	2.26	2.94	2.05	2.31	2.12	1.96

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

UNIT I – AROMATIC COMPOUNDS (12 hrs)

Aromaticity - Definition - Huckel's Rule - Consequence of Aromaticity - Stability, Carbon-Carbon Bond Lengths in Benzene Ring-Resonance Energy - Aromatic Electrophilic Substitution Reaction - Mechanism - Nitration, Halogenation, Sulphonation, Mercuration and Friedel-Crafts Reaction - Activating and Deactivating Substituents - Orientation in Mono Substituted Benzenes - Reactions of Aromatic Side Chain - Halogenation and Oxidation - Methods of Formation and Chemical Reactions of Alkylbenzenes, Biphenyl, Naphthalene and Anthracene.

UNIT II – ERROR ANALYSIS (12 hrs)

Significant Figures – Rounding off the Numerical Expressions and its Application – Accuracy, Precision, Method for Improving Accuracy - Rejection of Data - Presentation of Tabulated Data - Scatter Diagram – Method of Least Squares and its Basic Principle.

Errors: Types of Error - Absolute and Relative Error, Methods of Eliminating or Minimizing Errors - Methods of Expressing Error

UNIT III – SURFACE CHEMISTRY (12 hrs)

Definition- Types of catalysis – Theories of catalysis - Enzyme Catalysis - Michaelis-Menton Mechanism. **Adsorption**: Characteristics of adsorption - Physical adsorption and chemical adsorption – Factors affecting adsorption. **Various Adsorption Isotherms**: Freundlich Adsorption Isotherm - Langmuir Adsorption Isotherm-BET isotherm(derivation not necessary) - **Colloids**: Definition - Classifications- Preparation of Colloids - Kinetic, Optical and Electrical Properties of Colloids - Stability of Colloids, Protective Action – Hardy - Schulze Law - Gold Number - Application of Colloids.

UNIT IV – PHOTOCHEMISTRY (12 hrs)

Definition - Dark or Thermal Reactions – Photochemical Reactions – Difference between Thermal and Photochemical Reactions-Photochemistry Laws: Absorption of Light – Beer-Lambert Law – Validity of Beer's Law – Deviation from Beer's Law – Laws of Photochemistry – Law of Photochemical Equivalence - Quantum Yield - Factors Affecting Quantum Yield. Photo Physical Process: Jablonski Diagram - Luminescence – Fluorescence – Phosphorescence – Chemiluminescence – Photosensitization – Bioluminescence. Photochemical Kinetics: Dissociation of HI – Hydrogen and Chlorine Reaction – Reaction between Hydrogen and Bromine.

UNIT V – PHASE EQUILIBRIA (12 hrs)

Definition of Terms- Phase, Components and Degrees of Freedom – Derivation of Gibbs Phase Rule. One Component System: Water System - Sulphur System –Two Component Systems: Reduced Phase Rule - Simple Eutectic System: Pb-Ag System, KI-Water System. System with Congruent and Incongruent Melting Point: Congruent Melting Point - Mg-Zn System – Incongruent Melting Point – Na₂SO₄. 10H₂O.

TEXTBOOKS

1. Arun Bahl and Bahl B. S., *A Text Book of Organic Chemistry*. New Delhi: S. Chand & Company, 2013.
2. Arun Bahl and Bahl B. S., *Essential of Physical Chemistry*. New Delhi: S. Chand & Company, 2013.

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1. Glasstone Samuel. *Textbook of Physical Chemistry*. 2nd Edition, Macmillan, 1948.
2. Finar I. L., *Organic Chemistry*. 6th Edition, India, Pearson Education, 2002.
3. Puri B. R., Sharma L. R. and Madan S. Pathania. *Textbook of Physical Chemistry*. Jalandhar: Vishal Publishing & Co, 2008.
4. Soni P. L. *Textbook of Organic Chemistry*, New Delhi: S. Chand & Company, 2008.

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1. <https://www.youtube.com/watch?v=QpNfPwYoJdg>
2. <https://www.youtube.com/watch?v=QWjufDhjbdc>
3. <https://www.youtube.com/watch?v=WBjJhgDXIUk>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

**DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER - III**

**CORE COURSE - VI: PRACTICAL: ANALYTICAL CHEMISTRY (21UCHC3P)
(From 2021 - 2022 Batch onwards)**

HOURS/WEEK: 4

CREDITS : 3

DURATION : 60 hrs

INT. MARKS: 50

EXT. MARKS: 50

MAX. MARKS: 100

Preamble

This course enables the learners to acquire practical knowledge in water treatment and electrochemistry.

Course Outcomes (CO)

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

CO1 [K2]: illustrate about the physical and chemical parameters of water such as hardness, alkalinity and dissolved oxygen content

CO2 [K2]: outline the terms of corrosion, pH, micelles, surfactants and polymers

CO3 [K3]: determine the molecular weight of polymers by using Ostwald viscometer and critical micelle concentration by conductivity measurement

CO4 [K4]: examine Winkler, Ostwald viscometer and weight loss method

CO5 [K5]: evaluate rate of corrosion, hardness, alkalinity, strength and dissolved oxygen of the given samples.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K2]	3	2	-	1	-	-	1
CO2 [K2]	3	2	1	1	1	1	-
CO3 [K3]	3	2	1	1	1	1	1
CO4 [K4]	3	3	2	1	-	1	-
CO5 [K5]	3	3	2	2	1	1	1
Weightage of the course	15	12	6	6	3	4	3
Weighted percentage of Course contribution to POs	2.46	2.46	2.94	2.05	2.31	2.12	1.96

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

LIST OF EXPERIMENTS

1. Determination of Total, Temporary and Permanent of Hardness of Water by EDTA Method.
2. Determination of Dissolved Oxygen (DO) Content of Water Sample by Winkler Method.
3. Determination of Alkalinity in Water Sample.
4. Determination of Strength of Given Acids by using pH Meter.
5. Determination of Rate of Corrosion by Weight Loss Method.
6. Determination of Critical Micelle Concentration (CMC) of Surfactant by Conductivity Measurement.
7. Determination of Molecular Weight of Polymers using Ostwald Viscometer.

REFERENCES

Books

1. Thomas A. O., *Practical Chemistry*. Kerala: Scientific Book Centre, 1999.
2. Renu Gupta. *Practical physical Chemistry*. Kerala: New Age International Pvt. Ltd Publishers, 2017.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme –B.Sc. Chemistry
SEMESTER - III
ALLIED COURSE - III: PHYSICS - I (21UCHA31)
(From 2021-2022 Batch onwards)

HOURS/WEEK : 4	INT. MARKS : 40
CREDITS : 4	EXT. MARKS : 60
DURATION : 60 hrs	MAX. MARKS : 100

Preamble

This course familiarizes the learners with the basic concepts of strength of materials, viscous properties of liquids, modes of heat transmission, geometrical and physical optics.

Course Outcomes (CO)

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

- CO1 [K1]:** outline the basic concepts of properties of matter, heat transmission, geometrical and physical optics
- CO2 [K2]:** explain the basic concepts of properties of matter, heat transmission, geometrical and physical optics
- CO3 [K3]:** choose appropriate formulae to solve problems
- CO4 [K4]:** analyze the physical and optical parameters of materials
- CO5 [K4]:** examine the physical and optical parameters of materials.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	-	1	-	1	-
CO2 [K2]	3	1	-	2	-	1	-
CO3 [K3]	3	3	1	1	-	1	1
CO4 [K4]	2	3	2	1	-	1	1
CO5 [K4]	2	3	2	1	1	1	1
Weightage of the Course	13	11	5	6	1	5	3
Weighted percentage of Course contribution to POs	2.13	2.26	2.45	2.05	0.77	2.65	1.96

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

UNIT I – ELASTICITY**(12 hrs)**

Elasticity – Different Moduli of Elasticity – Torsion of a Body – Work Done in Twisting a Wire – Torsional Oscillations of a Body – Rigidity Modulus by Dynamic Torsion Method (Torsional Pendulum) – Bending of Beams – Expression for Bending Moment – Depression at the Mid-Point of a Beam Loaded at the Middle – Uniform Bending of a Beam – Determination of Young's Modulus.

UNIT II – VISCOSITY**(12 hrs)**

Viscosity – Streamline Flow and Turbulent Flow – Poiseuille's Formula for the Flow of a Liquid Through a Capillary Tube – Poiseuille's Method for Determination of Coefficient of Viscosity of a Liquid (Constant and Variable Pressure Head) – Ostwald Viscometer – Terminal Velocity and Stoke's Formula – Stoke's Method for the Coefficient of Viscosity – Friction and Lubrication.

UNIT III – TRANSMISSION OF HEAT**(12 hrs)**

Conduction – Coefficient of Thermal Conductivity – Forbe's Method – Lee's Disc Method for Bad Conductors – Convection – Central Heating System – Thermopile – Thermos Flask – Radiation – Black Body in Practice – Kirchhoff's Law – Stefan-Boltzmann Law – Distribution Energy in Black Body Spectrum – Planck's Radiation Law (No Derivation) – Solar Constant – Temperature of the Sun – Water Flow Pyroheliometer.

UNIT IV – GEOMETRICAL OPTICS**(12 hrs)**

Cardinal Points of an Optical System – Graphical Construction of Image using Cardinal Points – Newton's Formula – Cardinal Points of a Coaxial System of Two Thin Lenses. Angular and Chromatic Dispersion of a Prism – Achromatic Combination of Prism – Deviation without Dispersion – Dispersion without Deviation – Direct Vision Spectroscope – Aberration – Spherical and Chromatic Aberrations in Lenses.

UNIT V – PHYSICAL OPTICS**(12 hrs)**

Interference in a Wedge-Shaped Film – Air Wedge – Newton's Rings – Theory and Experiment. Types of Polarization – Double Refraction – Nicol Prism – Optical Activity – Biot's Laws for Rotatory Polarisation – Specific Rotation – Laurent's Half Shade Polarimeter – Determination of Specific Rotation of Sugar Solution. Resolving Power – Rayleigh's Criterion for Resolution – Limit of Resolution of the Eye – Resolving Power of a Microscope.

TEXTBOOKS

1. Murugesan R. *Properties of Matter*. New Delhi: S.Chand & Co., Fifth Edition, 2020. (Unit I & II)
2. Brij Lal, Subramanyam N and Hemne P.S. *Heat Thermodynamics and Statistical Physics*. New Delhi: S. Chand & Company Ltd., Revised Edition, Reprint 2020. (Unit III)

3. Subraminyam N, Brij lal and Avadhanulu M.N., *A Textbook of Optics*. New Delhi: S. Chand & Company Ltd., 25th Revised Edition, Reprint 2018. (Unit IV & V)

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Books

1. Mathur D. S. *Elements of Properties of Matter*. New Delhi: Chand & Company Ltd., Revised Edition, 2007.
2. Mathur D. S and Bapat M. N. *Heat and Thermodynamics*. New Delhi: Sultan Chand & Sons, Fifth Edition, Reprint 2014.
3. Kakani S. L, and Bhandari K. C. *A Textbook of Optics*. New Delhi: Sultan Chand & Sons, Second Edition, Reprint 2015.

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2. <https://www.pdfdrive.com/general-properties-of-matter-e157569735.html>
3. <https://www.pdfdrive.com/heat-and-themodynamics-by-mark-waldo-zemanskyrichard-dittman-d37736570.html>
4. <https://www.youtube.com/watch?v=wTElYtivVhM>
5. https://www.youtube.com/watch?v=6_C8KyU67RU

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – B.Sc. Chemistry
SEMESTER - III
ALLIED COURSE - III: PRACTICAL: PHYSICS - I (/21UCHA3P)
(From 2021-2022 Batch onwards)

HOURS/WEEK : 2	INT. MARKS : 50
CREDIT : 1	EXT. MARKS : 50
DURATION : 30 hrs	MAX. MARKS : 100

Preamble

This course enables the learners to acquire practical skill to determine material's specific physical parameters and study the behaviour of electrical circuits by applying physics concepts.

Course Outcomes (CO)

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

- CO1 [K1]:** identify the concepts of physics underlying in the experiments
- CO2 [K2]:** demonstrate the concepts of physics underlying in the experiments
- CO3 [K3]:** calculate the physical parameters of a matter/electrical circuits from the experimental data
- CO4 [K4]:** analyze the experimental results
- CO5 [K5]:** evaluate the physical parameters of a matter/electrical circuits.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	2	-	-	-	1	-
CO2 [K2]	2	2	1	1	-	2	-
CO3 [K3]	2	2	1	1	1	1	1
CO4 [K4]	2	2	2	1	1	1	1
CO5 [K5]	2	3	1	1	1	1	1
Weightage of the course	10	11	5	4	3	6	3
Weighted percentage of Course contribution to POs	1.64	2.26	2.45	1.37	2.31	3.17	1.96

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

LIST OF EXPERIMENTS (ANY 8):

1. Determination of Young's Modulus of Elasticity of Material of the Beam by Uniform Bending Method using Pin and Microscope
2. Determination of Young's Modulus of Elasticity of Material of the Beam by Non-Uniform Bending Method using Optic Lever
3. Determination of Rigidity Modulus of the Material of Wire by Torsional Oscillations Method
4. Determination of Co-efficient of Viscosity of Water by Capillary Flow Method
5. Determination of Acceleration due to Gravity 'g' and Radius of Gyration of a Compound Bar Pendulum about Its Center of Gravity
6. Determination of Co-efficient of Thermal Conductivity of a Bad Conductor by Lee's Disc Method
7. Determination of Specific Heat of a Liquid by Newton's Law of Cooling Method
8. Determination of Specific Heat Capacity of Solid by the Method of Mixtures
9. Determination of Diameter of a Thin Wire by Air Wedge Arrangement
10. Determination of Refractive Index of Material of a Prism by Minimum Deviation Method
11. Studying the Characteristics of LCR – Series Resonance Circuit and Finding Associated Parameters
12. Calibration of Low Range Voltmeter using Potentiometer

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.

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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.

Web Sources

1. <http://arunkumard.yolasite.com/resources/3%20Young's%20Modulus%20Uniform%20Bending.pdf>

2. <http://www.egyankosh.ac.in/bitstream/123456789/18814/1/Experiment-5.pdf>
3. http://www.iiserpune.ac.in/~bhasbapat/phy221_files/Lee's%20Method.pdf

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

NON-MAJOR ELECTIVE COURSE - I: CHEMISTRY IN DAY TO DAY LIFE (21UCHN31)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK : 2

CREDIT : 1

DURATION : 30 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course introduces the students to the land mark achievements of the basic manufacturing process of polymers, metals, & non-metals chemicals used in everyday life.

Course Outcomes (CO)

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

CO1 [K1]: recognize the significance of chemistry involved in polymers, fuels, metals & non-metals

CO2 [K2]: examine the basic idea about the significance of polymers

CO3 [K3]: determine the hardness of water

CO4 [K3]: formulate the quality of tooth paste and tooth powder

CO5 [K4]: distinguish the differences between paints and varnishes.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	1	-	-	1	-	1	1
CO2 [K2]	2	-	-	1	-	1	1
CO3 [K3]	2	1	-	2	-	1	1
CO4 [K3]	2	2	-	2	-	1	1
CO5 [K4]	2	2	-	2	-	1	1
Weightage of the course	9	5	0	8	0	5	5
Weighted percentage of Course contribution to POs	1.48	1.03	0	2.73	0	2.65	3.27

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

UNIT I – WATER AND FUELS (6 hrs)

Water – Hardness of Water – Reverse Osmosis. Fuels – Classification of Fuels – Water Gas – Producer Gas – Marsh Gas – LPG- Crude Oil – Mobile Oil – Gasoline – Octane Number – Combustion - Composition of Match Head – Match Side – Fireworks.

UNIT II – POLYMERS (6 hrs)

Definition – Classification – PVC – Polythene –Teflon – Nylon – Terylene – Polyester – Rubber – Plastic – Paint – Pigment - Varnish – Dyes – Starch – Cellulose – Gum – Paper – Glass.

UNIT III – CHEMICALS USED IN DAY TO DAY LIFE (6 hrs)

Tooth Paste – Tooth Powder – Candle – Sugar – Common Salt – Baking Soda – Washing Soda – Dettol – Bleaching Powder – Detergent – Soap Oil.

UNIT IV – METALS, NON METALS AND ALLOYS (6 hrs)

Introduction – General Characteristics – Application. Metals: Gold – Silver – Copper – Tungsten - Aluminum. Non-Metals: Sulphur – Carbon - Graphite – Diamond - Phosphorus. Alloys: Steel – Stainless Steel- Bronze – Brass – Applications.

UNIT V – POLLUTION (6 Hrs)

Pollution – Pollutant – Classification – Sources – Green House Effect – Acid Rain – Ozone Layer Depletion – Fog – Smog – Photochemical Smog.

TEXTBOOK

1. B. K. Sharma. *Industrial Chemistry*, Meerut: Goel Publishing House, 14th Edition, 2004.

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1. K. Bagavathi Sundari. *Applied Chemistry*. Chennai: MJP Publisher, 2006.
2. Jain and Jain, *Engineering Chemistry*, New Delhi: Dhanpat Rai Publishing Company, 14th Edition, 2004.

Web Sources

1. https://www.youtube.com/watch?v=-Fprhdh_Ngl
2. <https://www.youtube.com/watch?v=jxK5rZxbyQY>
3. <https://www.youtube.com/watch?v=KpKerZxbnTfY>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF CHEMISTRY

UG Programme – B.Sc. Chemistry

SEMESTER - III

**SKILL ENHANCEMENT COURSE - III: COMPUTER APPLICATION IN CHEMISTRY
(21UCHS31)**

(From 2021 - 2022 Batch onwards)

HOURS/WEEK : 2

CREDITS : 2

DURATION : 30 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course explains various components of computer, types of computer and basics of internet and enables the students to gain knowledge of Microsoft word and spreadsheet application.

Course Outcomes (CO)

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

CO1 [K1]: detail on components of computer, internet access, MS-Word and MS-Excel

CO2 [K1]: locate advanced resources for accessing scholarly literature from internet

CO3 [K2]: illustrate the various types of computers and various operations performed in MS-Word and MS-Excel

CO4 [K3]: apply the basic operations of spreadsheet applications and MS-Word to draw graphs and charts, tools for drawing the chemical structure

CO5 [K4]: examine various operations of MS-Word and MS-Excel for documentation.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	-	-	-	-	1
CO2 [K1]	3	2	-	1	-	1	-
CO3 [K2]	3	2	1	1	-	1	1
CO4 [K3]	3	3	1	1	-	1	-
CO5 [K4]	2	3	2	1	1	1	-
Weightage of the course	14	11	4	4	1	4	2
Weighted percentage of Course contribution to POs	2.3	2.26	1.96	1.37	0.77	2.12	1.31

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

UNIT I – COMPUTER (6 hrs)

Computer – Definition – History of Computer – The Components of Computer – Input Unit – CPU – Output Unit – Secondary Storage Devices - Hardware and Software: System Software – Application Software – Types of Computer.

UNIT II – INTERNET (6 hrs)

Internet – Definition – Internet Access- Home Page – Search Engine - E- mail Sending and Receiving mail through Internet- Introduction to Google Scholar and Accessing Google Scholarly Literature from Internet, DOI.

UNIT III – MS-WORD (6 hrs)

MS-Word Introduction – Word for Windows – Creating and Saving Documents – Page Setup – Print Preview – Print - Edit – Redo, Cut, Copy, Paste, Find and Replace. Views – Normal, Print Layout, Ruler, Header and Footer. Insert – Page Number. Picture, Text Box, Word Art, Format Fonts (Size, Colors and Type), Bulleted Numbering, Border and Shading, Columns and Change Cases Tools – Spelling and Grammar mail Merge. Table – Draw Insert, Delete, Select, Split Columns and Rows.

UNIT IV – CHEMDRAW (6 hrs)

Chemdraw: Introduction to basic features of chemdraw - Chemical Structure to Name Conversion - Chemical Name to Structure-NMR spectrum simulation (both H¹ NMR & C¹³ NMR) Mass spectrum simulation – Structure clean up – export to PDF- Introduction to chem. Sketch – Molecular modeling – create and modifying images of chemical structures- write and perform chemical equation and diagrams.

UNIT V – SPREADSHEET APPLICATION (6 hrs)

Introduction to Spreadsheet (MS-Excel) - Creating a Spreadsheet, Entering and Formatting Information, Basic Functions and Formulae, Performing Basic Statistics using Spreadsheet - Creating Basic Graphs and Charts using Spreadsheet Applications.

TEXTBOOKS

1. James K. L., *The Internet a User's Guide*. New Delhi: Prentice Hall of India Private Limited, 2003.
2. David Laurence S., *MS Office*. Rajapalayam: Publication, JDP, 1st Edition, 2008.

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1. Raman K. V., *Computers in Chemistry*. Tata MC GrawHill Publisher, 5th Edition, 2003.
2. Crouch S. R., and Holler F. J., *Applications of MS Excel in Analytical Chemistry*. Thomson, 2004.

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1. <https://www.webucator.com/how-to/how-use-mail-merge-microsoft-word.cfm>
2. <https://www.youtube.com/watch?v=qwoTFEBO1DU>
3. <https://www.youtube.com/watch?v=ixX-G26-jTQ>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF TAMIL
UG Programme - B.A./B.SC./BCA
SEMESTER-IV

பொதுத்தமிழ் - IV (21UTAL41)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 6
CREDITS : 3
DURATION : 90 hrs

INT. MARKS: 40
EXT. MARKS: 60
MAX. MARKS: 100

நோக்கம்

சங்க இலக்கியங்களின் மேன்மைகளையும் வாழ்வியல் அறங்களையும் மாணவர்களுக்கு எடுத்துரைப்பதையும் புதின இலக்கியத்தை அறிமுகப்படுத்துவதையும் நோக்கமாகக் கொண்டு இத்தாள் வடிவமைக்கப்பட்டுள்ளது.

கற்றலின் பயன்கள்

- இத்தானை வெற்றிகரமாக முடித்தவுடன் மாணவர்கள்,
C01 [K1]: புதின இலக்கியவகைகளை அடையாளம் காண்பர்
C02 [K2]: சங்க இலக்கியங்களில் உள்ள அறக்கருத்துக்களை எடுத்துரைப்பர்
C03 [K3]: அக, புற இலக்கணங்களைக் கற்பர்
C04 [K4]: சங்க இலக்கியங்களின் வாயிலாகமக்களின் வாழ்க்கைமுறையினைப் பாகுபடுத்துவர்
C05 [K5]: பண்டையதமிழ் இலக்கிய ஆளுமைகளை மதிப்பிடுவர்.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
C01 [K1]	2	1	-	1	-	-	-
C02 [K2]	2	1	-	2	-	-	-
C03 [K3]	2	2	-	2	1	-	1
C04 [K4]	2	2	1	2	1	1	-
C05 [K5]	2	2	1	2	-	1	1
Weightage of the course	10	8	2	9	2	2	2
Weighted percentage of Course contribution to POs	1.64	1.64	0.98	3.07	1.54	1.06	1.31

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

கூறு I**(18 hrs)**

எட்டுத்தொகை இலக்கியவரலாறு - குறிஞ்சித்திணை - நற்றிணை: ஓங்குமலைநாட (55) - கழுதுகால்கிளர (255). முல்லைத்திணை - குறுந்தொகை: பெருந்தண் மாரிப்(94), மடவவாழிமஞ்சை (251). மருதத்திணை கலித்தொகை: அகந்துறை அணிபெற (73), புள்இமிழ் அகல் வயல்(79). நெய்தல் திணை -ஐங்குறுநூறு:தாய்க்குஉரைத்தபத்து(10 பாடல்கள்). பாலைத்திணை -அகநானூறு: வளம்கெழுதிருநகர்ப் (17), கடல்முகந்துகொண்டகமஞ்சுல் (43). பரிபாடல்: வையை - வளிபொருமின்னொடு(12). புறநானூறு: இரும்பனைவெண்தோடு(45) - எமக்கேகலங்கல் (298),பதிற்றுப்பத்து:ஐந்தாம்பத்தில் மாமலைமுழக்கின்.

கூறு II**(18 hrs)**

பத்துப்பாட்டு இலக்கியவரலாறு- பத்துப்பாட்டு: குறிஞ்சிப்பாட்டு (முழுவதும்)

கூறு III**(18 hrs)**

சங்கமருவியகால இலக்கியவரலாறு- திரிகடுகம்:தற்புகழ்ச்சிக்குக் கூடாதவை -தொல் அவையும்(8) -புகழ்க்குரிய மூவர் - மண்ணின் மேல் வான்(16),வீடுபேறுஅடையும் வழிகள் - பற்று(22) -கற்றறிந்தார் கடமை -நுண்மொழிநோக்கிப்பொருள்(32),நல்லோர் நெறி- சான்றாரூள் சான்றான் எனப்படுதல்(82). நாலடியார்: கூடாநட்பு (231-240).இனியவைநாற்பது: உடையான் வழக்கினிது(2) -மானம் அழிந்தபின்(13) - குழவிதளர்நடை(14) -பிறன்கைப் பொருள்வெளவான்(21) - வருவாய் அறிந்து (22). இன்னாநாற்பது: உண்ணாதுவைக்கும்(16) - மாரிநாள் கூவும்(20) - யானையில் மன்னாக்(22) - சிறையில்லா மூதாரின்(23) - ஏமம்இல் மூதார்(24).திருக்குறள்:அறத்துப்பால் - புகழ், இன்பத்துப்பால் - குறிப்பறிதல் (அதிகாரங்கள் முழுவதும்).

கூறு IV**(18 hrs)**

புதின இலக்கியவரலாறு,கூட்டுக்குஞ்சுகள் - இராஜம் கிருஷ்ணன்.

கூறு V**(18 hrs)**

இலக்கணம் - தொல்காப்பியர் குறிப்பிடும் திணைக்கோட்பாடுகள் - அகப்பொருள் - புறப்பொருள் - உள்ளுறை - இறைச்சி - விண்ணப்பம் - புகார் - பாராட்டுக் கடிதங்கள் - அறிக்கை - செய்திஎழுதுதல்.

பாடநூல்கள்

1. தொகுப்பு நூல்,தமிழியல் துறை, ஸ்ரீ காளீஸ்வரிகல்லூரி (தன்னாட்சி), சிவகாசி.
2. இராஜம் கிருஷ்ணன். கூட்டுக்குஞ்சுகள், நியூ செஞ்சரி புத்தகநிலையம், சென்னை, 2011.
3. வாசுதேவன், கா. பன்முகநோக்கில் தமிழ் இலக்கியவரலாறு, தேவன் பதிப்பகம், திருச்சிராப்பள்ளி, 2017.

பார்வை நூல்கள்

1. சுப்பிரமணியன், க. சங்ககாலச் சமுதாயம், ஜனசக்தி அச்சகம், சென்னை, 1993.
2. பாலசுப்பிரமணியன் சிற்பி & நீலபத்மநாபன் (பதி), புதியதமிழ் இலக்கிய வரலாறு. மணமலர்ப் பதிப்பகம், சென்னை, 2000.
3. பாலசுப்பிரமணியன், சி.தமிழ் இலக்கிய வரலாறு, மணமலர்ப் பதிப்பகம், சென்னை, 2003.
4. மோகன், இரா. பத்துப்பாட்டு மூலமும் உரையும், நியூ செஞ்சரி புத்தகநிலையம், சென்னை, 2004.

வலைப்பதிவுகள்(Web Sources)

1. https://youtu.be/Gv84KCknV_g
2. <https://youtu.be/B42bzKeb-aI>
3. <https://youtu.be/sLE4yH-7PeE>
4. <https://youtu.be/wdlw8CyEBP8>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF ENGLISH
UG Programme - B.A./B.SC./BCA
SEMESTER - IV
COMMUNICATIVE ENGLISH - IV (21UENL41)
(From 2021-2022 Batch onwards)

HOURS/WEEK: 6

CREDITS : 3

DURATION : 90 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course helps the learners to develop their communication skills in English through listening, reading, speaking and writing practices.

Course Outcomes (CO)

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

CO1 [K1]: relate and state ideas by listening to lectures and reading narratives

CO2 [K2]: demonstrate effective speaking skills through group discussions and answering interview questions

CO3 [K3]: apply knowledge of word power and grammar rules through drafting Memorandum, Minutes of the meetings and Agenda

CO4 [K4]: analyze tales from Shakespeare to develop language skills through literature

CO5 [K6]: construct grammatically correct and meaningful sentences for Covering letters and Resume Writing and thereby preparing students towards employability.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	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	1.64	1.85	1.47	2.73	1.54	1.59	1.96

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

UNIT I - LISTENING AND SPEAKING (18 hrs)

LISTENING

Listening to lectures

Listening to commentaries

Listening to narratives

SPEAKING

Welcome address and Vote of Thanks

Role Play

Anchoring

Group discussion

Interview questions

UNIT II - READING AND WRITING (18 hrs)

Reading Newspaper- articles, letter to editor, sports and entertainment

WRITING

Drafting:

Memorandum

Minutes of the meeting

Agenda

Resume writing & Covering letter

UNIT III - WORD POWER (18 hrs)

Words often confused

Analogy

Words related to- Health and Medicine, Pleasant and Unpleasant feelings,

Success and Failure, Science and Technology and Travel

UNIT IV - GRAMMAR (18 hrs)

Identify Phrases and Clauses

Transformation of Sentences: Reported speech, Simple, Compound and Complex Sentences

Error Spotting

UNIT V - LANGUAGE THROUGH LITERATURE (18 hrs)

TALES FROM SHAKESPEARE

Romeo and Juliet

A Midsummer Night's Dream

The Merchant of Venice

King Lear

Macbeth

TEXTBOOKS

1. Carthy Mc., and Felicity O'Dell. *English Vocabulary in Use (Upper intermediate)*. UK: Cambridge University Press, 2005.
2. Pillai, Radhakrishna G., and K.Rajeevan. *Spoken English for You (Level One)*. Chennai: Emerald Publishers, 2009.
3. Pillai, Radhakrishna G. *Emerald English Grammar and Composition*. Chennai: Emerald Publishers, 2016.

REFERENCES

Books

1. *Life Skills (Jeevan Kaushal) Facilitators' Guidelines*. New Delhi: University Grants Commission, 2021.
2. Radha, Alamelu and Kasthuri Bai. *Situational Grammar and Composition*. Chennai: New Century Book House Pvt. Ltd, 2008.
3. Sadanand, Kamalesh and Susheela Punitha. *Spoken English- A Foundation Course for speakers of Tamil*. Mumbai: Orient Blackswan, 2009.
4. Taylor, Grant. *English Conversation Practice*. New Delhi: Tata McGraw Hill Publishers, 2001.

Web Sources

1. <https://www.litcharts.com/how-to-guides/shakespeare-research-resources>
2. <https://steffesziri.files.wordpress.com/2019/04/illustrated-stories-from-shakespeare-0.pdf>
3. <https://www.talkenglish.com/lessonindex.aspx>
4. <https://www.englishhelper.com/>
5. <https://www.englishpage.com/>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER - IV
CORE COURSE - VII: GENERAL CHEMISTRY - IV (21UCHC41)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 4

CREDITS : 3

DURATION : 60 Hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course explains alkyl and aryl halides, Gravimetric analysis, p-block elements and various concepts of acids and bases.

Course Outcomes (CO)

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

CO1 [K1]: recognize the nucleophilic substitution reaction, condition of precipitation, properties of p-block elements and theories of acid and bases

CO2 [K2]: explain the mechanism of organic reaction, preparation and properties of compounds of p-block elements and the concept of pH

CO3 [K3]: present the addition and elimination reactions, gravimetric analysis, chemistry of oxoacids and reaction in non-aqueous solvents

CO4 [K4]: discriminate S_N^1 , S_N^2 and S_N^i mechanism, allotropic forms of elements and concepts of acids and bases

CO5 [K4]: compare reactivities of different halides, the relative strength of acids and bases.

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	-
CO3 [K3]	3	2	1	1	1	1	1
CO4 [K4]	3	3	1	2	-	1	-
CO5 [K4]	3	3	1	2	1	1	1
Weightage of the course	15	12	5	7	3	4	3
Weighted percentage of Course contribution to POs	2.46	2.46	2.45	2.39	2.31	2.12	1.96

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

UNIT I – HALOALKANES AND HALOARENES**(12 hrs)**

Classification of Alkyl Halides - Methods of Formation from Alcohols, Alkanes, Alkenes - Allylic/Benzylic Bromination and Chlorination -Hundiecker Reaction, Finkelstein Reaction and Swart's Reaction - Nucleophilic Substitution Reactions - Mechanisms of Nucleophilic Substitution Reactions - S_N^1 , S_N^2 and S_N^i , Reactions with Energy Profile Diagrams -Dehydrohalogenation with Mechanism -Saytzeff's Rule - Reaction with Metals - Wurtz Reaction and Formation of Grignard Reagent -Methods of Formation of Aryl Halides -Nucleophilic Substitution Reactions of Aryl Halides - Addition-Elimination and Elimination-Addition Mechanisms- Electrophilic Substitution -Ullmann Reaction - Wurtz-Fittig Reaction -Relative Reactivities of Alkyl,Allyl, Vinyl and Aryl Halides.

UNIT II – GRAVIMETRIC ANALYSIS**(12 hrs)**

Principles of Gravimetric Analysis - Characteristics of Precipitating Agents - Choice of Precipitants and Conditions of Precipitation -Specific and Selective Precipitants -DMG, Cupferron, Salicylaldehyde, Ethylene Diamine - Use of Sequestering Agents - Co Precipitation -Post Precipitation - Peptisation - Differences Reduction of Error - Precipitation from Homogeneous Solutions.

UNIT III – P-BLOCK ELEMENTS: I BORON, CARBON, NITROGEN FAMILY (12hrs)

General Characteristics of Elements of Group III A - Extraction of Boron-Compounds of Boron - Borax, Boric Acid, Diborane, Boron Nitride - Extraction of Al - Physical and Chemical Properties - Uses - Compounds of Aluminium - Al_2O_3 , $AlCl_3$, - Alloys of Aluminium. General Characteristics of Elements of Group IV A - Allotropic Forms of Carbon - Extraction of Silicon - Types and Structure of Silicates - Glass and its types. General Characteristics of Elements of V A Group -Preparation of Nitrogen - Uses -Chemistry of Some Compounds of Nitrogen - NH_3 , Hydrazine, Hydroxylamine, Hydrazoic Acid-Chemistry of PH_3 , PCl_3 , PCl_5 , $POCl_3$, P_2O_5 , Oxyacids of Nitrogen and Phosphorous.

UNIT IV – P-BLOCK ELEMENTS: II OXYGEN, HALOGEN, INERT GASES (12 hrs)

General Characteristics of Elements of Group V - Anomalous Behavior of Oxygen - Structure and Allotropy of Elements, Ozone, Oxides: Classification of oxides based on chemical behavior (Peroxides, Superoxides, Basic Oxides, Amphoteric Oxides, Acidic Oxides, Neutral Oxides) - Oxides of Sulphur - Oxoacids of Sulphur - Sulfuryl Compounds - Chemistry of Selenium and Tellurium. General Characteristics of Halogen with Reference of Electronegativity, Electron Affinity, Oxidation States, and Oxidizing Power - Peculiarities of Fluorine, Hydrides, Oxides and Oxo Acids of Halogens - Interhalogen Compounds: Preparation, Properties and Structure of ClF , ICl , ClF_3 , BrF_3 , ClF_5 , BrF_5 and IF_7 . Polyhalogens - Cyanogen, Thiocyanogen - Pseudohalogens. Inert gases - Position in the Periodic Table - Isolation from Atmosphere - General Characteristics - Structure and Shape of Xenon Compounds - XeF_2 , XeF_4 , XeF_6 , $XeOF_2$, $XeOF_4$ - Uses of Noble Gases.

UNIT V – PROTIC AND APROTIC SOLVENT, ACID AND BASES (12 hrs)

Non-Aqueous Solvents: Classification of Solvents – General Properties of Non Aqueous Solvents-Self Ionization and Leveling effect, Liq. SO₂, Liq. NH₃, Liq. HF.

Acid Base Chemistry: Concepts of Acids and Bases – Arrhenius concept - Bronsted-Lowry Concept – Relative Strength of Acids and Bases - Cady – Esley Concept: General Theory of solvent System, Lewis concept - Usanovich Concept - HSAB Principle – Theory and Applications - Acid-base - Lux Flood Concept.

TEXTBOOKS

1. Finar L., Organic Chemistry, Vol I, Pearson Education, India, 6th Edition, 2002.
2. Lee J. D., *Concise Inorganic Chemistry*. Oxford University Press (OUP), 5th Edition, 2008.
3. Arun Bhal and Bhal B. S., *A Textbook of Organic Chemistry*. New Delhi: S. Chand and Company, 2013.
4. Puri B. R., Sharma L. R., and Kalia K. C., *Principles of Inorganic Chemistry*. Milestone Publishers and Distributors, 2013.

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Books

1. Bruice P. Y., and Prasad K. J. R., *Essential Organic Chemistry*. New Delhi: Pearson Education, 1st Edition, 2008.
2. Peter Atkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, *Shriver and Atkins Inorganic Chemistry*. Oxford University Press, 5th Edition, 2010.
3. Soni P. L., *Textbook of Organic Chemistry*. New Delhi: S. Chand and Company, 2008.

Web Sources

1. <https://nptel.ac.in/courses/104/101/104101090/>
2. <https://www.youtube.com/watch?v=Pbrlolsalts>
3. <https://nptel.ac.in/content/storage2/courses/104103071/pdf/mod2.pdf>

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

CORE COURSE - VIII: PRACTICAL: INORGANIC SEMIMICRO QUALITATIVE ANALYSIS
(21UCHC4P)

(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 4

CREDITS : 3

DURATION : 60 hrs

INT. MARKS: 50

EXT. MARKS: 50

MAX. MARKS: 100

Preamble

This course explains the separation of elements into groups, elimination of interfering radical and the confirmatory test for cations and anions present in it.

Course Outcomes (CO)

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

CO1 [K1]: arrange the cations into groups based on common ion effect and solubility product principles

CO2 [K2]: specify the elimination of interfering anions by using suitable reagents

CO3 [K3]: perform anion and cation analysis by following systematic procedure of semi-micro qualitative analysis

CO4 [K4]: separate cations into different groups and carry out group analysis to confirm the cation

CO5 [K5]: judge anions and cations present in the mixture using selective reagents.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	2	1	1	-	1	-
CO2 [K2]	3	2	1	1	1	-	1
CO3 [K3]	3	2	1	1	-	1	1
CO4 [K4]	3	3	1	2	1	1	-
CO5 [K5]	3	3	2	2	1	1	1
Weightage of the course	15	12	6	7	3	4	3
Weighted percentage of Course contribution to POs	2.46	2.46	2.94	2.39	2.31	2.12	1.96

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

SEMIMICROMETHOD OF ANALYSIS OF MIXTURE

Semi-Micro Method of Analysis of Mixture Containing Two Anions (One Interfering and One Non - Interfering Anion) and Two Cations.

Anions: Carbonate, Sulphate, Nitrate, Fluoride, Chloride, Bromide, Iodide, Oxalate, Borate, Phosphate.

Cations: Lead(II), Bismuth(II), Copper(II), Cadmium(II), Iron(II & III) Aluminum(III), Chromium(III), Zinc(II), Manganese(II), Cobalt(II), Nickel(II), Barium(II), Strontium(II), Calcium(II), Magnesium(II) and Ammonium(I).

REFERENCE

Book

1. Jeffery G. H., Bassett J, Mendham J, Denney R. C.,. *Vogel's Qualitative chemical Analysis*. England: Longman Scientific and Technical, 5th Edition, 1989.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG Programme – Chemistry
SEMESTER - IV
ALLIED COURSE - IV: PHYSICS - II (21UCHA41)
(From 2021-2022 Batch onwards)

HOURS/WEEK : 4	INT. MARKS : 40
CREDITS : 4	EXT. MARKS : 60
DURATION : 60 hrs	MAX. MARKS : 100

Preamble

This course familiarizes the learners with the basic concepts of special theory of relativity, structure of atoms, crystal structures of solids, analog and digital electronics.

Course Outcomes (CO)

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

- CO1 [K1]:** outline the basic concepts of relativity, atomic and crystal physics, analog and digital electronics
- CO2 [K2]:** explain the basic concepts of relativity, atomic and crystal physics, analog and digital electronics
- CO3 [K3]:** choose appropriate formulae to solve problems
- CO4 [K4]:** analyze the applicability of special theory of relativity, physical parameters of atoms, crystals, and behavior of electronic circuits
- CO5 [K4]:** inspect the applicability of special theory of relativity, physical parameters of atoms, crystals, and behavior of electronic circuits.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	-	1	-	1	-
CO2 [K2]	3	1	-	2	-	1	-
CO3 [K3]	3	3	1	1	-	1	1
CO4 [K4]	2	3	2	1	-	1	1
CO5 [K4]	2	3	2	1	1	1	1
Weightage of the course	13	11	5	6	1	5	3
Weighted percentage of Course contribution to POs	2.13	2.26	2.45	2.05	0.77	2.65	1.96

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

UNIT I – SPECIAL THEORY OF RELATIVITY (12 hrs)

Theory of Relativity - Frame of Reference – Inertial Frames – Non Inertial Frames – Galilean Transformation Equations – Michelson Morley Experiment. Einstein's Special Theory of Relativity – Lorentz Transformations – Lorentz-Fitzgerald Contraction – Time Dilation – Variation of Mass with Velocity – Mass-Energy Equivalence.

UNIT II – ATOMIC PHYSICS (12 hrs)

Bohr Atom Model – Drawbacks of Bohr Atom Model – Sommerfeld's Relativistic Atom Model – Stern and Gerlach Experiment – Space Quantization - The Vector Atom Model – Quantum numbers Associated with the Vector Atom Models – Pauli Exclusion Principle – The Periodic Elements – Electron Configurations.

UNIT III – CRYSTAL PHYSICS (12 hrs)

Introduction – Different Features of the Crystals – Bravais Lattice – Seven Crystal Systems – Cubic Crystal Structures (SC, BCC, FCC, diamond, ZnS & NaCl structures) – Miller Indices – Distances of Separation between Successive Planes – Diffraction of X-rays by Crystal Planes – X-ray Diffraction Methods – Laue Method – Debye-Scherrer Method – Rotating Crystal Method.

UNIT IV – ANALOG ELECTRONICS (12 hrs)

PN Junction Diode Rectifier – Ripple Factor – Capacitor Filter, Choke Input Filter and π Section Filter – Voltage Stabilization – Zener Diode – Zener Diode as Voltage Stabilizer – Solving Zener Diode Circuits – Transistors – Characteristics of CE Mode Connection – Faithful Amplification – Transistor Biasing – Stabilization – Voltage Divider Bias – Single Stage Amplifier.

UNIT V – DIGITAL ELECTRONICS (12 hrs)

Number System – Binary Number System – Binary to Decimal Conversion – Decimal to Binary Conversion – Octal Numbers – Hexa Decimal Numbers – Logic Gates – NOT, OR, AND (Realization Using Diode and Transistor) – NOR & NAND as Universal Gates – Boolean Laws and Theorems – Binary Addition – Arithmetic Building Blocks – Half Adder – Full Adder.

TEXTBOOKS

1. Murugesan R and Kiruthiga Sivaprasath. *Modern Physics*. New Delhi: S. Chand & Company Ltd., Eighteenth Edition, Reprint 2019. **(Unit I, II & III)**
2. Mehta V. K and Rohit Mehta. *Principles of Electronics*. New Delhi: S. Chand & Company Ltd., Revised Eleventh Edition, Reprint 2013. **(Unit IV)**
3. Albert P. Malvino, Donald P. Leach and Goutam Saha. *Digital Principles and Applications*. Chennai: Tata McGraw Hill Education (India) Pvt. Ltd., Eighth Edition, Reprint 2017. **(Unit V)**

REFERENCES

Books

1. Arthur Beiser. *Concepts of Modern Physics*. New Delhi: Tata McGraw-Hill Publication, Sixth Edition, Reprint 2006.
2. Albert Malvino and David J. Bates. *Electronic Principles*. Chennai: McGraw Hill Education (India) Pvt. Ltd., Seventh Edition, Reprint 2018.
3. Thomas L. Floyd. *Digital Fundamentals*. New Delhi: Pearson Education (Singapore) Pvt. Ltd., Seventh Edition, Reprint 2002.

Web Sources

1. <https://www.pdfdrive.com/digital-principles-application-by-malvino-e34313541.html>
2. <https://www.pdfdrive.com/electronic-principles-e51577263.html>
3. <https://www.pdfdrive.com/fundamentals-of-physics-textbook-e33735280.html>
4. <https://www.pdfdrive.com/materials-science-and-engineering-a-first-course-d187628834.html>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF PHYSICS
UG PROGRAMME –B.Sc. Maths/Chemistry
SEMESTER - IV
ALLIED COURSE - IV: PRACTICAL: PHYSICS - II (21UCHA4P)
(From 2021-2022 Batch onwards)

HOURS/WEEK : 2	INT. MARKS : 50
CREDIT : 1	EXT. MARKS : 50
DURATION : 30 hrs	MAX. MARKS : 100

Preamble

This course enables the learners to acquire practical skill to determine material's specific physical parameters and study the behaviour of electronic circuits by applying physics concepts.

Course Outcomes (CO)

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

- CO1 [K1]:** identify the concepts of physics underlying in the experiments
- CO2 [K2]:** demonstrate the concepts of physics underlying in the experiments
- CO3 [K3]:** calculate the physical parameters of a matter/electronic circuits from the experimental data
- CO4 [K4]:** analyze the experimental results
- CO5 [K5]:** evaluate the physical parameters of a matter/electronic circuits.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	2	-	-	-	1	-
CO2 [K2]	2	2	1	1	-	2	-
CO3 [K3]	2	2	1	1	1	1	1
CO4 [K4]	2	2	2	1	1	1	1
CO5 [K5]	2	3	1	1	1	1	1
Weightage of the course	10	11	5	4	3	6	3
Weighted percentage of Course contribution to POs	1.64	2.26	2.45	1.37	2.31	3.17	1.96

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

LIST OF EXPERIMENTS (Any 8):

1. Comparison of Viscosities of Two Liquids using Ostwald Viscometer
2. Determination of Dispersive Power of the Material of the Prism of a Prism using Spectrometer
3. Determination of Wavelength of Monochromatic Source by Forming Newton's Rings
4. Determination of the Wavelengths of Prominent Spectral Lines of Mercury Spectrum by Grating Normal Incidence Method
5. Study of Characteristics of a Zener Diode
6. Study of Characteristics of a Transistor under C.E. Mode
7. Construction of Logic Gates (AND, OR, NOT, NAND, NOR) using Discrete Components
8. Verification of Universality of NAND and NOR Gates using IC 7400 and IC 7402 respectively
9. Implementation of Half Adder and Full adder Circuits using Logic Gates
10. Determination of Charge of an Electron using Copper Voltammeter.
11. Determination of Resistance and Specific Resistance of a given coil using Carey-Foster's Bridge
12. Calibration of High Range Voltmeter using Potentiometer

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 & 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., Second Edition, 2015.

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=fWhgguWc8rk>
2. <https://www.youtube.com/watch?v=wkdz1T-ywVk>
3. <https://www.youtube.com/watch?v=BxbXnYFqygU&t=311s>
4. <https://www.youtube.com/watch?v=YslaWEpTDWk>
5. <https://www.youtube.com/watch?v=aXFNoYa95-8>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER - IV
SELF-PACED LEARNING (SWAYAM COURSE):
INTRODUCTORY ORGANIC CHEMISTRY - I (21UCHSM41)
(From 2021 - 2022 Batch onwards)

CREDITS : 2
DURATION: 8 Weeks

EXT. MARKS: 100
MAX. MARKS: 100

Preamble

This course explains the basic concepts in inorganic chemistry; and gives knowledge about the alkanes, alkenes, alkynes alkyl halides and alcohols.

Course Outcomes (CO)

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

CO1 [K1]: describe the electronic structure and bonding in organic compounds.

CO2 [K2]: explain the acid base concepts in organic compounds

CO3 [K3]: employ the concept of aromaticity in hydrocarbons

CO4 [K4]: analyse the conformations of alkanes

CO5 [K5]: perform the addition, substitution and elimination reactions in organic compounds.

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	2	1	-	1
CO5 [K5]	3	3	1	2	-	1	1
Weightage of the course	15	11	5	7	2	2	3
Weighted percentage of Course contribution to POs	2.46	2.26	2.45	2.39	1.54	1.06	1.96

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

COURSE LAYOUT

Week 1: Electronic Structure and Bonding

Week 2: Alkanes and conformational analysis

Week 3: Stereochemistry

Week 4: Acids and Bases

Week 5: Alkenes: structure and reactivity (Addition reactions)

Week 6: Alkynes: structure and reactivity (Addition reactions)

Week 7: Alkyl halides: structure and reactivity (Substitution and elimination reactions)

Week 8: Alcohols Ethers and Epoxides, Aromatic hydrocarbons and aromaticity

REFERENCES

Books

1. Clayden J., Greeves N., and Warren S., *Organic Chemistry*. New Delhi. Oxford University Press, 2nd Edition, 2012.
2. Morrison R. T., and Boyd R. N., *Organic Chemistry*, New Delhi. Prentice-Hall, 6th Edition, 1992.
3. Bruice P. Y., and Prasad K. J. R., *Essential Organic Chemistry*. New Delhi: Pearson Education, 1st Edition, 2008.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER - IV
SELF-PACED LEARNING (SWAYAM COURSE): QUANTITATIVE METHODS IN
CHEMISTRY (21UCHSM42)
(From 2021 - 2022 Batch onwards)

CREDITS : 2
DURATION: 8 Weeks

EXT. MARKS: 100
MAX. MARKS: 100

Preamble

This course explains the various quantitative concepts in chemistry such as chemical stoichiometry, measurements, hypothesis, software analysis and chromatography.

Course Outcomes (CO)

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

CO1 [K1]: describe the basic concepts of chemical stoichiometry, measurements and various analytical techniques

CO2 [K2]: explain the various definitions in chemical stoichiometry and measurements.

CO3 [K3]: employ softwares to linear and non-linear regression

CO4 [K4]: discriminate rate theory and plate theory

CO5 [K5]: appraise the various analytical separation techniques.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	P01	P02	P03	P04	P05	P06	P07
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	2	1	-	1
CO5 [K5]	3	3	1	2	-	1	1
Weightage of the course	15	11	5	7	2	2	3
Weighted percentage of Course contribution to POs	2.46	2.26	2.45	2.39	1.54	1.06	1.96

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

COURSE LAYOUT

Week 1: Chemical stoichiometry, parameters to define concentration of chemicals (normality, molarity, molality, mole-fractions, parts-per million), analytical concentration and equilibrium concentrations, p-value of concentration.

Week 2: Measurements and its statistical analyses (definition of mean, median, mode, variance, standard deviation, standard error, accuracy, precision), need for performing replicates/repeats, reproducibility. Classification and sources of errors, error propagation, scientific reporting data (significant figures), error curves.

Week 3: Hypothesis validation (null hypothesis, confidence levels, confidence intervals, one-tail test, two-tail test, use of statistical tables such as z-table, t-table, F-table, identifying outliers in data with Q-test).

Week 4: Sampling, fitting and analysis of data (linear regression, single factor analysis of variance, least-significant difference).

Week 5: Software-based data analysis (linear and non-linear regression).

Week 6: Examples of data fitting and analysis (application to rate kinetics, gradient mixing, biomolecular folding).

Week 7: Analytical separations (solvent extraction, chemical precipitation, various types of chromatography – size exclusion, ion exchange, affinity, gas, high pressure liquid chromatography, field-flow fractionation), Detectors in chromatography.

Week 8: Theoretical basis of chromatography (concept of plates, theoretical plate height, plate count, resolution, retention time, retention factor, selectivity factor), Differences between rate theory and plate theory.

REFERENCES

Books

1. Skoog D. A., *Fundamentals of Analytical Chemistry*. Cengage Learning, 9th Edition, 2013.
2. Christian G. D., *Analytical Chemistry*. Wiley, 6th Edition, 2003.
3. Gordus. *Schaum's A. A., Outline of Analytical Chemistry*, Tata-McGraw Hill, 1st Edition, 1985.

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

NON-MAJOR ELECTIVE COURSE - II: INDUSTRIAL CHEMISTRY (21UCHN41)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 2

CREDIT : 1

DURATION : 30 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course enables the students to attain the basic knowledge in the manufacturing process of fuel, oil, glass, cement and polymers.

Course Outcomes (CO)

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

CO1 [K1]: recognize the significance of chemistry involved in polymers, fuels, cement, glass and oil

CO2 [K2]: explain processing of fuels, manufacturing of cement and glass and preparation of polymers

CO3 [K2]: explain processing of oils and fats, manufacturing of cement, glass and preparation of polymers

CO4 [K3]: report calorific value, saponification value, iodine value and setting of cement

CO5 [K4]: classify fuels, oils and fats, glasses and polymers.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	P01	P02	P03	P04	P05	P06	P07
CO1 [K1]	1	-	-	1	-	1	1
CO2 [K2]	2	-	-	1	-	1	1
CO3 [K2]	2	1	-	2	-	1	1
CO4 [K3]	2	2	-	2	-	1	1
CO5 [K4]	2	2	-	2	-	1	1
Weightage of the course	9	5	0	8	0	5	5
Weighted percentage of Course contribution to POs	1.48	1.03	0	2.73	0	2.65	3.27

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

UNIT I – POLYMER (6 hrs)

Introduction - Classification of Polymer - Natural and Synthetic Polymers - Preparation, Properties and Uses of Nylon 6, Nylon 66, Polyvinyl chloride (PVC), Bakelite.

UNIT II – CEMENT (6 hrs)

Introduction - Types of Cement - Manufacturing Process-Raw Materials - Reaction in the kiln - Neat diagram - Setting and hardening of cement.

UNIT III – OIL (6 hrs)

Introduction - Classification of Oils - Essential Oils - Isolation of Essential Oils - Analysis of Oils - Saponification Value – Iodine Value.

UNIT IV – FUEL (6 hrs)

Introduction - Classification of Fuels - Calorific Value - Determination of Calorific Value - Methods of Processing Various Fuels – Gasification - Pyrolysis of Alkanes.

UNIT V – GLASS (6 hrs)

Introduction - Physical and Chemical Properties of Glass - Characteristics of Glass - Methods of Manufacturing Process of Glass-Formation of Batch Material-Annealing and Finishing Process - Types of Glass.

TEXTBOOK

1. Sharma B. K., *Industrial Chemistry*. Meerut: Goel publishing house, 14th Edition, 2004.

REFERENCES**Books**

1. Bagavathi Sundari K., *Applied Chemistry*. Chennai: MJP publisher, 2006.
2. Jain and Jain, *Engineering Chemistry*. New Delhi: Dhanpat Rai Publishing Company, 14th Edition, 2004.

Web Sources

1. <https://www.worldcat.org/title/industrial-chemistry-including-chemical-engineering/oclc/818809456>
2. <https://www.youtube.com/watch?v=St6BiJGidU0>
3. <https://www.youtube.com/watch?v=Q0VLQLOsNck>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF CHEMISTRY

UG Programme – B.Sc. Chemistry

SEMESTER - IV

**SKILL ENHANCEMENT COURSE - IV: FERMENTATION SCIENCE AND TECHNOLOGY
(21UCHS41)**

(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 2

CREDITS : 2

DURATION : 30 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This paper focuses the students on the science of processes and methods involved in fermentation science and technology.

Course Outcomes (CO)

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

CO1 [K1]: identify enzymes and microbes involved in food fermentation

CO2 [K2]: explain various methods for fermentation and microbial growth

CO3 [K2]: illustrate different experimental techniques for the production of fermented food products

CO4 [K3]: select suitable microbial culture for the fermentation of foods

CO5 [K4]: analyse the different aspects of the fermentation and fermented foods.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	1	-	-	-	-	-
CO2 [K2]	3	2	1	1	-	-	-
CO3 [K2]	3	2	1	1	-	1	-
CO4 [K3]	3	3	1	1	1	-	1
CO5 [K4]	3	3	2	1	1	1	-
Weightage of the course	15	11	5	4	2	2	1
Weighted percentage of Course contribution to POs	2.46	2.26	2.45	1.37	1.54	1.06	0.65

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

UNIT I – FERMENTATION (6 hrs)

Introduction – History - Conditions Favorable for Fermentation - Properties of Fermented Foods - Characteristics of Enzymes – Short Account of Some Fermentation Process.

UNIT II – FERMENTATION MEDIA (6 hrs)

Preparation of Microbial Culture, Preparation and Sterilization of Fermentation Media, Isolation and Improvement of Industrially Important Microorganisms.

UNIT III – FERMENTED FOODS (6 hrs)

Food Fermentation – Microbial Cultures Used in Food Industry (Bacterial Culture, Yeast Culture, Mold Cultures) – Fermented Dairy, Meat and Vegetable Products – Fermentation for Flavor Production.

UNIT IV – FERMENTATION IN BEVERAGES (6 hrs)

Carbonated Non Alcoholic Beverages (Coffee and Tea) – Alcoholic Beverages (Beer and Wine) – Distilled Liquors.

UNIT V – PRODUCTION OF MICROBIAL PRODUCTS (6 hrs)

Organic Acids (Citric Acid) – Antibiotics (Penicillin) – Single Cell Protein – Microbial Production of Enzymes (Amylase and Protease) – Byproduct Recovery.

TEXTBOOKS

1. Michael. J. Waites, Neil L. Margon, John S. Rockey and Gary Higton. *Industrial Microbiology An Introduction*. London, UK: Blackwell Science, 7th Edition, 2008.
2. Casida J. R., *Industrial Microbiology*. New Delhi, India: New Age International Pvt. Ltd, Publishers, 3rd Edition, 2015.

REFERENCES**Books**

1. Sivasankar B., *Food Processing and Preservation*. New age international Pvt. Ltd. Publishers, 3rd Edition, 2003.
2. Reed G., *Prescott and Dunn's Industrial Microbiology*. USA: AVI Publication Co., 4th Edition, 2005.

Web Sources

1. <https://youtu.be/yKoo54ZphV4>
2. <https://youtu.be/tZKonCiEgoU>
3. <https://www.youtube.com/watch?v=M E7PnwqIKg>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

UG Programme

SEMESTER - III & IV

PART V - EXTENSION

(From 2021 -2022 Batch Onwards)

HOURS/WEEK: 2

CREDIT : 1

DURATION : 60 hrs

INT. MARKS: 100

Preamble

This course aims to promote holistic development among the youth by defining their roles and responsibilities towards ones family and their society and enables them to acquire professional skills and ethics.

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/non verbal 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)

CO \ PO	P01	P02	P03	P04	P05	P06	P07
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	1.31	0.41	0.49	2.39	6.92	4.23	3.27

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 | |

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER - V
CORE COURSE - IX: ORGANIC CHEMISTRY - I (21UCHC51)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 5
CREDITS : 5
DURATION : 75 hrs

INT. MARKS: 40
EXT. MARKS: 60
MAX. MARKS: 100

Preamble

This course familiarizes the learners with the reaction of carbonyl compounds, nitrogen containing compounds and stereochemistry involved in the reaction.

Course Outcomes [CO]

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

CO1 [K1]: describe the reactions of carbonyl, nitrogen and heterocyclic compounds

CO2 [K2]: explain the stereochemistry of aliphatic and cyclic compounds and rearrangement reactions

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

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

CO5 [K4]: compare the reactivity of acids, basicity of amines and optical activity in biphenyls, allenes.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	2	1	1	-	1	-
CO2 [K2]	3	2	1	1	1	1	1
CO3 [K3]	3	3	1	1	1	1	-
CO4 [K4]	3	3	1	2	-	-	1
CO5 [K4]	3	3	1	2	1	1	1
Weightage of the course	15	13	5	7	3	4	3
Weighted percentage of Course contribution to POs	2.46	2.67	2.45	2.39	2.31	2.12	1.96

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

UNIT I – STEREOCHEMISTRY

(15 hrs)

Stereochemistry - Representation of Molecules in Saw Horse, Fischer, Flying-Wedge and Newman Formulae and their Inter Translations. Optical Rotation – Specific Rotation - Optical Purity - Optical Isomers - Enantiomers - Diastereomers – Epimers - Notation of Optical Isomers – Optical activity of Tartaric acid, Lactic acid –Asymmetric synthesis and resolution of racemic mixture Cahn-Ingold-Prelog Rules, R and S Notations for Optical Isomers with One and Two . Geometrical Isomerism – Nomenclature of Geometrical Isomers – Cis/Trans, E-Z Notation and Syn-Anti for C=C, C=N Compounds (Determination of Geometrical isomerism of aldoxime and ketoxime, Maleic and Fumaric acid) - Stability of Geometrical Isomers and Heats of Hydrogenation. Conformational Analysis - Conformation - Conformational Nomenclature-Energy Barrier of Rotation - Potential Energy Diagram. Relative Stability of Conformers on the Basis of Steric Effect, Dipole-Dipole Interaction, H-Bonding - Conformational Analysis of Ethane, n-Butane, Haloethane, 1,2-Dihaloethane, Ethylene Glycol, Cyclohexane and Mono Substituted Cyclohexanes.

UNIT II – CARBONYL COMPOUNDS AND THEIR DERIVATIVES

(15 hrs)

Common Methods for the Synthesis of Aldehydes and Ketones - Synthesis of Aldehydes from Acid Chlorides, Stephen's Reduction - Gattermann-Koschand Etard Reactions - Synthesis of Ketones from Nitriles, Dialkylcadmium, Alkyl Lithium and Friedel-Crafts Reactions. Addition of HCN, Alcohols, Grignard Reagents - Condensation with Ammonia and its Derivatives - Aldol, Perkin, Benzoin and Knoevenagel Condensations, Wittig Reaction, Mannich Reaction, Reformatsky Reaction and Cannizaro Reaction. Oxidation by Tollen's Reagent, KMnO_4 , Hypohalite, SeO_2 and Peracids. Reduction by H_2/Ni , $\text{H}_2\text{-Pd-C}$, NaBH_4 , LiAlH_4 , Clemmenson and Wolff-Kischner Reductions. α , β -Unsaturated Aldehydes (Cinnamaldehyde) – Preparation and Reactions.

Acidity of Carboxylic Acids, Effects of Substituents on Acid Strength. Reactions of Carboxylic Acids - Hell-Volhard-Zelinsky Reaction, Synthesis of Acid Chlorides, Esters and Amides, Reduction of Carboxylic Acids, Methods of Decarboxylation. Methods of Preparation and Chemical Reactions of Hydroxy Acids - Malic, Tartaric and Citric Acids. Action of Heat on α , β , γ , δ -Hydroxyacids. Preparation and Reactivity of Carboxylic Acid Derivatives - Acid Chlorides, Esters. Synthetic Applications of Malonic Ester and Ethylacetoacetate in the Synthesis of Monocarboxylic Acids, Dicarboxylic Acids, α , β -Unsaturated Carboxylic Acids.

UNIT III – NITROGEN CONTAINING COMPOUNDS

(15 hrs)

Preparation of Nitroalkanes and Nitroarenes - Chemical Reactions of Nitroalkanes and Nitroarenes - Reductions in Acidic, Neutral and Alkaline Media. Methods of Preparation of Alkyl and Aryl Amines - Gabriel Phthalimide Reaction and Hofmann Reaction - Separation of a Mixture of Primary, Secondary and Tertiary Amines - Hinsberg's and Hofmann's Method - Structural Features Effecting Basicity of Amines - Basicity of Aliphatic and Aromatic Amines -Reactions of Amines. Benzene Diazonium

Salts - Preparation, Stability, Reactions. Amino Acids - Essential and Non-essential - Methods of Preparation - Zwitterions Formation - Isoelectric Point - Chemical Reactions of Amino Acid. Polypeptides and Proteins - Classification - Primary, Secondary, Tertiary and Quaternary Structure of Proteins - Determination of Primary Structure with End Group Analysis.

UNIT IV – HETEROCYCLIC COMPOUNDS (15 hrs)

Naming of Heterocyclic Compounds Containing One and Two Hetero Atoms Present in Five/Six Membered Rings. Nomenclature-Preparation, properties of the following compounds: Pyrrole, Furan, Thiophene and Pyridine – Basic character of Pyridine and Pyrrole. Methods of Synthesis and Chemical Reactions with Particular Emphasis on the Mechanism of Electrophilic Substitution and Mechanism of Nucleophilic Substitution Reaction in Pyridine Derivatives. Preparation and Reactions of Indole and Quinoline (Fisher Indole Synthesis, Skraup Synthesis and Bischler-Napieralski Synthesis) - Mechanism of Electrophilic Substitution Reactions of Indole and Quinoline.

UNIT V – REARRANGEMENTS (15 hrs)

Rearrangement to Electron - Deficient Carbon - 1,2 Shift (Wagner-Meerwein Rearrangement, Pinacol-Pinacoline Rearrangement, Wolff Rearrangement, Benzil-Benzilic Acid Rearrangement). Aromatic Rearrangements from Oxygen to Ring Carbon – Fries, Claisen and Benzidine Rearrangement. Rearrangement to Electron-Deficient Nitrogen – Beckmann, Schmidt, Hofmann, Curtius Rearrangement). Rearrangement to Electron-Deficient Oxygen: Baeyer-Villiger Oxidation, Hydroperoxide Rearrangement.

TEXTBOOKS

1. Ernest L. Eliel, Samuel H. Wilen, *Stereochemistry of Organic Compounds*, Wiley Publishers, 1st Edition, 2008.
2. Arun Bhal and Bhal B. S., *A Text Book of Organic Chemistry*. S. Chand and Company, 2013.
3. Ernest L. Eliel and Samuel H. Wilen. *Stereochemistry of Organic Compounds*. Wiley India, 2010.
4. Soni P. L., *Text Book of Organic Chemistry*. New Delhi: S. Chand & Company, 2008.

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Books

1. Morrison R. T., Boyd R. N., and Bhatnagar S. K., *Organic Chemistry*. Pearson Publication, 2011.
2. Peter Vollhardt and Neil Schore. *Organic Chemistry Structure and Function*. W.H. Freeman & Company, 2009.
3. Finar I. L., *Organic Chemistry Vol I*. Pearson Education, 2001.

Web Sources

1. <https://nptel.ac.in/content/storage2/courses/104103022/download/module4.pdf>

2. [https://nptel.ac.in/content/storage2/courses/104101005/downloads/Lecture Notes/chapter%2010.pdf](https://nptel.ac.in/content/storage2/courses/104101005/downloads/Lecture%20Notes/chapter%2010.pdf)
3. <https://nptel.ac.in/content/storage2/courses/104103071/pdf/mod8.pdf>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER - V
CORE COURSE - X: INORGANIC CHEMISTRY - I (21UCHC52)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 5
CREDITS : 5
DURATION : 75hrs

INT. MARKS: 40
EXT. MARKS: 60
MAX. MARKS: 100

Preamble

This course introduces the learners the basic concepts of d – block elements, f-block elements, coordination chemistry, magnetic and electric properties.

Course Outcomes (CO)

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

CO1 [K1]: outline the basic concepts of d-block elements, f-block elements and coordination compounds

CO2 [K2]: express the various properties of transition elements, inner-transition elements and coordination compounds

CO3 [K3]: determine the crystal field stabilization energy and magnetic moments of the dⁿ metal complexes in octahedral and tetrahedral geometry

CO4 [K4]: examine the various theories of coordination compound, chemistry of various compounds of transition metal compounds

CO5 [K5]: predict the stability of oxidation states of various d-block elements, geometry and hybridization of various co-ordination compounds.

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	-	-	-	-
CO3 [K3]	3	3	1	2	-	1	1
CO4 [K4]	3	3	1	2	1	1	-
CO5 [K5]	3	3	1	2	1	1	1
Weightage of the course	15	13	5	6	3	4	3
Weighted percentage of Course contribution to POs	2.46	2.67	2.45	2.05	2.31	2.12	1.96

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

UNIT I – d-BLOCK ELEMENTS (15 hrs)

Transition Elements: Position in the Periodic Table- Electronic Configuration Colour, Variable Valency, Magnetic and Catalytic Properties, and Ability to form Complexes. Stability of various Oxidation States And E.M.F. (Latimer & Bsworth Diagrams) - Group Study of Titanium, Vanadium, Chromium, Manganese and Iron Metals – Comparative Study of Zinc Group Metals –Important Uses of Transition Metals and their Alloys - Horizontal Comparison With Fe, Co, Ni Groups – Toxicity of Cd and Hg -Comparison of 3d, 4d and 5d Transition Series. Transition Metal Compounds: Chemistry of $K_2Cr_2O_7$ - $KMnO_4$ - Titanium Dioxide - Titanium Tetrachloride - Vanadium Pentoxide - Ammonium Vanadate - Zirconium Dioxide - Zirconium Halides - Ammonium Molybdate - Molybdenum Blue - Tungsten Tri Oxide - Tungsten Bronzes – Chloroplatinic Acid - Barium Platinocyanide.

UNIT II – f-BLOCK ELEMENTS (15 hrs)

The Minerals of Lanthanides and Actinides and their Occurrence in India - Position in the Periodic Table - Lanthanides: Electronic Configuration and General Properties – Occurrence - Isolation of Lanthanides from Monazite – Separation by Ion Exchange and Solvent Extraction Methods – Lanthanide Contraction – Magnetic Properties – Complexation Behavior. Actinides: Occurrence and Preparation- Oxidation States - Ionic Radii – Colour - Complex Formation - Uranium – Occurrence and Metallurgy – Chemical Properties of Oxides, Hydrides and Halides. Comparison of Lanthanides and Actinides.

UNIT III – COORDINATION CHEMISTRY-I (15 hrs)

Terminology, Classification of Ligands: Unidentate, Bidentate, Polydentate Ligands, Chelating Ligands – Chelates– IUPAC Nomenclature of Coordination Compounds. Structural Isomerism: Hydrate Isomerism, Coordination Isomerism, Ionisation Isomerism, Linkage Isomerism, Coordination Position Isomerism – Orbital and Spin Magnetic Moments, Spin only Moments of D^n Ions and their Correlation with Effective Magnetic Moments, Including Orbital Contribution; Quenching of Magnetic Moment Werner Theory and its Limitation – Sidgwick Theory - Effective Atomic Number Concept.

UNIT IV – COORDINATION CHEMISTRY-II (15 hrs)

Coordination Compounds II: Valence Bond Theory: Postulates –Hybridisation and Geometries of Complexes - Outer Orbital and Inner Orbital Octahedral Complexes. Square Planar and Tetrahedral Complexes – Limitations of V.B. Theory. Crystal Field Theory: Postulates of D-Orbital Splitting in Octahedral and Tetrahedral – Strong and Weak Field Ligands – Spectrochemical Series – High Spin and Low Spin Complexes – Colour, Geometry of Complexes – Crystal Field Stabilisation Energy (CFSE) and its Applications. Calculation of CFSE: CFSE Values of D^1 to D^{10} Octahedral and Tetrahedral Complexes – Factors Affecting CFSE – Limitations of C.F. Theory – Comparison between VBT and CFT.

UNIT V – MAGNETIC AND ELECTRICAL PROPERTIES

(15 hrs)

Magnetic Properties: Elements of Magnetic Properties and Terminology – Pole Strength – Magnetic Induction – Permeability – Magnetic Susceptibility – Determination of Using Guoy's Method - Magnetic Moment - Types of Magnetism – Diamagnetism, Paramagnetism, Antiferromagnetism, Ferro and Ferri Magnetism – Variation with Temperature – Curie-Wiess Law, Curie Temperature and Neel Temperature – Permanent and Temporary Magnets - Piezoelectric, Pyro-Electric and Ferroelectrics (Introduction and Application).

TEXTBOOKS

1. Lee J. D., *Concise Inorganic Chemistry*. Oxford University Press (OUP), 5th Edition, 2008.
2. Puri B. R., Sharma L. R., and Kalia K. C., *Principles of Inorganic Chemistry*. Delhi: Milestone Publishers & Distributor, 31st Edition, 2013.
3. Satya Prakash, Tuli G. D., Basu S. K., and Madan R. D., *Advance Inorganic Chemistry*. New Delhi: Vol II, S. Chand & Company Ltd, 19th Edition, 1944.

REFERENCES

Books

1. Peter Atkins, Tina Overton, Jonathan Rourke, Mark Weller and Fraser Armstrong, *Shriver and Atkins Inorganic Chemistry*. Oxford University Press, 5th Edition, 2010.
2. James E. Huheey, Ellen A. Keitler and Richard L. Keitler, *Inorganic Chemistry*. New York: Harper Collins College Publishers, 4th Edition, 2012.
3. Madan R. D., *Sathya Prakash's Modern Inorganic Chemistry*. New Delhi: S. Chand & Company, 2013.
4. Gurdeep Raj. *Advanced Inorganic Chemistry*. Meerut: Vol I, Goel Publishing House, 2015.

Web Sources

1. <https://www.ychem4u.com/2020/09/01/coordination-chemistry-ajai-kumar/>
2. https://www.researchgate.net/publication/295605765_Essentials_of_Coordination_Chemistry_A_Simplified_Approach_with_3D_Visuals
3. <https://soe.unipune.ac.in/studymaterial/ashwiniWadegaonkarSelf/421%20unit%204.pdf>
4. <https://ncert.nic.in/ncerts/l/lech108.pdf>

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

CORE COURSE - XI: PRACTICAL: PHYSICAL CHEMISTRY - I (21UCHC5P)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK : 5

CREDITS : 4

DURATION : 75 hrs

INT. MARKS: 50

EXT. MARKS: 50

MAX. MARKS: 100

Preamble

This course enables the students to acquire practical knowledge in thermochemistry, colligative properties and phase rule.

Course Outcomes (CO)

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

CO1 [K1]: describe the basic concepts of thermochemistry, phase equilibrium and colligative properties

CO2 [K2]: infer physical constant by carrying out physical chemistry experiments

CO3 [K3]: calculate heat of solution and molecular weight of various chemical compounds

CO4 [K4]: construct the phase diagram for simple eutectic and compound formation

CO5 [K4]: examine molecular weight of the chemical compound by rast and transition temperature methods.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	P01	P02	P03	P04	P05	P06	P07
CO1 [K1]	3	2	1	1	-	1	1
CO2 [K2]	3	2	1	1	-	-	-
CO3 [K3]	3	2	1	1	1	1	-
CO4 [K4]	3	3	1	1	1	1	1
CO5 [K4]	3	3	2	2	1	1	1
Weightage of the course	15	12	6	6	3	4	3
Weighted percentage of Course contribution to POs	2.46	2.46	2.94	2.05	2.31	2.12	1.96

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

1. Determination of Molecular Weight by

- (i) Rast Method – Naphthalene
- (ii) Transition Temperature Method – Sodium Thiosulphatepentahydrate

2. Phase Diagram involving

- (i) Compound Formation: Naphthalene – *m*-Dinitrobenzene
- (ii) Simple Eutectic System: Naphthalene – Biphenyl

3. Thermo Chemistry

- (i) Heat of Solution of Ammonium Oxalate
- (ii) Heat of Solution of Oxalic Acid
- (iii) Heat of Solution of Potassium Dichromate

REFERENCES

Books

1. Thomas A. O., *Practical Chemistry*. Kerala: Scientific Book Centre, 1999.
2. Renu Gupta. *Practical Physical Chemistry*. Kerala: New Age International (P) Ltd Publishers, 2017.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER - V
CORE COURSE - XII: PRACTICAL: ORGANIC ANALYSIS AND ESTIMATION
(21UCHC5Q)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 5

CREDITS : 4

DURATION : 75 Hrs

INT. MARKS: 50

EXT. MARKS: 50

MAX. MARKS: 100

Preamble

This course introduces the learners to apply the basic principles of iodometry titration in the estimation of organic compounds and also apply the concept of addition, hydrolysis reaction in the organic salt analysis.

Course Outcomes (CO)

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

CO1 [K2]: explain the aromatic and aliphatic nature of the organic compound

CO2 [K2]: interpret the different functional group through the confirmation test and its derivative formation

CO3 [K3]: determine the concentration of phenol, aniline by applying the principles of iodometric method

CO4 [K4]: differentiate the primary, secondary and tertiary nature of nitrogen through the confirmatory test

CO5 [K5]: examine the amount of organic compound by volumetric method.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K2]	3	2	1	1	-	-	-
CO2 [K2]	3	2	1	1	1	1	-
CO3 [K3]	3	3	1	1	1	1	1
CO4 [K4]	3	3	1	1	-	1	1
CO5 [K5]	3	3	2	2	1	1	1
Weightage of the course	15	13	6	6	3	4	3
Weighted percentage of Course contribution to POs	2.46	2.67	2.94	2.05	2.31	2.12	1.96

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

ORGANIC ESTIMATION

- A. Estimation of Phenol
- B. Estimation of Aniline
- C. Estimation of Glucose

ORGANIC ANALYSIS

Analysis of an Organic Compound Containing One or Two Functional Groups

- Carboxylic Acid
- Phenolic OH Group
- Aldehyde
- Ketone
- Ester
- Nitro Compounds
- Amines (Primary, Secondary and Tertiary)
- Amide
- Anilide
- Aliphatic Diamide
- Aliphatic Diamide Containing Sulphur
- Carbohydrates

Confirmed by the Derivatives

REFERENCE

Book

1. Furniss B. S., Hannford A. J., Smith P. W. G., and Tatchell A. R., *Vogel's Textbook of Practical organic chemistry*. England: Longman Scientific and Technical, 5th Edition, 1989.

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

MAJOR ELECTIVE COURSE - I: ELECTROCHEMISTRY (21UCH051)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 4

CREDITS : 3

DURATION : 60 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

The course introduces the learners to the basic concepts and theories of electrochemistry and the importance of electrochemical cells.

Course Outcomes (CO)

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

CO1 [K1]: define the terms like conductance, specific conductance and transport number

CO2 [K2]: outline the basic concepts in the conductance measurements and emf of the solution

CO3 [K3]: formulate ΔH , ΔG and ΔS of a cell reaction

CO4 [K4]: classify the different types of electrodes and cells

CO5 [K5]: evaluate pH, solubility product and conductance of the given solution.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	2	1	1	-	-	1
CO2 [K2]	3	2	1	1	-	1	1
CO3 [K3]	3	2	1	1	1	1	1
CO4 [K4]	3	3	1	2	1	1	-
CO5 [K5]	3	3	2	1	1	1	-
Weightage of the course	15	12	6	6	3	4	3
Weighted percentage of Course contribution to POs	2.46	2.46	2.94	2.05	2.31	2.12	1.96

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

UNIT I – ELECTROLYTIC CONDUCTANCE (12 hrs)

Conductance: Faraday's Laws of Electrolysis – Conductance – Resistance – Electrolytic Conductance – Specific Conductance – Equivalent Conductance – Molar Conductance – Cell Constant – Variation of Molar Conductance with Dilution - Strong Electrolyte - Weak Electrolyte - Determination of Cell Constant - pH of Solutions – Measurement of pH- pH Scale - Numerical Problems Based on pH-Buffer - Acid Buffer-Base Buffer - Calculation of P^H of Buffer Solution – Numerical Problems Based on Buffer.

UNIT II – ELECTROLYTIC TRANSFERENCE (12 hrs)

Transport Number: Ionic Mobility – Hittorf's Theoretical Device – Transport Number – Determination of Transport Number – Hittorf's Method – Moving Boundary Method – Calculation of Molar Ionic Conductance.

Ionic Mobility: Kohlrausch's Law – Relation between Molar Ionic Conductance And Ionic Mobility – Determination of Ionic Mobility – Applications of Kohlrausch's Law – Diffusion and Ionic Mobility.

Applications of Conductance Measurements: Conductometric Titrations.

UNIT III – ELECTROMOTIVE FORCE OF GALVANIC CELLS-I (12 hrs)

Galvanic Cell: Types of Reversible Electrodes – Metal-Metal Ion Electrodes – Gas Electrodes – Metal-Insoluble Metal Salt Electrodes– Oxidation Reduction Electrodes – Thermodynamics of Reversible Electrodes and Reversible Cells – Electrical Energy and Free Energy Change of the Cell Reaction – Relation between Electrical Energy and Enthalpy of a Cell Reaction – Determination of ΔH , ΔG and ΔS of a Cell Reaction – Determination of ΔG° , ΔS° and ΔH° of a Cell Reaction – Electromotive Force and Equilibrium Constant of a Cell Reaction – Standard EMF and Equilibrium Constant.

UNIT IV – ELECTROMOTIVE FORCE OF GALVANIC CELLS-II (12 hrs)

Effect of Concentration of Electrolyte on Cell Potential – Effect of Electrolyte Concentration on Electrode Potential – The Nernst Equation – Potentiometric Titrations- **Concentration Cell:** Electrode Concentration Cell – Electrolyte Concentration Cell. **Types of Electrolyte Concentration Cell:** Concentration Cells without Transference – Concentration Cell with Transference – Liquid Junction Potential. **Fuel Cells:** Hydrogen-Oxygen Fuel Cell – Coal-Fired Fuel Cell.

UNIT V – IONIC EQUILIBRIA AND APPLICATIONS OF EMF (12 hrs)

Ostwald Dilution Law - Experimental Verification of Ostwald Law- Limitation of Ostwalds Law - Degree of Dissociation - Common Ion Effect- Factors Influence Degree of Dissociation – Solubility Product.

Applications of EMF Measurement: Determination of Transport Number – Determination of Valency of Ions in Doubtful Cases – Determination of The Solubility Product Constants – Determination of pH Using Glass Electrode - Problem Based on Applications of EMF Measurements.

TEXTBOOKS

1. Glasstone Samuel. *An Introduction to Electrochemistry*. Franklin Classes Trade Press, 2018.
2. Puri B. R., Sharma L. R., and Madan S. Pathania. *Textbook of Physical Chemistry*. Jalandhar: Vishal Publishing & Company, 2008.
3. Arun Bahl and Bahl B. S., *Essential of Physical Chemistry*. New Delhi: S. Chand & Company, 2013.

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Books

1. Christine Lefrou, Pierre Fabry and Jean-Claude Poignet. *Electrochemistry: The Basics with Examples*, 2012.
2. Bajpai D. N., *Advanced Physical Chemistry*, New Delhi: S. Chand & Co. Private Limited, 2010.
3. Gurdeep Raj. *Advanced Physical Chemistry*. Jalandhar: Goel Publication, 2012.

Web Sources

1. <https://www.youtube.com/watch?v=zRa9F2-BEyE>
2. <https://www.youtube.com/watch?v=ifdy9wnF80s>
3. <https://www.youtube.com/watch?v=qyuH6693YkY>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER - V
MAJOR ELECTIVE COURSE - I: PHOTO CHEMISTRY (21UCHO52)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 4

CREDITS : 3

DURATION : 60 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course familiarizes the learners with electronic energy state, photophysical process and photochemical process.

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 photophysical pathways and photochemical reactions.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	2	1	1	-	-	1
CO2 [K2]	3	2	1	1	-	1	1
CO3 [K3]	3	2	1	1	1	1	1
CO4 [K4]	3	3	1	2	1	1	-
CO5 [K5]	3	3	2	1	1	1	-
Weightage of the course	15	12	6	6	3	4	3
Weighted percentage of Course contribution to POs	2.46	2.46	2.94	2.05	2.31	2.12	1.96

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*. Jalandhar: New Age International Publishers, 2003.
2. Vincenzo Balzani, Paola Ceroni, Alberto Juris., *Photochemistry and Photophysics: Concepts, Research, Applications*. Wiley Publishers, 2014.

REFERENCES**Books**

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
MAJOR ELECTIVE COURSE - I: GEOCHEMISTRY (21UCHO53)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 4

CREDITS : 3

DURATION : 60 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course introduces the learners to familiarize in the geographical nature of the chemical present in the universe

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]: analyse 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)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	2	1	1	-	-	1
CO2 [K2]	3	2	1	1	-	1	1
CO3 [K3]	3	2	1	1	1	1	1
CO4 [K4]	3	3	1	2	1	1	-
CO5 [K5]	3	3	2	1	1	1	-
Weightage of the course	15	12	6	6	3	4	3
Weighted percentage of Course contribution to POs	2.46	2.46	2.94	2.05	2.31	2.12	1.96

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. D. K Todd. *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/5xwhXnwf5fl>
2. <https://youtu.be/bLbhFuFIBKc>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF CHEMISTRY

UG Programme – B.Sc. Chemistry

SEMESTER - V

MAJOR ELECTIVE COURSE - II: BIO CHEMISTRY (21UCH054)

(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 4

CREDITS : 3

DURATION : 60 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course introduces the learners to the basic knowledge of functions, mechanism of action and biological importance of macromolecules.

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 molecule

CO5 [K4]: analyze the structure, function of the molecule in bio system.

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	1
CO3 [K3]	3	3	1	2	-	-	1
CO4 [K4]	3	3	1	2	-	1	-
CO5 [K4]	3	3	1	1	1	1	1
Weightage of the course	15	13	5	6	3	4	4
Weighted percentage of Course contribution to Pos	2.46	2.67	2.45	2.05	2.31	2.12	2.61

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

UNIT I – CARBOHYDRATES (12 hrs)

Definition – Classification – Haworth Projections, Biological Importance of Carbohydrates, Metabolism, Cellular Currency of Energy (ATP), Glycolysis, Krebs Cycle.

UNIT II – PROTEINS (12 hrs)

Classification, Biological Importance- Amino Acids – Essential and Non-Essential Amino Acids, Primary, Secondary and Tertiary Structures of Proteins: α - Helix, β - Helix, Pleated sheets, Denaturation of Proteins.

UNIT III – ENZYMES (12 hrs)

Classification, Active Sites, Mechanism of Enzyme Action, Stereospecificity of Enzymes and Co Factors, Enzyme Inhibitors, Biocatalysis in Green Chemistry and Chemical Industry.

UNIT IV – LIPIDS (12 hrs)

Biological Importance of Triglycerides and Phosphoglycerides and Cholesterol, Lipid Membrane Liposomes and their Biological Functions and Applications.

UNIT V – NUCLEIC ACIDS (12 hrs)

Structure of Purines and Pyrimidines, Nucleotides and Nucleosides, DNA: Double Helix, DNA Denaturation and Renaturation, RNA-Types, Unusual Bases, DNA as Genetic Material.

TEXTBOOKS

1. Berg J. M., Tymoczko J. L., and Stryer L., *Biochemistry*. W H Freeman & Co., 4thEdition, 2006.
2. Satyanarayana U. and Chakrapani U. *Fundamentals of Biochemistry*. Elsevier Publisher, 2019.

REFERENCES**Books**

1. Sivasankar B. *Food Processing and Preservation*. New age international Pvt. Ltd., Publishers, 3rdEdition, 2003.
2. Jain J. L., *Fundamentals of Biochemistry*. S. Chand Publications, 4thEdition, 2005.

Web Sources

1. <https://youtu.be/iuW3nk5EADg>
2. <https://youtu.be/2kZKBAxjXf8>
3. <https://youtu.be/V8QRP2I4Q-s>

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

MAJOR ELECTIVE COURSE - II: ENVIRONMENTAL CHEMISTRY (21UCHO55)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 4

CREDITS : 3

DURATION : 60 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This paper focuses the learners to have an idea about the environmental pollution and ethics of environment.

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 [K4]: discriminate the chemical reactions leading to the environmental issues.

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	1
CO3 [K3]	3	3	1	2	-	-	1
CO4 [K4]	3	3	1	2	-	1	-
CO5 [K4]	3	3	1	1	1	1	1
Weightage of the course	15	13	5	6	3	4	4
Weighted percentage of Course contribution to POs	2.46	2.67	2.45	2.05	2.31	2.12	2.61

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, Third Edition, 1998.

REFERENCES**Books**

1. Balram P., *Text Book Environmental Chemistry*. New Delhi: I K International, 2007.
2. Gilbert M., *Introduction to Environmental Engineering & Science*. New Delhi: 2004.

Web Sources

1. <https://youtu.be/B5gHoyOZrFQ>
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
MAJOR ELECTIVE COURSE - II: NANOCHEMISTRY (21UCH056)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 4

CREDITS : 3

DURATION : 60 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course enables the learners to know the synthesis, properties and characterization of nano particles.

Course Outcomes (CO)

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

CO1 [K1]: recognize the fundamentals of nanoscience, properties, size, and mode of preparation and applications of nanoparticles

CO2 [K2]: demonstrate nanostructures, their classification and synthetic routes

CO3 [K3]: determine suitable synthetic approach for the preparation of nanoparticles and their use

CO4 [K4]: classify nanomaterials and various synthetic techniques used for their synthesis

CO5 [K4]: analyze different characteristics like surface morphology, particle size etc. by instrumentation 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	1
CO3 [K3]	3	3	1	2	-	-	1
CO4 [K4]	3	3	1	2	-	1	-
CO5 [K4]	3	3	1	1	1	1	1
Weightage of the course	15	13	5	6	3	4	4
Weighted percentage of Course contribution to POs	2.46	2.67	2.45	2.05	2.31	2.12	2.61

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

UNIT I – INTRODUCTION (12 hrs)

Nanoscience, Nanostructure and Nanotechnology, Overview of Nanostructures and Nanomaterials, Classification (Cluster, Colloid, Nanoparticles and Nanostructures – Spheroid, Wire, Rod, Tube and Quantum Dot), Applications.

UNIT II – PROPERTIES (12 hrs)

Size Dependent Properties of Nanomaterials, Quantum Confinement, Electrical, Optical, Variation in Colours (Blue Shift, Red Shift), Magnetic, Thermal and Catalytic Properties.

UNIT III – SYNTHESIS (12 hrs)

Top – Down and Bottom up Approaches and Self-Assembly Techniques of Nanoparticle Synthesis, Examples of Preparation of Gold and Silver Metallic Nanoparticles, Carbon Nanotubes and Inorganic Nanowires.

UNIT IV – ROUTES FOR SYNTHESIS OF NANOMATERIAL (12 hrs)

Chemical Precipitation and Co Precipitation, Metal Nanocrystals by Reduction – Sol – Gel Synthesis – Micro Emulsion – Solvo Thermal Synthesis – Thermolysis Routes – Sonochemical Synthesis.

UNIT V – CHARACTERISATION / INSTRUMENTATION (12 hrs)

Principle – Application – Instrumentation: TEM, SEM, EDAX, UV-Visible.

TEXTBOOKS

1. Charles P Poole Jr and Frank J Owens. *Introduction to Nanotechnology*. John Wiley & Sons, 2003.
2. Pradeep T., *Nano: The Essentials-Understanding Nanoscience and Nanotechnology*. McGraw Hill, 2007.

REFERENCES**Books**

1. Rao C. N. R., Muller A., and Cheetham A. K., *Chemistry of Nanomaterials: Synthesis, Properties and Application*. Germany: Willey – ECH Verlag, 2005.
2. Vincent Rotello. *Nanoparticles: Building Blocks for Nanotechnology*. 2004.

Web Sources

1. <https://youtu.be/hshvGT959qw>
2. <https://youtu.be/Z51R4900qAA>
3. <https://youtu.be/IFYs3XDu4fQ>

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

SKILL ENHANCEMENT COURSE - V: PERSONALITY DEVELOPMENT (21UCHS51)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 2

CREDITS : 2

DURATION : 30 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course equips the learners with soft skills like effective communication, decision making, and problem solving and leadership qualities.

Course Outcomes (CO)

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

CO1 [K1]: identify the concepts and principles of basic psychological skills, time management and critical thinking

CO2 [K2]: relate the psychological skills and critical thinking skills to their real life

CO3 [K3]: present stress management, mental models, and leadership qualities

CO4 [K4]: analyse human resources with improved leadership qualities

CO5 [K4]: distinguish the effective communication, decision making and problem solving skills.

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	-	-	-
CO3 [K3]	3	2	1	1	1	1	1
CO4 [K4]	3	2	1	-	-	-	-
CO5 [K4]	2	2	1	-	1	1	1
Weightage of the course	14	10	5	2	3	3	3
Weighted percentage of Course contribution to POs	2.3	2.05	2.45	0.68	2.31	1.59	1.96

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

UNIT I – BASIC PSYCHOLOGY SKILLS (6 hrs)

Mental Heuristics and Priming, Cialdini's Six Psychological Principles, Charisma and Charisma Enhancements, Facing Interviews.

UNIT II – PRODUCTIVITY AND TIME MANAGEMENT (6 hrs)

Eisenhower Matrix, Pomodoro Technique, Dealing with Procrastination, Journaling Methods, Check lists, to-do lists and Scheduling the Events.

UNIT III – DEALING NEGATIVITY (6 hrs)

Work Life Balance, Stress Management, Coping with Failures and Depression.

UNIT IV – CRITICAL THINKING AND HUMAN RESOURCES (6 hrs)

Logical Fallacies, Cognitive Biases, Mental Models, Critical Thinking. Evaluation and Improvement; Leadership Qualities.

UNIT V – LIFE SKILL STRATEGY (6 hrs)

Life Skill Strategies – Effective Communication, Creative Thinking, Decision Making, Goal Setting, Problem Solving, Resume Writing.

Interpersonal Skills, Self-awareness, Emotional Intelligence, leadership Development, Team Building – Time, Stress and Conflict Management.

TEXTBOOKS

1. Machakkalai R, Saraswathi L. *Personality Development a Need*. Madurai: Mangai Publishers, 2005.
2. Velayudhan A, Amudhadevi N. V. *Personality Development for College Students*. LAP Lambert Academic Publishing, 2012.
3. Green C J. *Leadership and Soft Skills for Students: Empowered to Succeed in High School, College and Beyond*. Dog Ear Publishing, 2015.

REFERENCES**Books**

1. Sharma S. P., *Youngsters Guide for Personality Development*. New Delhi: Pustak Mahal, 2005.
2. Sean Convey. *The 7 habits of highly effective teens*. RP Minis; Mini Ed. Edition, 2003.
3. Robert B Cialdini. *Influence: The Psychology of Persuasion*, Revised Edition. Harper Business, 2006.

Web Sources

1. <https://www.youtube.com/watch?v=fdUZR0tSbmg>
2. <https://www.youtube.com/watch?v=QVwTVM1Iv1c>
3. <https://nptel.ac.in/courses/109/103/109103134/>
4. https://www.youtube.com/watch?v=Gwv_HSEZlZA

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER - V
INTERNSHIP (21UCHJ51)
(From 2021 - 2022 Batch onwards)

CREDIT : 1
DURATION : 25 Days

INT. MARKS: 50
EXT. MARKS: 50
MAX. MARKS: 100

Preamble

This course familiarizes the real world experience through practice oriented and hands on working experience in the industry and the research laboratories to the learners.

Course Outcomes (CO)

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

CO1 [K2]: demonstrate the depth of expertise in coherent area of chemistry

CO2 [K3]: employ technical information using scientific communications, scientific operations and procedures

CO3 [K3]: develop effective oral and written communication skills in the field of chemistry

CO4 [K6]: develop hands on training experience and skill in chemistry

CO5 [K6]: create awareness on logistics, economic and realities of functioning in a work environment.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K2]	3	2	-	1	1	1	2
CO2 [K3]	2	3	-	1	-	1	2
CO3 [K3]	2	2	-	2	-	1	1
CO4 [K6]	-	2	1	-	-	1	1
CO5 [K6]	1	3	3	3	-	1	2
Weightage of the course	8	12	4	7	1	5	8
Weighted percentage of Course contribution to POs	1.31	2.46	1.96	2.39	0.77	2.65	5.23

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

Guidelines

1. Each Student has to undergo minimum 25 days institutional/industry based training during the fourth semester summer vacation.
2. Internships could be undertaken in different organizations, industries and agencies approved by the department.
3. Students should keep a detailed record of activities performed and hrs spent in training and reports the same to the Faculty Coordinator every week.
4. The Internship report should be of minimum 20 pages.
5. Attendance certificate from the organization has to be submitted to the HOD.
6. Two copies of the Internship report should be submitted.
7. The Internship carries 100 marks out of which 50 marks for Internal Assessment and 50 Marks for External Examination.
8. The student has to appear for Viva-voce.
9. The viva voce board shall consist of the Head of the Department and the Internal Examiner.

The following rubrics will be taken into account for the evaluation of the Training Programme:

Internal Assessment Pattern (50 Marks)

Assessment tool	Marks	Description
Report & Review	40 Marks	One Review will be conducted
Daily Log Report / Attendance	5 Marks	Maintenance log for daily activities / Regular attendance will be assessed
Power Point Presentation	5 Marks	Presentation of the Report

External Assessment Pattern (50 Marks)

Assessment tool	Marks	Description
Training Report	20 Marks	Final Training Report
Viva-Voce	30 Marks	One Oral Mode Test

Internship report must contain the following details:

- 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. Conclusion

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER - VI
CORE COURSE - XIII: ORGANIC CHEMISTRY - II (21UCHC61)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 5

CREDITS : 5

DURATION : 75 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course introduces the learners to structural elucidation of natural products and also identify the structure of simple organic compounds through spectroscopy like UV, IR, NMR and Mass spectra.

Course Outcomes [CO]

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

CO1 [K1]: detail the structure of natural products

CO2 [K2]: interpret the structure of natural products and synthetic organic compounds through UV, IR, NMR and Mass spectroscopy

CO3 [K3]: determine the stereochemistry of carbohydrate and structure of organic compounds by different spectroscopic techniques

CO4 [K4]: classify alkaloids, terpenoids, carbohydrate and other industrially important compounds

CO5 [K4]: differentiate structure and properties of organic compounds by qualitative methods and instrumentation 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]	3	2	1	1	1	1	1
CO4 [K4]	3	3	1	2	-	1	1
CO5 [K4]	3	3	2	2	-	-	1
Weightage of the course	15	12	6	7	3	4	3
Weighted percentage of Course contribution to POs	2.46	2.46	2.94	2.39	2.31	2.12	1.96

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

UNIT I – CARBOHYDRATES **(15 hrs)**

Carbohydrates: Definition - Classification with Suitable Examples - Classification of Sugars as Reducing and Non-reducing Sugars - Stereochemistry of Carbohydrates: D- And L- Configurations – Erythro and Threo Diastereomers – Anomers and Epimers with Suitable Examples - Monosaccharides: Classification of Monosaccharides with Suitable Examples – Glucose - Properties of Glucose – Epimerisation of Glucose – Anomers of Glucose and Mutarotation - Fructose and its Properties - Conversion Glucose into Fructose and vice-versa - Formation of Osazone and Glycosides - Fischer Open Structure and Evidences for Open Structure - Haworth Projection Cyclic Structures (Pyranose and Furanose) and Evidences for Cyclic Structures of Glucose and Fructose - Stepping Up – Kiliani - Fischer Synthesis and Stepping Down - Ruff Degradation of Monosaccharides - Disaccharides: α - and β - Glycosidic Linkages with Suitable Examples - 1,4' and 1,6' Linkages with Suitable Examples - Structure and Properties of Sucrose- Polysaccharides: Cellulose, Combination of Cellulose - Starches Structure of Amylose and Glycogen.

UNIT II – NATURAL PRODUCTS AND BIOCHEMISTRY **(15 hrs)**

Alkaloids: Definition - Classification with Suitable Examples for Each Class - Properties - Structural Determination - Sources, Isolation, Physiological Activities and Structure of Piperine, Conine, Nicotine and Quinine. Terpenoids: Definition, Isoprene Rule and Classification with Suitable Examples - Isolation, Properties, Structure and Uses of Citral, Geraniol and Limonene. Steroids and Hormones: Definition - Classification - Occurrence, Structure and Physiological Activities of Cholesterol, Estrogens and Testosterone.

UNIT III – INDUSTRIAL ORGANIC CHEMISTRY **(15 hrs)**

Dyes - Theory of Color and Constitution - Chromophore, Auxochrome, Classification According to Application and Structure - Preparation and Uses of Azo Dyes - Methyl Orange, Triphenyl Methane Dyes - Malachite Green, Indigo Dyes - Indigotin, Anthraquinone Dyes - Alizarin, Phthalein Dyes – Fluorescein. Polymers – Definition - Classification - Preparation of Nylon 66, Nylon 6, Dacron, Bakelite, Melamine, Neoprene, Buna-N, Buna-S and Biodegradable Polymers.

UNIT IV – UV AND IR SPECTROSCOPY **(15 hrs)**

UV-Visible Spectroscopy: Possible Electronic Transitions in an Organic Compound. Selection Rule. Solvent Effect. Chromophore and Auxochromes. Calculation of λ_{\max} of Unsubstituted Dienes and Dienones – Woodward Fieser Rule. **Infrared Spectroscopy:** Various Types of Vibrations and Number of Vibrational Degrees of Freedom. Selection Rules - Solvent Effect. Effect of Hydrogen Bond - Finger Print Region. The Characteristic Ranges of Absorption of IR Radiation of Various Functional Groups- Study of Hydrogen Bonding – Interpretation of IR Spectra of Acetone, Anisole, Benzaldehyde, Ethyl Acetate, Ethyl Amine.

UNIT V – NMR AND MASS SPECTROSCOPY

(15 hrs)

NMR Active Nuclei. Equivalent and Non-Equivalent Protons and Number of Signals. Reference Compound TMS. Relative Signal Intensities and Number of Hydrogens. Chemical Shift and various Factors Influencing Chemical Shift. Spin-Spin Splitting, Splitting Constant, NMR Spectrum of Simple Molecules Like Ethanol, Acetone, Anisole, Benzaldehyde, Ethyl Acetate, Ethylamine, Ethyl Bromide, Toluene and Isopropyl Phenyl Ketone. Mass Spectrometry: Basic Principles - Instrumentation - Representation of Mass Spectrum. Molecular Ion - Identification of Parent Ion - Isotopic Peaks - Determination of Molecular Formula - Meta Stable Peak. General Fragmentation – McLafferty Rearrangement - Retro-Diels-Alder Rearrangement. Mass Spectra of Ethylbenzene, Methoxyethane, Acetophenone, N-Butyl Amine, 1-Propanal and 1-Pentanol.

TEXTBOOKS

1. Gurdeep R. Chatwal. *Chemistry of Natural Products Vol II*. Himalaya Publishing House, 2001.
2. Jag Mohan. *Organic Spectroscopy - Principle and Applications*. Alpha Science International Ltd, 2004.
3. Arun Bhal, Bhal B. S., *A Text Book of Organic Chemistry*. S. Chand & Company, 2013.

REFERENCES

Books

1. Finar I. L., *Organic Chemistry Vol II*. Pearson Education, 2001.
2. Silverstein R. M., Basseler G. C., Morrill T. C., Bryce D. L., *Spectroscopic Identification of Organic Compounds*. John Wiley & Sons, 2015.
3. Morrison R. T., Boyd R. N., Bhattejee S. K., *Organic Chemistry*. Pearson Publication, 2011.

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1. <https://www.youtube.com/watch?v=iuW3nk5EADg>
2. <https://nptel.ac.in/content/storage2/courses/104106075/Week8/MODULE%20033.pdf>
3. <https://nptel.ac.in/content/storage2/courses/104103071/pdf/mod9.pdf>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER - VI
CORE COURSE - XIV: INORGANIC CHEMISTRY - II (21UCHC62)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 5
CREDITS : 5
DURATION : 75hrs

INT. MARKS: 40
EXT. MARKS: 60
MAX. MARKS: 100

Preamble

This course familiarizes the learners with various concepts on nuclear chemistry, solid state chemistry and inorganic polymers.

Course Outcomes (CO)

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

CO1 [K1]: describe the basic concepts in bioinorganic, nuclear and solid state chemistry

CO2 [K2]: explain the various concepts of nuclear, radiation and solid state chemistry

CO3 [K3]: compute the concept of nuclear reaction and radioactivity in various fields like energy production, medicine, agriculture, industry, etc.

CO4 [K4]: discriminate the crystal structure of solids, the function and structure of biomolecules

CO5 [K5]: assess the impact of radioactivity, structure and defects in solids.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	2	1	1	-	-	1
CO2 [K2]	3	2	1	1	-	1	1
CO3 [K3]	3	3	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	6	6	3	4	3
Weighted percentage of Course contribution to POs	2.46	2.67	2.94	2.05	2.31	2.12	1.96

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

UNIT I – SOLID STATE CHEMISTRY (15 hrs)

Classification of Solids – Amorphous and Crystalline Solids – Van der Waals Crystals – Covalent Crystals – Laws of Crystallography – Elements of Symmetry – Weiss and Miller Indices – Crystal Systems and Bravais lattices – Packing in crystal and its types – Radius Ratio Rules – Structure of Ionic Solids – Crystal Structures – Sodium Chloride, Zinc Blende, Wurtzite, Rutile, Cesium Chloride, Fluorite – Antifluorite – Crystal Defects – Point Defects. Ionic Bonding – Lattice Energy – Born Equation and its derivation, – Bragg's Equation. Spinels and Inverse Spinels – Defects in Solids, Non-Stoichiometric Compounds – Band Theory – Semiconductors – Superconductors.

UNIT II – ORGANOMETALLIC CHEMISTRY-I (15 hrs)

Definition – Nomenclature and Classification – Sigma Complex – Pi Complex – Complexes containing both Sigma and Pi Bonds – Non Classically Bonded Organometallic Compounds – Concept of Hapticity of Organic Ligands – 18 Electron Rule – Electron Count in Complexes – Oxidation State Method – Neutral Ligand Method – 16 Electron Rule – Exception in 18 and 16 Electron Rule – Metal Carbonyls – Preparation and Structure of $\text{Ni}(\text{CO})_4$, $\text{Fe}(\text{CO})_5$, $\text{Fe}_2(\text{CO})_9$, $\text{Fe}_3(\text{CO})_{12}$, $\text{HCo}(\text{CO})_4$ – Synergic Effect.

UNIT III – BIOINORGANIC CHEMISTRY (15 hrs)

Porphyrin Ring – Occurrence of Porphyrin Ring in the Nature – Importance of Iron in the Living System. Myoglobin and Hemoglobin: Structure and their Function – Co-Operativity – Bohr Effect – Poisoning Effect of CO and CN^- – Photosynthesis – Chlorophyll: Structure and Work Function (Z Diagram) – Metalloenzymes: Apoenzymes – Enzyme Action – Carboxypeptidase A – Carbonic Anhydrase.

UNIT IV – NUCLEAR CHEMISTRY-I (15 hrs)

Composition of Nuclei – Subatomic Particles, Nuclear Forces – Nuclear stability – Mass defect – Binding energy – Packing fraction – N/P Ratio – Magic Numbers – Isobars, Isotones and Isomers – Natural Radioactivity – Artificial Radioactivity – Definition – Different Types of Artificial Radioactivity – Artificial Transmutation. Detection and Measurement of Radioactivity: Wilson Cloud Chamber – Geiger-Muller Counter. Particle Accelerator: Cyclotron – Soddy's Group Displacement Law – Disintegration Series – Rate of Disintegration – Half-Life Period – Average Life Period – Geiger – Nuttal Rule.

UNIT V – NUCLEAR CHEMISTRY-II (15 hrs)

Nuclear Fission: Theories of Fission – Application of Fission – Principle of Atom Bomb – Nuclear Reactor. Nuclear Fusion: Stellar Energy and Hydrogen Bomb – Atomic Power Projects in India. Application of Radioactivity: Application in Medicine – Agriculture – Industry – Trace Element in the Elucidation of Structure – Investigation of Reaction Mechanism – Analytical Chemistry – Neutron Activation Analysis – Age Determination – Radioactive Waste Disposal.

TEXTBOOKS

1. Ivano Bertini, Harry B. Gray, Stephen J. Lippard, Joan Selverstone Valentine. *Bioinorganic Chemistry*, University Science Books, 1994.
2. Soni P. L., and Mohan Katyal. *Textbook of Inorganic Chemistry - A Modern Approach*. New Delhi: Sultan Chand & Sons, 2003.
3. Puri B. R., Sharma L. R., and Kalia K. C., *Principles of Inorganic Chemistry*. Delhi: Milestone Publishers & Distributor, 31st Edition, 2013.

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1. James E. Huheey, Ellen A. Keitler and Richard L. Keitler, *Inorganic Chemistry*. New York: Harper Collins College Publishers, 4th Edition, 2012.
2. Atkins P. W., Shriver D. K., and Langford C. H., *Inorganic Chemistry*. U.K: Oxford ELBS, 1990.
3. Gurdeep Raj. *Advanced Inorganic Chemistry – Vol. Meerut*: Goel Publishing House, 2015.
4. Cotton F. A., and Wilkinson G., *Advanced Inorganic Chemistry*. Singapore: John Wiley & Sons, 5th Edition, 2003.

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1. <https://link.springer.com/referencework/10.1007%2F978-1-4419-0720-2>
2. [www.freebookcentre./chemistry-netbooks-download/Basics-of-nuclear-chemistry-\(PDF-32p\).html](http://www.freebookcentre./chemistry-netbooks-download/Basics-of-nuclear-chemistry-(PDF-32p).html)
3. [https://www.academia.edu/29794507/Solid State ChemiStry and itS appliCati on 2014 Anthony R West?auto=download](https://www.academia.edu/29794507/Solid_State_ChemiStry_and_itS_appliCati_on_2014_Anthony_R_West?auto=download)

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER - VI
CORE COURSE - XV: PHYSICAL CHEMISTRY (21UCHC63)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 5

CREDITS : 5

DURATION : 75 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course familiarizes the learners with various concepts on thermodynamics, group theory and quantum mechanics.

Course Outcomes (CO)

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

CO1 [K1]: describe the terms of thermodynamics, symmetry and quantum mechanics

CO2 [K2]: explain the basic principles, concepts of thermodynamics, quantum mechanics and group theory

CO3 [K3]: apply the fundamentals to derive the expression for various thermodynamic parameters

CO4 [K4]: classify the different types of thermodynamic process and groups

CO5 [K5]: deduce group multiplication table and postulates of quantum mechanics.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	2	1	1	-	-	1
CO2 [K2]	3	2	1	1	-	1	-
CO3 [K3]	3	2	1	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	12	7	6	3	4	3
Weighted percentage of Course contribution to POs	2.46	2.46	3.43	2.05	2.31	2.12	1.96

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

UNIT I – THE FIRST LAW OF THERMODYNAMICS (15 hrs)

Statement and Mathematical form of First Law of Thermodynamics – Internal Energy – Enthalpy or Heat Content – Heat Capacity - Molar Heat Capacity at Constant Volume (C_v) and at Constant Pressure (C_p) – Relationship Between C_p and C_v – Work Done, Heat Change and Enthalpy Change for Reversible Isothermal Expansion and Compression of an Ideal Gas – Calculation Of Q , W , ΔE , ΔH for Reversible Adiabatic Expansion and Compression of an Ideal Gas – Relation Between T , V and P of an Ideal Gas Undergoing Adiabatic Reversible Expansion of an Ideal Gas – Joule Effect – Joule Thomson Effect - Joule Thomson Coefficient in the case of Ideal and Real Gases – Inversion Temperature.

UNIT II – THE SECOND LAW OF THERMODYNAMICS (15 hrs)

Limitations of First Law of Thermodynamics – Spontaneous Process – Statement of Second Law of Thermodynamics - Cyclic Process-Carnot Cycle – Efficiency of a Heat Engine – Entropy - Definition and Derivation of the Concept of Entropy – Physical Significance (Illustrations with Unavailable Energy, Disorder and Probability) – Work and Gibbs Function – Variation of Free Energy Change with Temperature and Pressure – Gibbs-Helmholtz Equations - Maxwell Relations.

UNIT III – THE THIRD LAW OF THERMODYNAMICS (15 hrs)

Partial Molar Properties – Physical Significance - Chemical Potential - Gibbs-Duhem Equation - Variation of Chemical Potential with Temperature and Pressure – Clapeyron-Clausius Equation - Concepts of Fugacity and Activity-Determination of Fugacity by Graphical Method - Third Law of Thermodynamics – Statement - Nernst Heat Theorem – Determination of Absolute Entropies of Solids, Liquids and Gases-Test of the Third Law- Residual Entropy-Calculation of Residual Entropy of CO , NO , N_2O And H_2 .

UNIT IV – GROUP THEORY (15 hrs)

Symmetry Elements: Rotational Axis of Symmetry – Plane of Symmetry – Improper Rotational Axis – Inversion – Identity – Symmetry Operation. Properties of a Group: Closure Rule – Associative Rule – Identity Rule – Inverse Rule – Deducing the Implied Presence of other Symmetry Elements. Types of Groups: Abelian and Non-Abelian Groups – Classes and Sub Groups. Groups Multiplication Table: C_{2v} . Point Groups: Classification of Molecules into Point Groups - C_{2v} , C_{3v} , C_{2h} , D_{2h} , D_{4h} , D_{6h} , T_d and O_h .

UNIT V – BASIC QUANTUM MECHANICS (15 hrs)

Particle and Wave Nature of Electron – de Broglie's Concept of Matter Waves – Derivation of de Broglie Equation – Davison-Germer Experiment – Photoelectric Effect – Compton Effect – Heisenberg's Uncertainty Principle - Schrodinger Wave Equation (Derivation not Required) – Postulates of Quantum Mechanics – Eigen Values and Eigen

Function (Problems Based on Eigen Value Equation) – Significance of Ψ And Ψ^2 – Orthogonality – Normalization of Wave Functions – Orthonormal Set.

TEXTBOOKS

1. Puri B. R., Sharma L. R., and Madan, S. Pathania. *Textbook of Physical Chemistry*. Jalandhar: Vishal Publishing & Company, 2008.
2. Arun Bahl and Bahl B. S., *Essential of Physical Chemistry*. New Delhi: S. Chand & Company, 2013.
3. Ramakrishnan V. and Gopinathan M. S., *Group Theory in Chemistry*, Jalandhar: Vishal Publishing Company, 1988.

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1. Prasad R. K., *Quantum Chemistry*. Jalandhar: New Age International Limited Publishers, 2015.
2. Bajpai D. N., *Advanced Physical Chemistry*, New Delhi: S. Chand & Co. Private Limited, 2010.
3. Gurdeep Raj. *Advanced Physical Chemistry*. Jalandhar: Goel Publication, 2012.

Web Sources

1. <https://www.youtube.com/watch?v=iBznk9DtV68>
2. <https://www.youtube.com/watch?v=9GMBpZZtjXM>
3. <https://www.youtube.com/watch?v=ClDvdv4BRhQ>
4. <https://www.youtube.com/watch?v=TcmGYe39XG0>

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

CORE COURSE - XVI: PRACTICAL: PHYSICAL CHEMISTRY- II (21UCHC6P)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 5

CREDITS : 4

DURATION : 75 hrs

INT. MARKS: 50

EXT. MARKS: 50

MAX. MARKS: 100

Preamble

This course familiarizes the learners with the practical knowledge in thermochemistry, colligative properties and phase rule.

Course Outcomes (CO)

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

CO1 [K2]: express the basic concepts of thermochemistry, phase equilibrium and colligative properties

CO2 [K3]: employ the fundamentals involved in the simple eutectic, compound formation and transition temperature methods

CO3 [K4]: examine heat of solution of chemical compounds

CO4 [K5]: perform the phase diagram for simple eutectic and compound formation

CO5 [K6]: develop the skill and tricks in the physical chemistry practical.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K2]	3	1	1	-	-	-	-
CO2 [K3]	3	2	1	1	-	1	1
CO3 [K4]	3	3	1	2	1	1	-
CO4 [K5]	3	3	1	2	1	1	1
CO5 [K6]	3	3	2	2	1	1	1
Weightage of the course	15	12	6	7	3	4	3
Weighted percentage of Course contribution to POs	2.46	2.46	2.94	2.39	2.31	2.12	1.96

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

1. Critical Solution Temperature

- (i) Determination of CST of Phenol – Water system and
- (ii) Study the Effect of Impurity on CST – Determination of Strength of Sodium Chloride.

2. Partition Co-efficient Experiments

- (i) Determination of Partition co-efficient – Iodine between Carbon Tetrachloride and Water
- (ii) Determination of Distribution of Benzoic Acid and Water-Determination of Association Factor of Benzoic Acid in Benzene.

3. Kinetics

Determination of Relative Strength of Acids by Acid Catalyzed Hydrolysis of Ester.

4. Electro Chemistry

- (i) Conductivity - Conductivity Titration between an Acid and a Base (HCl vs NaOH).
- (ii) Potentiometric Titrations
 - KMnO_4 vs FeSO_4
 - $\text{K}_2\text{Cr}_2\text{O}_7$ vs FeSO_4

REFERENCES

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1. Thomas A. O., *Practical Chemistry*. Kerala: Scientific Book Centre, 1999.
2. Renu Gupta. *Practical Physical Chemistry*. Kerala: New Age International Pvt. Ltd. Publishers, 2017.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF CHEMISTRY

UG Programme – B.Sc. Chemistry

SEMESTER - VI

**CORE COURSE - XVII: PRACTICAL: GRAVIMETRY AND COMPLEX PREPARATION
(21UCHC6Q)**

(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 4

CREDITS : 3

DURATION : 60 hrs

INT. MARKS: 50

EXT. MARKS: 50

MAX. MARKS: 100

Preamble

This course introduces the learners to the quantitative estimation of metal ions by complexometric titration and qualitative analysis of cations in the given inorganic salt mixture.

Course Outcomes (CO)

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

CO1 [K2]: estimate the amount of lead, barium, calcium, copper and nickel present in the given solution by gravimetrically

CO2 [K2]: Interpret the various reactions involved in the gravimetry and complex preparation

CO3 [K3]: apply theoretical aspects of in the gravimetry and complex preparation

CO4 [K4]: compare and contrast gravimetry and volumetry

CO5 [K5]: resolve various difficulties in gravimetry and complex preparation.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K2]	3	2	1	1	-	-	1
CO2 [K2]	3	2	1	1	1	1	-
CO3 [K3]	3	3	1	1	1	1	1
CO4 [K4]	3	3	2	2	-	1	-
CO5 [K5]	3	3	2	1	1	1	-
Weightage of the course	15	13	7	6	3	4	2
Weighted percentage of Course contribution to POs	2.46	2.67	3.43	2.05	2.31	2.12	1.31

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

I. GRAVIMETRIC ANALYSIS

1. Estimation of Lead as Lead Chromate
2. Estimation of Barium as Barium Chromate
3. Estimation of Calcium as Calcium Oxalate Monohydrate
4. Estimation of Copper as Cuprous Thiocyanate
5. Estimation of Nickel as Ni DMG.

II. PREPARATION OF COMPLEXES

1. Tetraamminecopper(II) Sulphate
2. Tris(thiourea)copper(II) Sulphate
3. Potassium tris(oxalato) Chromate(III)
4. Prussian Blue
5. Potassium tris(oxalato) Ferrate(III)

REFERENCE

Book

1. Jeffery G. H., Bassett J., Mendham J., and Denney R, C., *Vogel's Quantitative Chemical Analysis*, England: Longman Scientific & Technical, 5th Edition, 1989.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI

DEPARTMENT OF CHEMISTRY

UG Programme – B.Sc. Chemistry

SEMESTER - VI

**MAJOR ELECTIVE COURSE - III: ORGANOMETALLIC CHEMISTRY AND BIOLOGICAL
ROLE OF METALS (21UCHO61)**

(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 4

CREDITS : 3

DURATION : 60 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course introduces the learners to the various concepts and reactions in organometallics and bioinorganic chemistry.

Course Outcomes (CO)

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

CO1 [K1]: describe the basic concepts in organometallic and biological role of metals

CO2 [K2]: express the structure of metal carbonyls, metallocenes and role of metals in medicine

CO3 [K3]: develop knowledge in the toxicology of heavy metals and the concept of hapticity in electron counting

CO4 [K4]: analyze the chemistry behind organometallic compounds and the structure of inorganic polymers

CO5 [K4]: examine the role of organometallic catalysts in polymerization reactions and the metal ions in biological reactions.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	2	1	1	-	-	1
CO2 [K2]	3	3	1	1	-	1	-
CO3 [K3]	3	3	1	1	-	1	-
CO4 [K4]	3	3	1	2	1	1	1
CO5 [K4]	3	3	2	1	1	1	1
Weightage of the course	15	14	6	6	2	4	3
Weighted percentage of Course contribution to POs	2.46	2.87	2.94	2.05	1.54	2.12	1.96

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

UNIT I – ORGANOMETALLIC CHEMISTRY - I (12 hrs)

Reactions of Organometallic Compounds – Oxidative Addition – Oxidative Coupling – Reductive Elimination – Migratory Insertion – β -H Elimination – α -H Abstraction – Hydrogenolysis (Definition with Illustration) – Preparation and Structure of Zeise's Salt, Methyl Lithium (Tetramer) and Trialkyl Aluminium (Dimer) Concept of Multicentre Bonding in these Compounds. Role of Triethylaluminium in Polymerisation of Ethene (Ziegler – Natta Catalyst).

UNIT II – ORGANOMETALLIC CHEMISTRY - II (12 hrs)

Cyclic Polyene Complexes – Metallocenes – Half Sandwich Compounds – Bent Sandwich Compounds – Triple Deckers - Ferrocene: Preparation, Properties and Reactions (Acetylation, Alkylation, Metallation, Mannich Condensation) - Structure and Aromaticity - Comparison of Aromaticity and Reactivity with that of Benzene – Applications – Schwartz's Reagent: Preparation and Application.

UNIT III – BIOLOGICAL ROLE OF METALS (12 hrs)

Essential and Trace Elements – Role of Na^+/K^+ Ions – Sodium Ion Pump - Role of Ca^{2+} in Blood Clotting - Toxicology of Heavy Metals: Introduction - Environment Toxicology of Heavy Metals – Sources – Effects. Detoxification: Speciation of Mercury, Lead, Cadmium, Arsenic – Effects of Elements on Human Health – Metal Deficiency Disease and its Treatment – Fe, Zn, Cu, Co.

UNIT IV – METALS IN MEDICINE (12 hrs)

Cancer Therapy: Cis-Platin and its Mode of Action. **Radiotherapy:** Radio-Pharmaceuticals - Technetium. **Chemotherapy:** Basics and Applications. **Anti Rheumatic Agents:** Gold Containing Drugs and their Action - Vanadium Based Diabetic Drugs. **Psychopharmacological Drugs:** Lithium Drugs and their Mode of Action. **Contrast Enhancing Agents for MRI:** MRI Imaging, Synthesis of Gadolinium Based Contrast Agents.

UNIT V – INORGANIC POLYMERS (12 hrs)

Sulphur- Nitrogen Compounds: Preparation, Properties and Structure of Tetrasulphurtetranitride and Polythiazyl $(\text{SN})_x$ Compounds. Sulphur - Phosphorous Compounds: Molecular Sulphides such as P_4S_3 , P_4S_7 , and P_4S_{10} . Phosphorous- Nitrogen Compounds: Preparation, Properties and Structure of Phosphazines, Cyclo and Linear Phosphazines. Boron-Nitrogen Compounds: Borazine, Boron Nitride.

TEXTBOOKS

1. Ajai Kumar. *Organometallic and Bioinorganic Chemistry*. 1st Edition, Aaryush Education Publication, 2019.
2. Puri B. R., Sharma L. R., Kalia K. C., *Principles of Inorganic Chemistry*. Delhi: Milestone Publishers and Distributor, 31st Edition, 2013.

3. Askim K. Das, *Bioinorganic Chemistry*. Kolkata: Arunabha Sen Books and Allied Private Limited, 2008.

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1. James E. Huheey, Ellen A. Keitler, Richard L. Keitler. *Inorganic Chemistry*. New York: Harper Collins College Publishers, 4th Edition. 2012.
2. Atkins P. W., Shriver D. K., Langford C. H., *Inorganic Chemistry*. U.K: Oxford ELBS. 1990.
3. Gurdeep Raj. *Advanced Inorganic Chemistry. Vol I*. Meerut: Goel Publishing House, 2015.

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1. <https://www.researchgate.net/publication/242330312> Organometallic Chemistry
2. [http://www.freebookcentre.net/chemistry-books-download/Organometallic-chemistry-basics-\(PDF-245p\).html](http://www.freebookcentre.net/chemistry-books-download/Organometallic-chemistry-basics-(PDF-245p).html)
3. <https://authors.library.caltech.edu/25052/1/BioinCh.pdf>

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

MAJOR ELECTIVE COURSE - III: ANALYTICAL CHEMISTRY (21UCHO62)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 4

CREDITS : 3

DURATION : 60 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course provides technical knowledge about the spectroscopic methods, thermal analysis and chromatographic techniques.

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 [K4]: distinguish 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	1	1	-	-	1
CO2 [K2]	3	3	1	1	-	1	-
CO3 [K3]	3	3	1	1	-	1	-
CO4 [K4]	3	3	1	2	1	1	1
CO5 [K4]	3	3	2	1	1	1	1
Weightage of the course	15	14	6	6	2	4	3
Weighted percentage of Course contribution to POs	2.46	2.87	2.94	2.05	1.54	2.12	1.96

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 pK_a 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*. Pearson, 6th Edition, 2009.
2. Willard H. H., Merritt L. L., and Dean J. A., *Instrumental Methods of Analysis*. California, USA: Wardsworth Publishing, 7th Edition, 1988.
3. G. D. Christian. *Analytical Chemistry*. New York: John Wiley & Sons, 6th Edition, 2004.

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1. Khopkar S. M., *Basic Concepts of Analytical Chemistry*. New Age, 2nd Edition, 1998.
2. Skoog D. A., Holler F. J., and Nieman T. A.,. *Principles of Instrumental Analysis*, Brooks & Cole, 5th Edition, 1997.
3. Harris D. C., *Exploring Chemical Analysis*, New York: W.H. Freeman, 9th Edition, 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
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Chemistry
SEMESTER - VI

MAJOR ELECTIVE COURSE - III: MEDICINAL CHEMISTRY (21UCHO63)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 4

CREDITS : 3

DURATION : 60 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course introduces the learners to clinical, medicinal chemistry and different types of drugs and their role of action in the human body.

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 [K4]: differentiate route of administration, physiological action and biological action of drugs.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	3	2	1	1	-	-	1
CO2 [K2]	3	3	1	1	-	1	-
CO3 [K3]	3	3	1	1	-	1	-
CO4 [K4]	3	3	1	2	1	1	1
CO5 [K4]	3	3	2	1	1	1	1
Weightage of the course	15	14	6	6	2	4	3
Weighted percentage of Course contribution to POs	2.46	2.87	2.94	2.05	1.54	2.12	1.96

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

UNIT I – INTRODUCTION TO DRUG (12 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 (12 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 (12 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, Chloromycetin. (Structure not Necessary).

UNIT IV – HORMONES VITAMINS AND ANESTHETICS (12 hrs)

Definition – Classification of Hormones – Physiological Action of Hormone: Testosterone, Progesterone, Thyroxin. Definition – Classification of Vitamins – Biological Role of Vitamins: Vitamin A, B₆, B₁₂, 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 (12 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*. S. Chand Publishing, 3rd Revised Edition, 2003.
2. Alagarsamy V., *Text Book of Medicinal Chemistry*. CBS Publishers and Distributors Pvt. Ltd, 3rd Edition, 2019.

REFERENCES**Books**

1. Graham L Partrick., *An Introduction to Medicinal Chemistry II*. Oxford University Press, 3rd Edition, 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 Puplichers, 1985.

Web Sources

1. <https://nptel.ac.in/courses/102/108/102108077/>

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
SKILL ENHANCEMENT COURSE - VI: ANALYTICAL CLINICAL BIOCHEMISTRY
(21UCHS61)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 2

CREDITS : 2

DURATION : 30 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This paper focuses the learners to enhance the knowledge in analytical clinical biochemistry.

Course Outcomes (CO)

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

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

CO2 [K2]: explain the work function of biomolecules and principle and applications of analytical techniques

CO3 [K3]: employ analytical tools to identify biomolecules for the diagnosis of disease

CO4 [K4]: compare the structure, composition and result of estimation and interpretation of result

CO5 [K4]: present analytical tools used in clinical biochemistry, gene therapy, properties of enzymes and analysis of blood and urine.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 [K1]	2	1	1	1	-	-	-
CO2 [K2]	2	2	1	1	1	1	-
CO3 [K3]	3	2	1	1	-	1	1
CO4 [K4]	3	2	1	-	1	1	-
CO5 [K4]	3	2	1	1	1	1	1
Weightage of the course	13	9	5	4	3	4	2
Weighted percentage of Course contribution to POs	2.13	1.85	2.45	1.37	2.31	2.12	1.31

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

UNIT I – CHROMATOGRAPHY (6 hrs)

Introduction – Principles and Applications of Chromatographic Techniques – Paper, Thin Layer, Column, Gel Filtration, Ion Exchange, Affinity GLC, HPLC.

UNIT II – SPECTROSCOPY (6 hrs)

Colorimetry & Spectrophotometry – Laws of Light Absorption – Beer Lamberts Law, Principle, Instrumentation and Application of UV Visible Spectroscopy, Fluorescence Spectroscopy, Fluorescence Spectroscopy, Flame Photometry, Infrared Spectroscopy.

UNIT III – RNA (6 hrs)

Replication, Transcription and Translation, Gene Therapy. Enzymes: Nomenclature, Classification, Effect of pH, Temperature on Enzyme Activity, Enzyme Inhibition. A Diagnostic Approach to Biochemistry.

UNIT IV – BLOOD (6 hrs)

Composition and Functions of Blood, Blood Coagulation, Blood Collection and Preservation of Samples, Anemia, Regulation, Estimation and Interpretation of Data for Blood Sugar, Urea, Creatinine, Cholesterol and Bilirubin.

UNIT V – URINE (6 hrs)

Collection and Preservation of Samples – Formation of Urine – Composition and Estimation of the Constituents of Normal and Pathological Urine.

TEXTBOOKS

1. Carl A Burtis, Edward R Ashwood, *Fundamentals of Clinical Chemistry*, 5th Edition, 2012.
2. Berg J. M, Tymoczko J. L., and Stryer L., *Biochemistry*, W H Freeman, 2002.

REFERENCES**Books**

1. Delvin T. M., *Textbooks of Biochemistry with Clinical Correlations*, John Wiley and sons, 2010.
2. Wilson K., Walker J., *Practical Biochemistry*, Cambridge University Press, 2009.

Web Sources

1. <https://www.youtube.com/watch?v=GctGZ3Pa6s>
2. <https://www.youtube.com/watch?v=ayLgyPqDT2>
3. <https://www.youtube.com/watch?v=jT3WrolmZHA>

Courses offered to Other Departments

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Biotechnology/Botany/Physics
SEMESTER - I/III
ALLIED COURSE - I: CHEMISTRY - I (21UBTA11/21UBYA11/21UPHA31)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 4

CREDITS : 4

DURATION : 60 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course explains various types of adsorption, photochemistry and enable the students to gain knowledge on periodic properties.

Course Outcomes (CO)

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

CO1 [K1]: list out the types of adsorptions, chemical bonding and various kinds of oils and fats

CO2 [K2]: differentiate types of chemical bonding and photophysical processes

CO3 [K3]: present the concepts of adsorption, photochemistry, periodicity in properties and chemical bonding

CO4 [K4]: distinguish between soaps and detergents, oils and fats, photochemical and thermochemical reactions, absorption and adsorption

CO5 [K4]: analyze hybridization and structure of compounds and quality of soaps.

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 [K4]	3	2	1	1	1	1	-
Weightage of the course	15	10	05	04	02	03	02
Weighted percentage of Course contribution to POs							

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

UNIT I – ADSORPTION (12 hrs)

Adsorption - Adsorbent - Adsorbate - Definition with Illustration - Characteristics of Adsorption - Types of Adsorption - Physisorption - Chemisorption - Difference between Physisorption and Chemisorption - Factors Affecting Adsorption - Adsorption Isotherms - Freundlich Adsorption Isotherm - Application of Adsorption.

UNIT II – PHOTO CHEMISTRY (12 hrs)

Thermochemical Reactions - Photochemical Reactions - Difference between Photochemical Reaction and Thermochemical Reactions - Laws of Photochemistry, Grothus-Draper Law - Stark-Einstein Law - Quantum Efficiency - Causes of High and Low Quantum Efficiency - Determination of Quantum Efficiency - Photophysical Processes - Jablonski Diagram - Fluorescence - Phosphorescence - Chemiluminescence.

UNIT III – PERIODIC TABLE AND PERIODICITY IN PROPERTIES (12 hrs)

Long Form of Periodic Table - Division of Elements into s, p, d and f Blocks - Definition and Periodic Trends of Various Periodic Properties - Covalent Radius - Ionic Radius - Ionization Energy - Electron Affinity - Electronegativity - Factors Affecting Ionization Energy - Factors Affecting Electron Affinity - Determination of Electronegativity - Pauling Approach - Mullikan Approach - Application of Electronegativity.

UNIT IV – CHEMICAL BONDING (12 hrs)

Chemical Bonding - Types of Bonding - Covalent Bonding - Overlapping - s-s Overlapping - s-p Overlapping, p-p Overlapping - VB Theory and its Limitation - Hybridization - Definition, Characteristics and Determination - Hybridization of BeH_2 , BF_3 and CH_4 - MO Theory - Postulates - MOT of H_2 , He_2 , N_2 , O_2 .

UNIT V – FATS AND OILS (12 hrs)

Fats and Oils - Definition, Properties and Analysis of Fats and Oils - Difference between Fats and Oils - Manufacture of Vanaspati - Soaps - Definition - Manufacture of Soaps by - Kettle Process - Cleaning Action of Soaps - Synthetic Detergents - Synthetic Detergents verses Soaps.

TEXTBOOKS

1. Arun Bhal and Bhal B. S., *A Text Book of Organic Chemistry*. New Delhi: S. Chand & Company, 2013.
2. Arun Bhal and Bhal B. S., *Essential of Physical Chemistry*. New Delhi: S. Chand & Company, 2013.
3. Puri B. R., Sharma L. R., and Kalia K. C., *Principles of Inorganic Chemistry*. Milstones publishers & distributors, 2013.

REFERENCES

Books

1. Puri B. R., Sharma L. R., and Madan S. Pathania *Text Book of Physical Chemistry*. Jalandar: Vishal Publishing and Co, 2008.
2. Soni P. L., *Text Book of Organic Chemistry*. New Delhi: S. Chand and Company, 2008.

Web Sources

1. <https://www.youtube.com/watch?v=8QH853ffG2U>
2. https://www.youtube.com/watch?v=8VBs_xf7yLs
3. <https://www.youtube.com/watch?v=NPvWSo0Us9A>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Biotechnology/Botany/Physics
SEMESTER - I/III
ALLIED COURSE - I: PRACTICAL : VOLUMETRIC ANALYSIS
(21UBTA1P/21UBYA1P/21UPHA3P)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 2

CREDIT : 1

DURATION : 30 hrs

INT. MARKS: 50

EXT. MARKS: 50

MAX. MARKS: 100

Preamble

This course enables the students to acquire practical skill in quantitative estimation of inorganic compounds by volumetric method.

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 colour change of the indicator

CO5 [K6]: plan various volumetric procedures for the estimation of any inorganic compounds.

CO-PO Mapping table (Course Articulation Matrix)

CO \ PO	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							

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

VOLUMETRIC ANALYSIS

LIST OF EXPERIMENTS

I. ACIDIMETRY AND ALKALIMETRY

1. Estimation of Na_2CO_3
2. Estimation of NaOH / KOH
3. Estimation of Oxalic acid
4. Estimation of Hydrochloric acid

II. REDOX TITRATIONS

A. Permanganometry

5. Estimation of Oxalic acid
6. Estimation of Ferrous Ammonium Sulphate

B. Dichrometry

7. Estimation of Ferrous Ion
8. Estimation of Potassium Dichromate

REFERENCE

Book

1. Jeffery G. H., Bassett J., Mendham J., and Denney R. C., *Vogel's Quantitative Chemical Analysis*. England: Longman Scientific and Technical.

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Biotechnology/Botany/Physics
SEMESTER - II/IV

ALLIED COURSE - II: CHEMISTRY - II (21UBTA21/21UBYA21/21UPHA41)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 4

CREDITS : 4

DURATION : 60 hrs

INT. MARKS: 40

EXT. MARKS: 60

MAX. MARKS: 100

Preamble

This course enables the students to gain knowledge on catalysis, electrochemistry, acids, bases, polymers and dyes.

Course Outcomes (CO)

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

CO1 [K1]: describe catalysis, terms in electrochemistry, nuclear reactions, types of polymers and dyes

CO2 [K2]: illustrate the fundamental concepts of electrochemistry and nuclear chemistry

CO3 [K3]: make use of the various concepts of acids, bases and theory of dyes

CO4 [K4]: compare nuclear fission and fusion, homogeneous and heterogeneous catalysts

CO5 [K4]: classify polymers and dyes based on structure and properties of different types of polymers and its application.

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 [K4]	3	2	1	1	1	1	-
Weightage of the course	15	10	05	04	02	03	02
Weighted percentage of Course contribution to POs							

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

UNIT I – CATALYSIS**(12 hrs)**

Catalysis – Definition- Characteristics of Catalysis – Types of Catalysis – Homogeneous Catalysis – Intermediate Formation Theory – Heterogeneous Catalysis – Adsorption Theory - Promoters – Auto Catalyst – Positive Catalyst - Negative Catalyst – Catalytic Poisons –Enzyme Catalysis – Mechanism of Enzyme Catalysis – Characteristics of EnzymeCatalysis -Michalies – MentonEquation.

UNIT II – ELECTRO CHEMISTRY**(12 hrs)**

Electrolysis – Definition –Faraday’s Law of Electrolysis –Electrolytes – Conductance of Electrolytes – Specific Conductance –Equivalent Conductance – Molar Conductance – Equivalent Conductance on Infinite Dilution – Strong Electrolytes – Weak Electrolytes – pH – Buffer – Buffer Action – Henderson Equation to Determine the pH of Buffer.

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

Fundamental Composition of Nucleus – Mass Defect – Binding Energy - Radioactivity – Comparison of α , β and γ rays – Nuclear Fission – Nuclear Reactor - Nuclear Fusion – Stellar Energy – Proton – Proton Cycle, Carbon – Nitrogen Cycle – Application of Radioactive Isotopes in Medicine – Industry – Agriculture – Radiocarbon Dating – Nuclear Waste Disposal Management.

UNIT IV – POLYMERS**(12 hrs)**

Polymers – Definition – Classification of Polymers – Addition and Condensation Polymers – Preparation, Properties and Uses of Polyethylene, Polystyrene, PVC, Teflon, Nylon 66 – Thermoplastics and Thermosetting Polymers - Definition - Preparation, Properties and Uses of Bakelite – Natural and Synthetic Rubbers - Preparation, Properties and Uses of Neoprene and Buna – S.

UNIT V – DYES**(12 hrs)**

Dyes - Definition – Characteristics of Dyes - Color and Constitution Theory of Dyes – Chromophore – Auxochrome Theory –Classification of Dyes Based on Structure and Applications – Preparation of Congo Red, Bismark Brown, Malachite Green, Alizarine and Indigo.

TEXTBOOKS

1. Arun Bhal and Bhal B. S., *A Text Book of Organic Chemistry*. New Delhi: S. Chand & Company, 2013.
2. Arun Bhal and Bhal B. S., *Essential of Physical Chemistry*. New Delhi: S. Chand & Company, 2013.
3. Puri B. R., Sharma L. R., and Kalia K. C., *Principles of Inorganic Chemistry*, Milstones publishers & distributors, 2013.

REFERENCES

Books

1. Puri B. R., Sharma L. R. and Madan S. Pathania. *Text Book of Physical Chemistry*. Jalandar: Vishal Publishing and Co, 2008.
2. Soni P. L., *Text Book of Organic Chemistry*, New Delhi: S. Chand and Company, 2008.
3. Arnikar H. I., *Essentials of Nuclear Chemistry*, 3rd Edition. Wiley Eastern Ltd., New Delhi.

Web Sources

1. <https://www.youtube.com/watch?v=IWVX2ofyOIY>
2. https://www.youtube.com/watch?v=kOK_0dYr4S4
3. <https://www.youtube.com/watch?v=vZ02XIyflJY>

SRI KALISWARI COLLEGE (AUTONOMOUS), SIVAKASI
DEPARTMENT OF CHEMISTRY
UG Programme – B.Sc. Biotechnology/Botany/Physics
SEMESTER - II/IV
ALLIED COURSE - II: PRACTICAL : ORGANIC ANALYSIS
(21UBTA2P/21UBYA2P/21UPHA4P)
(From 2021 - 2022 Batch onwards)

HOURS/WEEK: 2

CREDIT : 1

DURATION : 30 hrs

INT. MARKS: 50

EXT. MARKS: 50

MAX. MARKS: 100

Preamble

This lab course enables the students to acquire practical skill on qualitative analysis of simple organic compounds.

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)

CO \ PO	P01	P02	P03	P04	P05	P06	P07
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							

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.