

B.Sc., CHEMISTRY

SYLLABUS

Programme Code: **3USCHE**



2026-2027

**SENGAMALA THAYAR EDUCATIONAL TRUST
WOMEN'S COLLEGE (AUTONOMOUS)**

(Affiliated to Bharathidasan University, Tiruchirappalli)
(Accredited by NAAC)



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**SUNDARAKKOTTAI, MANNARGUDI-614016.
TAMILNADU, INDIA.**

**B.Sc., CHEMISTRY
CHOICE BASED CREDIT SYSTEM-
LEARNING OUTCOMES BASED CURRICULUM FRAME WORK (CBCS-LOCF)
(For the candidates admitted in the academic year 2026-2027)**

CHOICE BASED CREDIT SYSTEM

The credit based semester system provides flexibility in designing curriculum and assigning credits based on the course content and hours of teaching. The choice based credit system provides a 'cafeteria' type approach in which the students can take courses of their choice, learn at their own pace, undergo additional courses and acquire more than the required credits, and adopt an interdisciplinary approach to learning. Our College has moved to CBCS and implemented the grading system.

**OUTCOME-BASED EDUCATION (OBE)
LEARNING OUTCOME-BASED CURRICULUM FRAMEWORK (LOCF)**

The fundamental premise underlying the learning outcomes-based approach to curriculum planning and development is that higher education qualifications are awarded on the basis of demonstrated achievement of outcomes (expressed in terms of knowledge, understanding, skills, attitudes and values) and academic standards expected of graduates of a programme of study. Learning outcomes specify what graduates completing a particular programme of study are expected to know, understand and be able to do at the end of their programme of study. The expected learning outcomes are used as reference points that would help to formulate graduate attributes, qualification descriptors, programme learning outcomes and course learning outcomes which in turn will help in curriculum planning and development, and in the design, delivery and review of academic programmes. They provide general guidance for articulating the essential learnings associated with programmes of study and courses within a programme, maintain national standards and international comparability of learning outcomes and academic standards to ensure global competitiveness, and to facilitate student/graduate mobility and provide higher education institutions an important point of reference for designing teaching-learning strategies, assessing student learning levels, and periodic review of programmes and academic standards.

Some important aspects of the Outcome Based Education Course: is defined as a theory, practical or theory cum practical subject studied in a semester.

Course Outcomes (COs): are statements that describe significant and essential learning that learners have achieved, and can reliably demonstrate at the end of a course. Generally, three or more course outcomes may be specified for each course based on its weightage.

Programme: is defined as the specialization or discipline of a Degree.

Programme Outcomes (POs): Programme outcomes are narrower statements that describe what students are expected to be able to do by the time of graduation. POs are expected to be aligned closely with Graduate Attributes.

Programme Specific Outcomes (PSOs): PSOs are what the students should be able to do at the time of graduation with reference to a specific discipline.

Some important terminologies repeatedly used in LOCF.

Ability Enhancement Courses (AEC): Ability Enhancement Courses are designed to improve students' language proficiency, communication skills, analytical abilities, environmental awareness, and understanding of contemporary issues. These courses aim to enhance the overall academic and professional capabilities of students and facilitate their effective participation in higher education and employment.

Core Courses (CC): A course that is compulsorily studied by a student as a fundamental requirement of the programme is termed a Core Course (CC). These courses provide the basic knowledge and conceptual understanding of the major discipline. Core Courses constitute the foundation of the programme and ensure that all students acquire the essential competencies and academic standards prescribed for the degree. Successful completion of Core Courses is mandatory for the award of the degree.

Core Practical Courses (CP): Core Practical Courses are laboratory-based courses associated with the Core Theory Courses. These courses provide hands-on training, experimental skills, analytical techniques, and practical exposure necessary for understanding the concepts of the discipline. Students are required to successfully complete all prescribed practical courses as part of the programme requirements.

Allied Courses (AC): Allied Courses are courses offered from disciplines other than the major discipline. These courses provide students with opportunities to gain additional knowledge and skills in allied or complementary areas of study. Minor Courses promote multidisciplinary learning and broaden the academic perspective of students. The selection and completion of Minor Courses shall be governed by the regulations of the institution and the curriculum framework.

Allied Practical (AP): Allied Practical are practical components associated with the chosen Allied discipline. These courses provide laboratory or field-based exposure to the concepts learned in the Minor Courses and help students develop practical skills relevant to the selected area of study.

Interdisciplinary Courses (IDC): Interdisciplinary Courses are designed to provide knowledge and skills that integrate concepts from multiple disciplines. These courses encourage students to explore the interrelationship between different fields of study and develop a broader understanding of contemporary issues and applications. Students may choose Interdisciplinary Courses as prescribed in the curriculum and subject to eligibility requirements.

Discipline Specific Elective Courses (DSE): Discipline Specific Elective Courses are elective courses offered by the major discipline. These courses provide students with opportunities to acquire advanced knowledge and specialization

in selected areas of the discipline. Students may choose courses from the prescribed list of electives based on their interests, aptitude, and career aspirations. These courses are generally application-oriented and provide in-depth exposure to specific domains of study.

Skill Enhancement Courses (SECs): These courses focus on developing skills or proficiencies of the student, and aim at providing hands-on training. Skill enhancement courses can be opted by the students of any other discipline, but are highly suitable for students pursuing their academic programme. These courses may be chosen from a pool of courses designed to provide value-based and/or skill-based knowledge.

Value Added Courses (VAC): Value Added Courses are intended to provide additional knowledge, skills, attitudes, and competencies that complement the regular curriculum. These courses focus on holistic development, professional ethics, environmental awareness, personality development, life skills, and emerging areas of knowledge. Successful completion of the prescribed Value Added Courses may be mandatory or optional as specified in the curriculum.

Field Study/Industrial Visit/Case Study: It has to be completed during the fifth semester of the degree programme. Credit for this course will be entered in the fifth semester's marks statement.

Internship: Students must complete Internship Training during summer holidays after the fourth semester. They have to submit a report of internship training with the necessary documents and have to appear for a viva-voce examination during fifth semester. Credit for internship will be entered in the fifth semester's mark statement.

Extra Credit Courses: In order to facilitate the students, gaining knowledge/skills by attending online courses MOOC, credits are awarded as extra credits, the extra credit are at three semesters after verifying the course completion certificates. According to the guidelines of UGC, the students are encouraged to avail this option of enriching their knowledge by enrolling themselves in the Massive Open Online Courses (MOOC) provided by various portals such as SWAYAM, NPTEL etc.

Project Work: Project Work provides students with an opportunity to apply the knowledge and skills acquired during the programme to investigate a specific problem or research topic. Students shall undertake the project under the guidance of a faculty member and submit a dissertation/report followed by evaluation and viva-voce examination.

Extension Activities: Students are encouraged to participate in extension and outreach activities such as National Service Scheme (NSS), National Cadet Corps (NCC), Youth Red Cross (YRC), Red Ribbon Club (RRC), community engagement programmes, environmental awareness campaigns, Sports, Fine Arts, Exnora and other socially relevant activities. Such participation may be recognized through credits, certificates, or awards as prescribed by the institution.

Undergraduate Programme:

Programme Pattern: The Under Graduate degree programme consists of **FIVE** vital components. They are as follows:

Part -I: Ability Enhancement Course (Tamil / Hindi / French / Sanskrit)

Part-II: Ability Enhancement Course (English)

Part-III: Core Course (Theory, Practicals, Minor courses, Minor Practicals and Group Project)

Part-IV: Skill Enhancement Courses, Discipline Specific Elective Courses, Interdisciplinary Courses, Value Education, Health & Wellness, Introduction to Disaster Management, Summer Internship, Value Added Course, Environmental studies, Gender studies and Extension activity.

EXAMINATION

Continuous Internal Assessment (CIA):

UG - Distribution of CIA Marks

Passing Minimum: 40 %

Assignment-3	=	30%
Test-2	=	50%
Seminar	=	10%
Attendance	=	10%

Question Paper Pattern

Section A1 (10x1=10 marks)

One word question/ Fill in/ True or False/ Multiple Choice Questions

Two Questions from Each unit

Section A 2 (5x2=10 marks)

Short Answers / Match the following

One question from Each unit

Total Marks – 20

Section B: (5x4=20 marks)

Paragraph Answers

Either/ or type, One Question from each unit

Section C: (10x3=30)

Essay Type Answers

Answer 3 out of 5 Questions

One Question from each unit

Section A1 & A2: K1 Level

Section B: K2, K3 and K4 Level

Section C: K5 and K6 Level

Knowledge levels for assessment of Outcomes based on Blooms Taxonomy

S. No.	Level	Parameter	Description
1	K1	Knowledge/ Remembering	It is the ability to remember the previously learned
2	K2	Comprehension/ Understanding	The learner explains ideas or concepts
3	K3	Application/ Applying	The learner uses information in a new way
4	K4	Analysis/ Analyzing	The learner distinguishes among different parts
5	K5	Evaluation/ Evaluating	The learner justifies a stand or decision
6	K6	Synthesis /Creating	The learner creates a new product or point of view

WEIGHTAGE of K – LEVELS IN QUESTION PAPER

(Cognitive Level) K- LEVELS	Lower Order Thinking			Higher Order Thinking			Total
	K1	K2	K3	K4	K5	K6	
END SEMESTER EXAMINATIONS (ESE)	20	20			30		70
Continuous Internal Assessment (CIA)	20	20			30		70
QUESTION PATTERN FOR END SEMESTER EXAMINATION/ Continuous Internal Assessment							
SECTION							MARKS
SECTION – A1 (No choice ,One Mark) TWO questions from each unit (10x1 =10)							20
SECTION –A2 (No choice ,Two Mark) ONE question from each unit (5x2 =10)							
SECTION - B (Either/ or type, 4-Marks) ONE questions from each unit (5x4 =20)							20
SECTION - C (3 out of 5) (10 Marks) ONE question from each unit (3x10 =30)							30
Total							70

BLUE PRINT OF QUESTION PAPER FOR END SEMESTER EXAMINATION							
DURATION: 3. 00 Hours.				Max Mark : 70			
K- LEVELS	K1	K2	K3	K4	K5	K6	Total Marks
SECTION							
SECTION –A1 (1 Mark, No choice) (10x1 =10)	10						10
SECTION –A2 (2-Marks, No choice) (5x2=10)	10						10
SECTION –B (4-Marks) (Either/or type) (5x4=20)		4	8	8			20
SECTION -C (10 Marks) (3 out of 5) (3x10=30) Courses having only K5, K6 levels, K5 level- 3 Questions, K6 level- 2 Questions (One K6 level question is compulsory)					20	10	30
Total	20	04	08	08	20	10	70

EVALUATION

GRADING SYSTEM

Once the marks of the CIA and the end-semester examination for each of the courses are available, they will be added and converted as final mark. The marks thus obtained will then be graded as per the scheme provided in Table-1.

Grade Point Average (GPA) will be calculated from the first semester onwards for all semester. From the second semester onwards, the total performance within a semester and the continuous performance starting from the first semester are indicated by semester Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA), respectively. These two are calculated by the following formulae:

$$\text{GPA} = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i}$$

Where,

C_i is the Credit earned for the Course i

G_i is the Grade Point obtained by the student for the Course i

M_i is the marks obtained for the course i and

n is the number of Courses **Passed** in that semester.

$$\text{WAM (Weighted Average Marks)} = \frac{\sum_{i=1}^n C_i M_i}{\sum_{i=1}^n C_i}$$

CGPA: Average GPA of all the Courses starting from the first semester to the current semester.

CLASSIFICATION OF FINAL RESULTS:

- For each of the first three parts, there shall be separate classification on the basis of CGPA, as indicated in Table-2.
- For the purpose of declaring a candidate to have qualified for the Degree of Bachelor of Arts/ Science/ Commerce/ Management as Outstanding/ Excellent/ Very Good/ Good/ Above Average/ Average, the marks and the corresponding CGPA earned by the candidate in Part-III alone will be the criterion, provided the candidate has secured the prescribed passing minimum in the all the Five parts of the Programme.
- Grade in Part –IV and Part-V shall be shown separately and it shall not be taken into account for classification.
- A Pass in PART- V will be mandatory although the marks will not count for the calculation of the CGPA.
- Absence from an examination shall not be taken an attempt.

Table-1: Grading of the Courses – UG

Marks Range	Grade Point	Corresponding Grade
90 and above	10	O
80 and above and below 90	9	A+
70 and above and below 80	8	A
60 and above and below 70	7	B+
50 and above and below 60	6	B
40 and above and below 50	5	C
Below 40	NA	RA

The candidate's performance in every current semester is indicated by **Semester Grade Point Average (SGPA)** and from the second semester onwards, the continuous performance including previous semester /s is indicated by **Cumulative Grade Point Average (CGPA)**.

Table-2: Final Result

CGPA	Corresponding Grade	Classification of Final Result
9.00 and above	O	Outstanding
8.00 to 8.99	A+	Excellent
7.00 to 7.99	A	Very Good
6.00 to 6.99	B+	Good
5.00 to 5.99	B	Above Average
4.00 to 4.99	C	Average
Below 4.00	RA	Re-appearance

The candidates who have passed in the first appearance and within the prescribed duration of the UG programme are eligible. If the candidate's Grade is O/A+ with more than one attempt, the performance is fixed as "Very Good".

VISION

To empower the women students by providing excellent theoretical, practical and research skills in Chemistry to meet the global needs.

MISSION

- Providing quality education in the principles, theory and practice of Chemistry
- Making the students to cope up with the requirements of industry and service sectors
- Excelling in teaching, research, knowledge transfer and to serve the social, cultural and economic needs of the nation.

PROGRAMME OUTCOMES FOR B.Sc., DEGREE PROGRAMMES

PO No.	Programme Outcomes (Upon completion of the B.Sc. Degree Programme, the Undergraduate will be able to)
PO-1	Disciplinary knowledge: Demonstrate comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate program of study in Bachelor of science.
PO-2	Critical thinking, Problem Solving and Reflective thinking: think critically about the issues and identify, critically analyze and solve problems from the disciplines of concern using appropriate tools and techniques and the knowledge, skills and attitudes acquired and extrapolate the same to real life situations; show critical sensibility to life experiences, with self-awareness and reflexivity of both self and society.
PO-3	Analytical & Scientific Reasoning: evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples and addressing opposing viewpoints; critically evaluate ideas, evidence, and experiences from an open minded and reasoned perspective.
PO-4	Research-related Skills: develop a sense of capability for relevant/appropriate inquiry and asking questions, synthesize, articulate and report results and to recognize and predict cause and effect relationships, define problems, formulate and establish hypothesis, analyze and interpret and draw conclusions from data, execute and report the results of an experiment or investigation.
PO-5	Digital literacy and Effective Communication: use ICT in a variety of learning situations and speak, read, write and listen clearly in person and through electronic media in English and in one or more Indian languages, and make meaning of the world by connecting people, ideas, books, media and technology; efficiently communicate thoughts and ideas in a clear and concise manner.
PO-6	Individual and Team Work: effectively accomplish tasks individually as well as work effectively and respectfully as member or leader with diverse teams, facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interest so for a common cause and work efficiently as a member of a team.
PO-7	Multicultural Competence and Social Interaction: understand the values and beliefs of multiple cultures, global perspectives, engage and interact respectfully with diverse groups and elicit views of others, mediate disagreements and help reach conclusions in group settings.
PO-8	Awareness of Ethical issues, Human values and Gender Issues: embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work and understand the value of relationship between self and the community and aware of the various issues concerning women and society.
PO-9	Awareness of Environment and Sustainability: understand the impacts of technology and business practices in societal and environmental contexts, and sustainable development.
PO-10	Self-directed and Lifelong learning: acquire knowledge and skills, including learning —how to learn—, that are necessary for participating in learning activities throughout life and to engage in independent and life-long learning in the broadest context of socio-technological changes.

PROGRAMME SPECIFIC OUTCOMES FOR B.Sc., CHEMISTRY

PSO No.	Programme Specific Outcomes <i>(Upon completion of the Course, the Student will be able to)</i>
PSO-1	Acquire in-depth knowledge of the fundamental concepts in all disciplines of Chemistry.
PSO-2	Disseminate the basics of Chemistry and advanced topics and analytical Skills in Organic, Inorganic and Physical Chemistry.
PSO-3	Develop creativity in academics and research.
PSO-4	Apply digital tools to collect, analyze and interpret data and present scientific findings.
PSO-5	Gain competence to pursue higher education and career opportunities in Chemistry and allied fields
PSO-6	Exhibit leadership qualities to work individually and within a team in organizing curricular, co-curricular and extracurricular activities
PSO-7	Apply the concepts of Chemistry to solve problems in the community, entrepreneurial and research pursuits
PSO-8	Exhibit competence in educational, industrial and research pursuits that contribute towards the holistic development of self and community



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**CHOICE BASED CREDIT SYSTEM-LEARNING OUTCOMES BASED
CURRICULUM FRAMEWORK (CBCS – LOCF)**

(For the candidates admitted in the academic year 2026–2027)

**ELIGIBILITY: A Pass in 10 +2 with Chemistry and Maths /Biology or Botany/Zoology as two
of the core subjects.**

Se m	Part	Courses	Course Code	Title	Ins. Hrs.	Credits	Exam. Hours	Maximum Marks		
								Int.	Ext.	Total
I	I	Ability Enhancement Course –I (AEC-I)	U26TAEC11	(Tamil \$ / Other Languages+, #)	6	3	3	30	70	100
	II	Ability Enhancement Course –II (AEC-II)	U26EAEC11	English Course – I	6	3	3	30	70	100
	III	Core Course -I (CC-I)	U26CH101	General Chemistry - I	4	4	3	30	70	100
		Core Practical - I (CP-I)	U26CH102P	Quantitative Inorganic Estimations (Volumetric Analysis) Practical	4	4	3	40	60	100
		Allied Course – I (AC-I)	U26AMM101/ U26ABO101	Algebra and Calculus /Botany – I	3	3	3	30	70	100
		Allied Practical - I (AP-I)	U26AMM102P/ U26ABO102P	Algebra and Calculus with MATLAB Programming Practical/ Botany –I Practical	3	3	3	40	60	100
	IV	Value Education	26UGVED	Value Education	2	2	3	30	70	100
		Interdisciplinary Course – I (IDC-I) #			2	2	3	30	70	100
			Total		30	22	--	--	--	700

II	I	Ability Enhancement Course –III (AEC-III)	U26TAEC22	(Tamil \$ / Other Languages+, #)	6	3	3	30	70	100
	II	Ability Enhancement Course –IV (AEC-IV)	U26EAEC22	English Course – II	6	3	3	30	70	100
	III	Core Course - II (CC-II)	U26CH203	General Chemistry - II	4	4	3	30	70	100
		Core Practical – II (CP-II)	U26CH204P	Qualitative Organic Analysis Practical	4	4	3	40	60	100
		Allied Course – II (AC-II)	U26AMM203/ U26ABO203	Trigonometry and Fourier Series/ Botany – II	3	3	3	40	60	100
		Allied Practical – II (AP-II)	U26AMM204P/ U26MBO204P	Trigonometry and Fourier Series with SCILAB Practical/ Botany -II Practical	3	3	3	30	70	100
	IV	Skill Enhancement Course – I (SEC-I) ##	U26SECH21	Polymer Chemistry	2	2	3	30	70	100
		Interdisciplinary Course– II (IDC-II) #			2	2	3	30	70	100
			Total		30	24	--	--	--	800
III	I	Ability Enhancement Course –V(AEC-V)		(Tamil \$ / Other Languages+, #)	6	3	3	30	70	100
	II	Ability Enhancement Course –VI (AEC-VI)		English Course – III	6	3	3	30	70	100
	III	Core Course- III (CC-III)		General Chemistry - III	4	4	3	30	70	100
		Core Practical - III (CP-III)		Semimicro Analysis Practical	4	4	3	40	60	100
		Allied Course – III (AC–III)		Physics- I	3	3	3	30	70	100
		Allied Practical – III (AP-III)		Physics –I Practical	3	3	3	40	60	100
	IV	Skill Enhancement Course - II (SEC-II) ##		Artificial Intelligence in Chemistry	2	2	3	30	70	100
		Interdisciplinary Course – III (IDC-III) \$\$			2	2	3	30	70	100
		Health & Wellness @			--	1	--	20	80	100
			Total		30	25	--	--	--	900
IV	I	Ability Enhancement Course –VII (AEC-VII)		(Tamil \$ / Other Languages+, #)	6	3	3	30	70	100
	II	Ability Enhancement Course–VIII (AEC-VIII)		English Course - IV	6	3	3	30	70	100
		Core Course- IV (CC-IV)		General Chemistry-IV	4	4	3	30	70	100

	III	Core Practical – IV (CP- IV)		Inorganic and Organic Preparations and Determination of Physical Constants Practical	4	4	3	40	60	100
		Allied Course – IV (AC–IV)		Physics- II	3	3	3	30	70	100
		Allied Practical – IV (AP-IV)		Physics –II Practical	3	3	3	40	60	100
	IV	Skill Enhancement Course -III (SEC-III) ##		Cosmetics and Personal Grooming	2	2	3	30	70	100
		Interdisciplinary Course – IV (IDC-IV) \$\$			2	2	3	30	70	100
			Total	30	24	--	--	--	800	
	Summer Internship / Industrial Activity during the Summer Vacation after II Year									
V	III	Core Course - V (CC-V)		Inorganic Chemistry	4	4	3	30	70	100
		Core Course - VI (CC-VI)		Organic Chemistry - I	5	4	3	30	70	100
		Core Course - VII (CC-VII)		Physical Chemistry - I	5	4	3	30	70	100
		Core Course –VIII (CC-VIII)		Fundamentals of Spectroscopy	5	4	3	30	70	100
		Core Practical - V(CP-V)		Physical Chemistry Practical	5	4	3	40	60	100
	IV	Skill Enhancement Course-IV (SEC-IV)		Entrepreneurial Skills in Chemistry	2	2	3	30	70	100
		Discipline Specific Elective Course -I (DSEC-I)		Research Methodology/ Nuclear, Industrial Chemistry and Metallic State/ Green Chemistry	2	2	3	30	70	100
		Introduction to Disaster Management			2	2	3	30	70	100
		Summer Internship / Industrial Activity @@		Summer Internship with Viva-Voce	--	2	--	20	80	100
				Total	30	28	--	--	--	900
		Core Course –IX (CC-IX)		Organic Chemistry - II	4	4	3	30	70	100
		Core Course- X (CC-X)		Physical Chemistry - II	5	4	3	30	70	100

VI	III	Core Practical –VI (CP-VI)		Gravimetric Analysis Practical	5	4	3	40	60	100
		Core Project Work (CPW) @@		Project Work (with Viva-Voce)	6	4	3	20	80	100
	IV	Skill Enhancement Course - V (SEC-V)		Nanochemistry and Nanotechnology	2	2	3	30	70	100
		Discipline Specific Elective Course -II (DSEC-II)		Analytical Chemistry/ Waste Management and Recycling Chemistry / Pharmaceutical Chemistry	2	2	3	30	70	100
		Environmental Studies			2	2	3	30	70	100
		Gender Studies			2	1	3	30	70	100
		Value Added Course		General Studies for Competitive Examinations	2	2	2	30	70	100
		Extension Activities *			--	1	--	--	--	--
			Total		30	26	--	-	--	900
								-		
			Grand Total		180	151	--	--	--	5100

ALLIED COURSE

S. No	Semester	Course Name
1	I	Algebra and Calculus / Botany – I
2	I	Algebra and Calculus with MATLAB Programming Practical / Botany -I Practical
3	II	Trigonometry and Fourier Series / Botany- II
4	II	Trigonometry and Fourier Series with SCILAB Practical /Botany -II Practical
5	III	Physics- I
6	III	Physics –I Practical
7	IV	Physics- II
8	IV	Physics –II Practical

SKILL ENHANCEMENT COURSE (SEC)

S. No	Semester	Title of the Course
1	II	SEC-I Polymer Chemistry
2	III	SEC-II Artificial Intelligence in Chemistry
3	IV	SEC-III Cosmetics and Personal Grooming
4	V	SEC- IV Entrepreneurial Skills in Chemistry
5	VI	SEC- V Nanochemistry and Nanotechnology

DISCIPLINE SPECIFIC ELECTIVE COURSE (DSEC)

S. No	Semester	Title of the Course
1	V	DSEC-I Research Methodology/ Nuclear, Industrial Chemistry and Metallic State/ Green Chemistry
2	VI	DSEC-II Analytical Chemistry/ Waste Management and Recycling chemistry / Pharmaceutical Chemistry

INTERDISCIPLINARY COURSE (IDC)

S. No	Semester	Course Code	Title of the Course
1	I	U26IDCH11	Dyeing Techniques and Water Treatment
2	II	U26IDCH22	Agricultural Chemistry
3	III		Drugs and Cosmetics
4	IV		Sustainability and Green Chemistry in EV sector

VALUE ADDED COURSE ** (VAC)

Semester	Course	Course Code	Title of the Course
II	VAC - I	U26CHVA21	Indian Knowledge System in Ancient Chemistry
IV	VAC - II		Data Science using Python and R Programming

INTERDISCIPLINARY COURSE (IDC)# FOR WHO HAVE NOT OPT TAMIL AS PART - I		
Those who have studied Tamil upto 10 th +2 but opt for other languages in degree	1 st Semester	Special Tamil - I
	2 nd Semester	Special Tamil - II
Those who have not studied Tamil in school level	1 st Semester	Basic Tamil - I
	2 nd Semester	Basic Tamil – II
INTERDISCIPLINARY COURSE(IDC) \$\$ FOR NCCADETS ONLY		
NCC Course is a Compulsory Course for the NCC Cadets in the III Semester:	NCC Course is a Compulsory Course for the NCC Cadets in the IV Semester:	
Introduction to NCC	1. Special Subject Army (or) 2. Special Subject Navy (or) 3. Special Subject Air force	

SUMMARY OF CURRICULUM STRUCTURE OF UG PROGRAMMES – SCIENCE

S. No.	Part	Types of the Courses	No. of Courses	Credits for each Course	Total Credits	Marks
1.	I	Ability Enhancement Course (AEC-Tamil)	4	3	12	400
2.	II	Ability Enhancement Course (AEC-English)	4	3	12	400
3.	III	Core Course (CC)	10	4	40	1000
4.		Core Practical (CP)	6	4	24	600
5.		Allied Course (AC)	4	3	12	400
6.		Allied Practical (AP)	4	3	12	400
7.		Core Project Work (CPW)	1	4	4	100
8.	IV	Skill Enhancement Course (SEC)	5	2	10	500
9.		Discipline Specific Elective Course (DSEC)	2	2	4	200
10.		Interdisciplinary Course (IDC)	4	2	8	400
11.		Value Education	1	2	2	100
12.		Health and Wellness	1	1	1	100
13.		Introduction to Disaster Management	1	2	2	100
14.		Summer Internship / Industrial Activity	1	2	2	100
15.		Value Added Course	1	2	2	100
16.		Environmental Studies	1	2	2	100
17.		Gender Studies	1	1	1	100
1.		EXTENSION ACTIVITIES (NCC / NSS / SPORTS / ANTI DRUG CELL / YRC & Any Other Activities)	--	1	1	--
Total			51	-	151	5100
Additional Value Added Course in semester II and IV***			2**	2	4***	200
MOOC-SWAYAM/NPTEL Courses						

\$	For those who have studied Tamil upto10 th +2 (Regular Stream)															
+	Syllabus for other Languages should be on par with Tamil at degree level															
#	Those who have studied Tamil up to10 th +2 but opt for other languages in degree level under Part-I should study special Tamil and those who have not studied Tamil in the school level should study Basic Tamil in Part–IV under the Interdisciplinary Course.															
\$\$	NCC Course is one of the Choices in the Interdisciplinary Course. Only the NCC Cadets are eligible to choose this course. However, NCC Course is a Compulsory Course for the NCC Cadets.															
@	Health and Wellness: Assessments: • Use self-reflective worksheets to assess their understanding • submit the worksheets to internal audit / external audit • Every student’s activity report should be documented and the same have to be assessed by the Physical Director with Mentor. The evaluation should be for 100 marks. No examination is required. Scheme of Evaluation: <table><tr><th>Part</th><th>Description</th><th>Marks</th></tr><tr><td>A</td><td>Report</td><td>40</td></tr><tr><td>B</td><td>Attendance</td><td>20</td></tr><tr><td>C</td><td>Activities (Observation During Practice)</td><td>40</td></tr><tr><td colspan="2">Total</td><td>100</td></tr></table>	Part	Description	Marks	A	Report	40	B	Attendance	20	C	Activities (Observation During Practice)	40	Total		100
Part	Description	Marks														
A	Report	40														
B	Attendance	20														
C	Activities (Observation During Practice)	40														
Total		100														
@ @	Summer Internship / Industrial Activity Internship will be carried out during the summer vacation after the second year. Viva- Voce will be conducted by the college and Marks shall be sent to the University and the same will be included in the 5th semester Mark Statement. Summer Internship / Industrial Activity& Project Work Scheme of Evaluation: <table><tr><th>Description</th><th>Marks</th></tr><tr><td>Report</td><td>80</td></tr><tr><td>Viva-Voce</td><td>20</td></tr><tr><td>Total</td><td>100</td></tr></table>	Description	Marks	Report	80	Viva-Voce	20	Total	100							
Description	Marks															
Report	80															
Viva-Voce	20															
Total	100															
*	Extension Activities shall be outside instruction hours.															
**	Additional value added courses credit will not be included in the total CGPA. These courses are extra-credit courses. Instruction hours for these courses is 30 hours															

SEMESTER-I



**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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(For the Candidates admitted in the academic year 2026 – 2027)

DEPARTMENT OF CHEMISTRY

B. Sc., CHEMISTRY

Semester: I-CC-I: General Chemistry-I

Ins. Hrs. /Week: 4

Course Credit: 4

Course Code: U26CH101

COURSE OBJECTIVES

- To learn the arrangement of elements in the periodic table and to understand the periodic properties
- To learn the laboratory hygiene, safety measures, principles of qualitative and quantitative analysis
- To learn the various methods of preparation, structure and stability of reaction intermediates.
- To understand the chemistry of cycloalkanes, alkenes and alkynes.
- To learn the types, preparation and properties of sols, colloids and emulsions and the determination of molecular weight of macromolecules

UNIT I: PERIODIC TABLE AND PERIODIC PROPERTIES: (12 HOURS)

Quantum Numbers, Filling up of atomic orbitals: Pauli's exclusion principle, Aufbau Principle, Hund's rule of maximum multiplicity – electronic configuration. Stability associated with half-filled and completely filled orbitals.

Periodic properties of elements – variation of atomic volume, atomic and ionic radii, ionization potential, electron affinity, electro negativity along periods and groups. Pauling scale of electro negativity.

Classification of elements into s, p, d and f blocks.

**UNIT- II LABORATORY HYGIENE, SAFETY MEASURES AND
ANALYTICAL METHODS: (12 HOURS)**

Storage and handling of chemicals – Corrosion, flammable, explosive, carcinogenic and toxic chemicals. Simple first aid procedures for accidents involving acids, alkalis, bromine, fire burns and cut by glass.

Solubility product, common ion effect, complexation, oxidation-reduction reactions

involved in identification of anions and cations – separation of cations into groups – Semi micro analysis of simple salts.

Volumetric analysis – preparation of standard solutions – normality, molarity and molality - titrimetric reactions – acid-base, redox, precipitation and complexometric titrations – indicators – effect of change in P^H – selection of suitable indicators.

UNIT – III ALKANES, REACTIVE INTERMEDIATES AND METHODS FOR REACTION MECHANISMS: (12 HOURS)

Introduction: Inductive, mesomeric, electromeric effects and hyper conjugation – structure of organic molecules based on sp^3 , sp^2 and sp hybridization. Alkanes – sources of alkanes – general preparation – general properties – conformational analysis of ethane and n-butane.

Carbocations, Carbanions and Carbenes: Generation and stability of reactive intermediates – Correlation of reactivity with structure of reactive intermediates. Free radicals: Generation, stability, identification methods – Free radical halogenations reactions and their mechanism.

Homolytic and Heterolytic cleavages of bonds, Characteristics of nucleophilic, electrophilic and free radical reactions.

UNIT- IV CHEMISTRY OF CYCLOALKANES, ALKENES, DIENES AND ALKYNES: (12 Hours)

Preparation of cycloalkanes – Chemical properties – Relative stability of cyclopropane to cyclooctane – Baeyer's Strain theory – Limitations – Mono and di-substituted cyclohexanes.

Alkenes: Nomenclature – Petroleum source of alkenes and aromatics – General methods of preparation of alkenes – Chemical properties – Markovnikov's rule and peroxide effect-Uses – Elimination reactions and its mechanisms (E_1 , E_2).

Dienes: Structures and properties – conjugated dienes – stability and resonance– electrophilic addition – 1,2 addition and 1,4 addition. Alkynes: Nomenclature – General methods of preparation – Physical properties – Chemical properties – Uses.

UNIT – V COLLOIDS AND MACROMOLECULES: (12 HOURS)

Definition and types of Colloids- preparation, Purification (dialysis, electro dialysis and ultra-filtration) and stability of colloids, gold number.

Properties of colloids- kinetic, optical and electrical properties.

Emulsions – Types of emulsions, preparation, properties and applications, Donnan

membrane equilibrium.

Osmosis – reverse osmosis and desalination. Macromolecules- Molecular weight of macromolecules- determination of molecular weight by osmotic pressure and light scattering methods.

UNIT – VI CURRENT CONTOURS (For Continuous Internal Assessment Only):

Chart preparation on laboratory hygiene with safety measures and s, p, d and f block elements separately with their common properties and applications. Best chart can be placed in the laboratory for students perusal.

TOTAL LECTURE HOURS: 60

COURSE OUTCOMES

The students are able to

1. Predict periodic properties and position of elements in the periodic table.
2. Apply theoretical aspects in qualitative and quantitative analysis and work safe and hygienically in laboratories.
3. Prepare and predict the stability and reactivities of reaction intermediates.
4. Prepare & explain the properties of colloids and emulsions.
5. Determine the Molecular Weight of macromolecules.
6. Apply the knowledge of laboratory hygiene with safety measures.

TEXT BOOK(S)

1. R.D. Madan, “Modern Inorganic Chemistry”, 2nd edition, S. Chand & Company Ltd., 2000.
2. P.L. Soni, “Text book of Inorganic Chemistry”, 20th revised edition, Sultan Chand & Sons, 2000.
3. B.R. Puri, L.R. Sharma, K.K. Kalia, Principles of Inorganic Chemistry, 23rd edition, New Delhi, ShobanLal Nagin Chand & Co., (1993).
4. J.D. Lee, ‘Concise Inorganic Chemistry’, 20th revised edition, Sultan Chand & Sons, 2000.
5. R. Gopalan, P.S. Subramanian & K. Rengarajan, “Elements of Analytical Chemistry”, 2nd edition, Sultan Chand & Sons, 1000.
6. Brown, T. L., LeMay, H. E., Bursten, B. E., Murphy, C., Woodward, P., & Stoltzfus, M. (2026). *Chemistry: The central science* (16th ed.). Pearson.
7. Ebbing, D. D., Gammon, S. D., Koenigsmann, C., & Wu, N. (2026). *General chemistry* (12th ed.).

Cengage Learning.

8. Silberberg, M. S., & Amateis, P. (2026). *Chemistry: The molecular nature of matter and change*. McGraw-Hill Education.

REFERENCE BOOK(S)

1. Morrison, R.T. and Boyd, R.N., Bhattacharjee, S. K. Organic Chemistry (7th edition), Pearson, India, (2011).
2. Bahl, B.S. and Bahl, A., Advanced Organic Chemistry, (12th edition), New Delhi, Sultan Chand & Co., (2010).
3. Jerry March, "Advanced Organic Chemistry, Reaction, Mechanism and Structure", 7th Edition, Wiley Inter Science (2013).
4. Puri B.R., Sharma L.R. and Pathania M.S. Principles of Physical chemistry, (35th edition), New Delhi: Shoban Lal Nagin chand and Co. (2013)
5. Glasstone S. and Lewis D., Elements of Physical Chemistry, London, Mac Millan & Co Ltd.
6. Petrucci, R. H., Herring, F. G., Madura, J. D., & Bissonnette, C. (2026). *General chemistry: Principles and modern applications* (12th ed.). Pearson.
7. Atkins, P., de Paula, J., & Keeler, J. (2026). *Atkins ' physical chemistry* (12th ed.). Oxford University Press.
8. Oxtoby, D. W., Gillis, H. P., & Campion, A. (2026). *Principles of modern chemistry* (8th ed.). Cengage Learning.

E-RESOURCES

1. <https://openstax.org/details/books/chemistry-2e>
2. https://chem.libretexts.org/Bookshelves/General_Chemistry
3. www.antoine.frostburg.edu1.com
4. www.oli.cmu.edu/courses/general-chemistry.com
5. https://oms.bdu.ac.in/ec/admin/contents-/316_20211123075240176.pdf
6. <https://kanchiuniv.ac.in/coursematerials/Dr.%20RP%20%20Carbocationspdf>

MAPPING WITH PROGRAMME OUTCOMES

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3		2		2		2	2		3	3	2		2
CO2	2	3	3	2		2	2		2	2	3	3	2	3	
CO3	3	3		2		3			3	2	3	3	2		
CO4	3	3	3	2		3	3	2	2	2	3	3	2	3	3
CO5	3	2	3	2		2		2	2		3	3	2	3	
CO6	2	3	3	2		2	2		2	2	3	3	2	3	2

3- Strong 2-Medium 1-Low



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DEPARTMENT OF CHEMISTRY

B. Sc., CHEMISTRY

Semester: I-CP-I: Quantitative Inorganic Estimations (Volumetric Analysis) Practical

Ins. Hrs. /Week: 4

Course Credit: 4

Course Code: U26CH102P

COURSE OBJECTIVES

- To learn the techniques of titrimetric analyses.
- To know the estimation of several cations and anions.
- To understand the estimation using neutralization.
- To know the estimation using redox principle.
- To acquire the Knowledge of handling of Chemicals.

TITRIMETRIC QUANTITATIVE ANALYSIS:

1. Estimation of HCl Vs NaOH using a standard oxalic acid solution.
2. Estimation of Na₂CO₃ Vs HCl using a standard Na₂CO₃ solution.
3. Estimation of Iron (II) sulphate Vs KMnO₄ using a standard Mohr's salt solution.
4. Estimation of oxalic acid Vs KMnO₄ using a standard oxalic acid solution.
5. Estimation of copper (II) sulphate by K₂Cr₂O₇ solution.
6. Estimation of KMnO₄ Vs thio using standard K₂Cr₂O₇ solution.

TOTAL LECTURE HOURS: 60

Scheme of Valuation

Record	- 10 marks
Procedure Writing	- 10 (marks)
Results	
< 1 %	- 40 marks
1-2 %	- 35 marks
2-3 %	- 25 marks
3-4 %	- 15 marks
> 4 %	- 10 marks

Total Marks

- 60 Marks

COURSE OUTCOMES

The students are be able to

1. Understand the use of volumetric pipette, burette and analytical balance.
2. Explain the principles of volumetric analysis,
3. Predict the volumetric involving redox and neutral analysis.
4. Prepare standard solution to find out the concentrations of unknown analyte,
5. Understand the selection of indicators.
6. Apply the knowledge in chemical experiments.

TEXT BOOK(S)

1. Harris, D. C., & Lucy, C. A. (2020). *Quantitative chemical analysis* (11th ed.). Macmillan Learning.
2. Vogel, A. I., & Bassett, J. (2021). *Vogel's textbook of quantitative inorganic analysis* (6th ed.). Pearson Education.
3. Kolthoff, I. M., & Sandell, E. B. (2022). *Textbook of quantitative inorganic analysis* (3rd ed.). Macmillan.
4. Mendham, J., Denney, R. C., Barnes, J. D., & Thomas, M. J. K. (2024). *Vogel's quantitative chemical analysis* (7th ed.). Pearson Education.
5. Svehla, G. (2026). *Vogel's qualitative inorganic analysis* (7th ed.). Pearson Education.

REFERENCE BOOK(S)

1. Venkateswaran V. Veerasamy R. Kulandaivelu A.R., Basic principles of Practical Chemistry, 2nd edition, New Delhi, Sultan Chand & sons (1997).
2. Harris, D. C., & Lucy, C. A. (2020). *Quantitative chemical analysis* (11th ed.). Macmillan Learning.
3. Vogel, A. I., Mendham, J., Denney, R. C., Barnes, J. D., & Thomas, M. J. K. (2026). *Vogel's quantitative chemical analysis* (7th ed.). Pearson Education.
4. Kolthoff, I. M., & Sandell, E. B. (2022). *Textbook of quantitative inorganic analysis* (3rd ed.). Macmillan.
5. Skoog, D. A., West, D. M., Holler, F. J., & Crouch, S. R. (2024). *Fundamentals of analytical chemistry* (10th ed.). Cengage Learning.
6. Christian, G. D., Dasgupta, P. K., & Schug, K. A. (2026). *Analytical chemistry* (8th ed.).

E-RESOURCES

1. [https://openlibrary.org/books/OL26550817M/Textbook of quantitative inorganic analysis by I.M. Kolth off and E.B. Sandell](https://openlibrary.org/books/OL26550817M/Textbook_of_quantitative_inorganic_analysis_by_I.M._Kolthoff_and_E.B._Sandell)
2. <http://ngc.digitallibrary.co.in/handle/123456789/2353>
3. [https://www.researchgate.net/publication/370341369 Essentials of Pharmaceutical Inorganic Chemistry Practical](https://www.researchgate.net/publication/370341369_Essentials_of_Pharmaceutical_Inorganic_Chemistry_Practical)
4. www.deepblue.lib.umich.edu/items.com
5. www.dokdimen.pub/download/practical-chemistry-ch-233.com

MAPPING WITH PROGRAMME OUTCOMES

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	2	3			3			2	3	3	3	2	2	3
CO2	2	3	3			3	2		2	3	3	3		3	3
CO3	3	3	3	3		3	3	2	3	2	3	3	3	3	3
CO4	3	3	3	3		3	3			3	3				
CO5	3	2	3	3		2		2	2		3	3		2	3
CO6	3	3	3	3		3	3			3	3			2	3

3- Strong 2-Medium 1-Low



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DEPARTMENT OF CHEMISTRY

B. Sc., CHEMISTRY

Semester I : Value Education

Ins. Hrs./Week: 2

Course Credit: 2

Course Code:26UGVED

COURSE OBJECTIVES

- To learn the Philosophy of life and social values.
- To understand the value oriented education.
- To acquire the national values.
- To promote the yoga practice.
- To understand the constitutional rights.

UNIT I PHILOSOPHY OF LIFE AND SOCIAL VALUES (6 HOURS)

Human Life on Earth(Kural629)-Purpose of Life(Kural46)-Meaning and Philosophy of Life (Kural 131, 226) -Family (Kural 45), Peace in Family (Kural1025) Society(Kural446), The Law of Life (Kural 952),Brotherhood(Kural807)Five responsibilities/duties of Man(a) to himself(b) to his family(c) to his environment(d)to his society, (e)to the Universe in his lives(Kural43,981).

UNIT II HUMAN VALUES AND CITIZENSHIP (6 HOURS)

Aim of education and value education: Evolution of value oriented education, Concept of Human values: types of Values- Character Formation – Components of Value education- APJ Kalam's ten points for enlightened citizenship-The role of media in value building

UNIT-III VALUE EDUCATION TOWARDS NATIONAL AND GLOBAL DEVELOPMENT (6 HOURS)

Constitutional or national values: Democracy, socialism, secularism, equality, Justice, liberty, freedom and fraternity - Social Values: Pity and probity, self-control, universal brotherhood - Professional Values - Knowledge thirst, sincerity in profession, regularity, punctuality and faith -Religious Values: Tolerance, wisdom, character –

Aesthetic Values- Love and appreciation of literature and fine arts and respect for the same- National Integration and International Understanding.

UNIT IV YOGA AND HEALTH

(6 HOURS)

Definition, Meaning, Scope of Yoga - Aims and objectives of Yoga – Yoga Education with modern context - Different traditions and schools of Yoga - Yoga practices: Asanas, Pranayama and Meditation.

UNIT V HUMAN RIGHTS

(6 HOURS)

Concept of Human Rights: Indian and international perspectives- Evolution of Human Rights- definitions under Indian and International documents -Broad classification of Human Rights and Relevant Constitutional Provisions: Right to Life, liberty and Dignity- Right to equality- Right against exploitation- Cultural and Educational Right- Economic Rights- Political Rights- Social Rights - Human Rights of Women and Children – Peace and harmony.

UNIT-VI CURRENT CONTOURS: (for continuous internal assessment only- Self Study)

Contemporary issues in value education focusing on ethics, human values, social responsibility, and citizenship. Awareness of environmental sustainability, gender equality, human rights, and national integration. Promotion of mental health, yoga, professional ethics, and community service. Assessment through seminars, assignments, group discussions, presentations, and field-based activities

COURSE OUTCOMES

Student will be able to:

1. Apply the values in thirukural to be peaceful, dutiful and responsible in family and society
2. Develop character formation and sense of citizenship
3. Be secular, self-control, sincere, respectful and moral.
4. Master yoga, asana and meditation to promote mental health
5. Be attitudinal to follow the constitutional rights.
6. Apply ethical values, social responsibility, and critical thinking to address contemporary societal issues.

TEXT BOOK(S)

1. SOUNDHEALTH THROUGH YOGA-Dr.K.Chandrasekaran,Prem Kalyan Publications, Sedapatti, 1999.
2. Grose.D.N-“A text book of Value Education’ New Delhi(2005)
3. Gawande . EN – “Value Oriented Education” – Vision for better living. New Delhi (2002) Sarupsons
4. Brain Trust Aliyar- “Value Education for Health, Happiness and Harmony” Erode (2004) Vethathiri publications
5. Pope, G. U. (2020). Thirukkural with English translation. Uma Publications.
6. Grose, D. N. (2021). A textbook of value education. Sarup & Sons.
7. Gawande, E. N. (2021). Value-oriented education: Vision for better living. Sarup & Sons.
8. Brain Trust Aliyar. (2022). Value education for health, happiness and harmony. Vethathiri Publications.
9. Kuvalayananda, S., & Vinekar, S. L. (2023). Yogic therapy. Ministry of Health, Government of India.
10. Chandrasekaran, K. (2024). Sound health through yoga. Prem Kalyan Publications.
11. Levin, L. (2025). Human rights. National Book Trust.

REFERENCE(S)

1. Thirukkural with English Translation of Rev.Dr.G.U.Pope, Uma Publication, 156,
2. Serfoji Nagar, Medical College Road, Thanjavur 613 004
3. Leah Levin,Human Rights,NBT, 1998
4. R.KrishnaIyer,Dialectics and Dynamics of Human Rights in India, Tagore Law Lectures.
5. Yogic Therapy – Swami Kuvalayananda and Dr.S.L.Vinekar,Government of India, Ministry of Health, New Delhi
6. Arumugam, N. (2024). *Value education* (6th ed.). Saras Publication.
7. Grose, D. N. (2020). *A textbook of value education*. Sarup & Sons.
8. Gawande, E. N. (2021). *Value oriented education: Vision for better living*. Sarup & Sons.
9. Brain Trust Aliyar. (2022). *Value education for health, happiness and harmony*. Vethathiri Publications.
10. Kuvalayananda, S., & Vinekar, S. L. (2023). *Yogic therapy*. Ministry of Health and Family Welfare, Government of India.

11. Chandrasekaran, K. (2025). *Sound health through yoga*. Prem Kalyan Publications.
12. Levin, L. (2026). *Human rights*. National Book Trust, India.

E-RESOURCES

1. <https://ndl.iitkgp.ac.in/>
2. <https://swayam.gov.in/>
3. <https://epgp.inflibnet.ac.in/>
4. <https://nptel.ac.in/>
5. www.unesco.org/en/ethics-1science-technology
6. www.unesco.org/en/ethics-2 science-technology

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	1	1	1	1	3	3	3	2	2	1	1	1	1	1
CO2	1	1	1	1	1	3	2	3	3	2	1	1	1	1	1
CO3	1	1	1	1	1	3	3	3	2	2	1	1	1	1	1
CO4	1	1	1	1	1	2	2	3	2	2	1	1	1	1	1
CO5	1	1	1	1	1	3	3	3	3	3	1	1	1	1	1
CO6	1	1	1	1	1	3	3	3	3	3	1	1	1	1	1

Strong-3

Medium-2

low-1

IDC-I



(Accredited by NAAC)

(For the Candidates admitted in the academic year 2026 – 2027)

DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY

Semester: I-Interdisciplinary Course-I: Dyeing Techniques and Water Treatments

Ins. Hrs./Week: 2

Course Credit: 2

Course Code: U26IDCH11

COURSE OBJECTIVES

- To develop the skills in dyeing.
- To understand the water qualities and treatments.
- To know the sewage treatments.
- To understand the industrial effluents.
- To aware the water pollutions.

UNIT – I PRETREATMENT OF FIBERS AND THEORY OF DYE: (6 HOURS)

Textile fiber pretreatments: Sizing and desizing, purpose, desizing methods (Hot water, Acid and enzymatic) - their merits and demerits - Scouring: classification, method of Kier boiling process. Dye chemistry: Witt's theory of colour –important dye stuff intermediates-their names- Difference between dye and pigments. Chromophore – auxo chromes –batho chromic shift and hypso-chromic shift -classification of dyes based on application.

UNIT – II TERMINOLOGIES IN DYEING PROCESS: **(6 HOURS)**

Technical terms in dyeing: M.L. ratio – % of shade – % of exhaustion – equilibrium absorption. Dyeing machineries: Description and uses of Padding mangle and Jigger. Textile dyeing processes I: Direct cotton dyeing – effect of temperature, Acid dyeing – effect of electrolytes in acid dyeing.

(6 HOURS)

UNIT – IV SEWAGE WATER TREATMENT METHODS: (6 HOURS)

**UNIT – V PROCESSES FOR TREATMENT OF INDUSTRIAL EFFLUENTS:
(6 HOURS)**

UNIT - VI CURRENT CONTOURS (FOR CONTINUOUS INTERNAL ASSESSMENT ONLY-SELF STUDY):

TOTAL LECTURE HOURS:30

COURSE OUTCOMES

The students are be able to

- Perform the pretreatment of grey fabric.
- Experience in dyeing of natural fibers with reactive, direct and acid dyes.
- Explain theory and process of dying textile fibers
- Characterize and find the suitable treatment process of sewage water and industrial effluents

- Compare the effect of aerobic and anaerobic treatment of industrial effluents and sewage water.

TEXT BOOK(S)

1. Shenai, V.A. ,Chemistry of Dyes and Principles of dyeing , vol.II, Sevak publication,2018 Mumbai
2. Venkataraman. K. The chemistry of synthetic dyes Vol, I, II, III & IV-, Academic Press N.Y., 2021.
3. Balay, G., & Borah, S. (2025). *Textile dyeing: Basic handbook*. Astral International Pvt. Ltd.
4. Maiti, S., Shahid, M., & Adivarekar, R. V. (Eds.). (2025). *Sustainable coloration techniques in textiles*. Springer.
5. Balay, G., & Borah, S. (2026). *Textile dyeing: Basic handbook*. Astral International Pvt. Ltd.

REFERENCE BOOK(S)

1. Venkataraman. K. The chemistry of synthetic dyes Vol, I, II, III & IV-, Academic Press N.Y., 1949.
2. H.Kaur “Environmental Chemistry” 7th Edition, 2024, Pragati Prakashan
3. A.K.De “Environmental Chemistry” 3rd Edition ,New Age International (P) Ltd.Publisher,2026.
4. Hilal, N., & Johnson, D. J. (2026). *Water treatment: Resource recovery and sustainability*. CRC Press.
5. Bhowmick, G. D., Pasternak, G., & Anyango, G. W. (Eds.). (2026). *Advanced tertiary wastewater treatment*. Springer.

E-RESOURCES

1. https://web.iitd.ac.in/~arunku/files/CVL100_Y16/LecSep1220.pdf
2. [https://oms.bdu.ac.in/ec/courses.php?subject=B.Sc.%20\(CHEMISTRY\)](https://oms.bdu.ac.in/ec/courses.php?subject=B.Sc.%20(CHEMISTRY))
3. [https://oms.bdu.ac.in/ec/courses.php112?subject=B.Sc.%20\(CHEMISTRY\)](https://oms.bdu.ac.in/ec/courses.php112?subject=B.Sc.%20(CHEMISTRY))
4. www.web.iitd.ac.in/~arunku.com
5. www.sciencedirect.com

MAPPING WITH PROGRAMME OUTCOMES

	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3	PSO4	PO5
CO1	3	1	2	2		2					3	3	3		2
CO2	3	3	3	3		1		3	3		3	3	3	3	
CO3	3	3	3	3		1		3	3	3	2	2	2	3	2
CO4	3	2	2	2		2					3	3	3		
CO5	3	1	2	3		3		3	2		3	3	3		
CO6	3	2	2	2		2					3	3	3		3

3- Strong

2-Medium

1-Low

SEMESTER- II



Semester: II-CC-II: General Chemistry-II

Ins. Hrs. /Week: 4

Course Credit: 4

Course Code: U26CH203

COURSE OBJECTIVES

- To learn the principles and theories of chemical bonding.
- To understand the chemistry of S-block elements and Zero group elements.
- To apply the concept of common ion effect, solubility product in inorganic Semi micro qualitative analysis
- To recognize the reaction mechanism of haloalkanes and halobenzene.
- To emphasize the atomic spectrum and dual nature of light black body radiation.

UNIT – I CHEMICAL BONDING:

(12 HOURS)

Ionic bond – formation, variable electro valency – Lattice energy, Born – Haber Cycle.

Covalent bond – formation, variable covalency, maximum covalency, covalent character in ionic bond – Fajans' Rule. Polarization – partial ionic character of a covalent bond.

VB theory, MO theory – Basic principles of bonding and antibonding orbitals, applications of MOT to H_2 , He_2 , N_2 & O_2 – molecular orbital sequence, comparison of VB & MO Theories.

Hybridization – Formation of $BeCl_2$ & BCl_3 . VSEPR theory of simple inorganic molecules – $BeCl_2$, $SiCl_4$, PCl_5 , SF_6 , IF_7 , XeF_6 , BF_3 & H_2O .

Hydrogen bonding – Intermolecular & Intramolecular H_2 – bonding and consequences.

UNIT – II CHEMISTRY OF s-BLOCK AND ZERO GROUP ELEMENTS:

(12 HOURS)

General characteristics of s-block elements – comparative study of elements – alkali metals and their hydroxides, oxides and halides, alkaline earth metals and their oxides, carbonates and sulphates.

Diagonal relationship of Li & Mg, Be & Al, chemistry of NaOH, KI & Mg

and Ψ^2 .

UNIT – VI CURRENT CONTOURS (For Continuous Internal Assessment Only):

An assignment on applications of hydrogen bonding, various atomic models and evidences for dualism of light. Chart preparations for molecular orbital theory diagram.

An exposure to virtual laboratory experiments.

TOTAL LECTURE HOURS: 60

COURSE OUTCOMES

The students should be able to

- Explain the principles and theories of chemical bonding.
- Explain the chemistry of S-block elements and Zero group elements.
- Apply the concept of common ion effect, solubility product in inorganic Semi micro qualitative analysis
- Explain the reaction mechanism of haloalkanes and halobenzene.
- Explain atomic models. Atomic spectrum and dual nature of light black body radiation and significances of wave functions.
- Recognize the application of Hydrogen bonding and Molecular theory Hydrogen Bonding.

TEXT BOOK(S)

1. P.L. Soni, “Text book of Inorganic Chemistry”, 20th revised edition, Sultan Chand & Sons, 2000.
2. B.R. Puri, L.R. Sharma, K.K. Kalia, Principles of Inorganic Chemistry, 23rd edition, New Delhi, Shoban Lal Nagin Chand & Co., (1993).
3. J.D. Lee, ‘Concise Inorganic Chemistry’, 20th revised edition, Sultan Chand & Sons, 2023.
4. Over by, J., & Chang, R. (2025). *Chemistry* (15th ed.). McGraw-Hill Education.
5. Bursten, B. E., Murphy, C. J., Le May, H. E., & Woodward, P. M. (2026). *Chemistry: The central science* (15th ed., SI units global ed.). Pearson.

REFERENCE(S)

1. Bahl B.S. and Bahl A., Advanced Organic Chemistry, (12th edition), New Delhi, Sultan Chand & Co., (2010).
2. Jerry March, “Advanced Organic Chemistry, Reaction, Mechanism and Structure”, 7th Edition, Wiley Inter Science (2013).

3. Puri B.R., Sharma L.R. and Pathania M.S. (2015) Principles of Physical Chemistry, (35th edition), New Delhi: Shoban Lal Nagin chand and Co.
4. Over by, J., & Chang, R. (2025). *Chemistry* (15th ed.). McGraw-Hill Education.
5. Brown, T. L., LeMay, H. E., Bursten, B. E., Murphy, C. J., Woodward, P. M., & Stoltzfus, M. W. (2026). *Chemistry: The central science* (15th ed.). Pearson.

E-RESOURCES

1. [https://oms.bdu.ac.in/ec/courses.php?subject=B.Sc.%20\(CHEMISTRY\)](https://oms.bdu.ac.in/ec/courses.php?subject=B.Sc.%20(CHEMISTRY))
2. http://www.chem.ualberta.ca/~vederas/Chem_164/handouts/pdf/sub_elim_rxn.pdf
3. www.sciencedirect.com
4. www.elevesier.com
5. [https://oms.bdu.ac.in/ec/courses.php?subject=B.Sc.%2020\(CHEMISTRY\)](https://oms.bdu.ac.in/ec/courses.php?subject=B.Sc.%2020(CHEMISTRY))

MAPPING WITH PROGRAMME OUTCOMES

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
C01	3	1	2	2		2					3	3	3		3
C02	3	3	3	3		1		3	3		3	3	3	3	2
C03	3	3	3	3		1		3	3	3	2	2	2	3	3
C04	3	2	2	2		2					3	3	3		2
C05	3	1	2	3		3		3	2		3	3	3		2
C06	3	2	2	2		2					3	3	3		1

3- Strong

2-Medium

1-Low

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

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(Accredited by NAAC)

SUNDARAKKOTTAI, MANNARGUDI-614016.

(For the Candidates admitted in the academic year 2026 – 2027)

B.Sc., CHEMISTRY



Semester: II-CP-II: Qualitative Organic Analysis Practical

Ins. Hrs. /Week: 4

Course Credit: 4

Course Code: U26CH204P

COURSE OBJECTIVES

- To observe the physical state, odor, color and solubility of the given Organic compound.
- To identify the presence of special elements and functional group in an unknown Organic compound performing a systematic analysis.
- To compare mono and dicarboxylic acid, primary, secondary and tertiary amines,
- To empathise the mono and diamides, mono and polyhydric phenols, aldehyde and ketone, reducing and non- reducing sugars and explain the reactions behind it.
- To exhibit a solid derivative with respect to the identified functional group.

Qualitative Organic analysis

Preliminary examination, detection of special elements – nitrogen, Sulphur and halogens.

Aromatic and aliphatic nature, Test for saturation and unsaturation, identification of functional groups using solubility tests.

Confirmation of functional groups

- monocarboxylic acid, dicarboxylic acid
- monohydric phenol, polyhydric phenol
- aldehyde, ketone, ester
- carbohydrate (reducing and non-reducing sugars)
- primary, secondary, tertiary amine
- monoamide, diamide, thioamide
- anilide, nitro compound

Preparation of derivatives for functional groups

Scheme of Valuation:	Max. Marks
Record	-10 (Marks)
Procedure Writing	-10 (Marks)
Qualitative Organic Analysis (Marks)	- 40
Total Marks	- 60 Marks

COURSE OUTCOMES

The students should be able to

1. Observe the physical state, odor, color and solubility of the given Organic compound.
2. Identify the presence of special elements and functional group in an unknown Organic compound performing a systematic analysis.
3. Compare mono and dicarboxylic acid, primary, secondary and tertiary amines, mono and diamides, mono and polyhydric phenols, aldehyde and ketone, reducing and non- reducing sugars and explain the reactions behind it.
4. Exhibit a solid derivative with respect to the identified functional group.
5. Acquire the Knowledge of handling the different chemicals.
6. Understand the various organic compounds.

(Total Lecture Hours -60)

TEXT BOOK(S)

1. Venkateswaran, V.; Veeraswamy, R.; Kulandaivelu, A.R. Basic Principles of Practical Chemistry, 2nd ed.; Sultan Chand: New Delhi, 2012.
2. Manna, A.K. Practical Organic Chemistry, Books and Allied: India, 2018.
3. Gurtu, J. N; Kapoor, R. Advanced Experimental Chemistry (*Organic*), Sultan Chand: New Delhi, 2020.
4. Venkateswaran V. Veerasamy R. Kulandaivelu A.R., Basic principles of Practical Chemistry, 4th edition, New Delhi, Sultan Chand & sons (2022).
5. Harris, D. C., & Lucy, C. A. (2026). *Quantitative chemical analysis* (11th ed.). Macmillan Learning.

REFERENCE(S)

1. Gnanapragasam, N, S. Ramamurthy, G. 1998. Organic Chemistry Lab Manual, Viswanathan, S. and Co. Pvt. Ltd. Chennai.

2. Vogel's Text Book of Qualitative Chemical Analysis, 6th edn. (2009), England. Mendham, J.; Denney, R. C.; Barnes, J. D.; Thomas, M.; Sivasankar, B.;
3. Johnson, D. J. (2024). *Water treatment: Resource recovery and sustainability*. CRC Press.
4. Bhowmick, G. D., Pasternak, G., & Anyango, G. W. (Eds.). (2026). *Advanced tertiary wastewater treatment*. Springer.
5. Hilal, N., & Johnson, D. J. (2026). *Water treatment: Resource recovery and sustainability*. CRC Press.

E-RESOURCES

1. <https://www.accessengineeringlibrary.com/content/book/9780071745925/chapter/chapter25>
2. <https://chemistryvce.weebly.com/volumetric-analysis.html>
3. [https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Supplemental_Modules_\(Analytical_Chemistry\)/Quantifying_Nature/Volumetric_Chemical_Analysis_\(Shiundu\)/14.2%3A_Learning_Activity](https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Supplemental_Modules_(Analytical_Chemistry)/Quantifying_Nature/Volumetric_Chemical_Analysis_(Shiundu)/14.2%3A_Learning_Activity)
4. <https://www.vlab.co.in/broad-area-chemical-sciences>
5. www.chemistryvce.weebly.com

MAPPING WITH PROGRAMME OUTCOMES

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO1	3	3	3	2		3	2	2	2	2	3	3	3	1	2
CO2	3	3	3	3		3	2	2	2	2	3	3	3	3	2
CO3	3	3	3	2		3	3	2	3	2	3	3	3	1	2
CO4	3	3	3	2		3	3	2	2	2	3	3	3	1	2
CO5	3	2	3	2		3	2	2	2	2	3	2	3	1	2
CO6	3	3	3	2		3	3	2	3	2	3	3	3	1	2

3- Strong

2-Medium

1-Low

SEC- I



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(For the Candidates admitted in the academic year 2026-2027)

DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY

Semester: II---SEC-I: Polymer Chemistry

Ins. Hrs./Week: 2

Course Credit: 2

Course Code : U26SECH21

COURSE OBJECTIVES

1. To learn the bonding in polymers.
2. To understand the various polymerization reactions.
3. To observe the processing of polymers.
4. To calculate the molecular weight by physical and chemical methods.
5. To interpret to the quality of synthetic polymers.

UNIT-I: CHARACTERIZATION, MOLECULAR WEIGHT AND ITS

DETERMINATION

(6 HOURS)

Primary and secondary bond forces in polymers; cohesive energy, molecular structure, chemical tests, thermal methods, T_g, molecular distribution, stability. Determination of Molecular mass of polymers: Number Average molecular mass (M_n) and Weight average molecular mass (M_w) of polymers. Molecular weight determination of high polymers by physical and methods.

UNIT-II: MECHANISM AND KINETICS OF POLYMERIZATION

(6 HOURS)

Chain growth polymerization: Cationic, anionic, free radical polymerization, Stereo regular polymers: Ziegler Natta polymerization. Reaction kinetics. Step growth polymerization, Degree of polymerization.

UNIT-III: TECHNIQUES OF POLYMERIZATION AND POLYMER

DEGRADATION

(6 HOURS)

Bulk, Solution, Emulsion, Suspension, solid, interfacial and gas phase polymerization. Types of Polymer Degradation, Thermal degradation, mechanical degradation, photodegradation, Photo stabilizers, Solid and gas phase polymerization.

UNIT-IV: INDUSTRIAL POLYMERS

(6 HOURS)

Preparation of fibre forming polymers, elastomeric material. Thermoplastics: Polyethylene, Polypropylene, polystyrene, Polyacrylonitrile, Poly Vinyl Chloride, Poly tetrafluoro ethylene, nylon and polyester. Thermosetting Plastics: Phenol formaldehyde and epoxide resin. Elastomers: Natural rubber and synthetic rubber - Buna - N, Buna-S and neoprene. Conducting Polymers: Elementary ideas; examples: poly sulphur nitriles, polyphenylene, poly pyrrole and poly acetylene. Polymethylmethacrylate, polyimides, polyamides, polyurethanes, polyureas, polyethylene and polypropylene glycols.

UNIT-V: POLYMER PROCESSING

(6 HOURS)

Compounding: Polymer Additives: Fillers, Plasticizers, antioxidants, thermal stabilizers, fire retardants and colourants. Processing Techniques: Calendaring, die casting, compression moulding, injection moulding, blow moulding and reinforcing. Film casting, Thermofoaming, Foaming. Catalysis and catalysts – Polymerization catalysis, catalyst support, clay compounds, basic catalyst, auto-exhaust catalysis, vanadium, heterogeneous catalysis and active centres.

UNIT – VI CURRENT CONTOURS (For Continuous Internal Assessment Only):

Recent trends in polymer chemistry focus on the development of biodegradable and environmentally friendly polymers. Advanced polymers are widely used in medicine, electronics, packaging and textile industries. Research is being carried out to improve recycling methods and reduce plastic pollution. Smart polymers and nanocomposite materials are gaining importance in modern technology and sustainable development.

TOTAL LECTURE HOURS: 30

COURSE OUTCOMES

Students will be able to:

1. Understand the bonding in polymers.
2. Scientifically plan and perform the various polymerization reactions.
3. Observe and record the processing of polymers.
4. Calculate the molecular weight by physical and chemical methods.
5. Interpret the experimental data scientifically to improve the quality of synthetic polymers.
6. Focus the development of biodegradable and eco- friendly polymers.

TEXT BOOK(S)

1. V.R. Gowariker, *Polymer Science*, Wiley Eastern, 1995.
2. G.S. Misra, *Introductory Polymer Chemistry*, New Age International (Pvt) Limited, 1996.
3. M.S. Bhatnagar, *A Text Book of Polymers*, vol-I & II, S.Chand & Company, New Delhi, 2004.
4. *A Introduction of Polymer Chemistry* - David M. Teegarden 2025.
5. *Properties of Polymer Chemistry* -James E.Mark, 2026

REFERENCE BOOK(S)

1. F. N. Billmeyer, *Textbook of Polymer Science*, Wiley Interscience, 1971.
2. A. Kumar and S. K. Gupta, *Fundamentals and Polymer Science and Engineering*, Tata McGraw-Hill, 1977
3. *Principles of polymer chemistry* by Paul J. Flory 2 2024.
4. *A Textbook of Polymer Chemistry Basic concepts, processing and applications, condensation polymers* ; Author, MS Bhatnagar, 2025.
5. M.S. Bhatnagar, *A Text Book of Polymers*, vol-I & II, S.Chand & Company, New Delhi, 2026.

E RESOURCES:

1. <https://sites.google.com/site/chemistrybookscollection02/home/polymer-chemistry/or>
2. www.buecher.com
3. www.rachidscience.com
4. <https://sites.google.com/site/chemistrybookscollection02/home/polymer-chemistry/or>
5. <https://sites.google.com/site/www.freebookcentre.net01/home/polymer-chemistry/or>

MAPPING WITH PROGRAMME OUTCOMES

	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	3	3	3	2		3	2	2	2	2	3	3	3	1	2
CO2	3	3	3	3		3	2	2	2	2	3	3	3	3	2
CO3	3	3	3	2		3	3	2	3	2	3	3	3	1	2
CO4	3	3	3	2		3	3	2	2	2	3	3	3	1	2
CO5	3	2	3	2		3	2	2	2	2	3	2	3	1	2
CO6	3	3	3	2		3	3	2	3	2	3	3	3	1	2

3- Strong

2-Medium

1-Low

IDC-II



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(For the Candidates admitted in the academic year 2026-2027)

DEPARTMENT OF CHEMISTRY

B. Sc., CHEMISTRY

Semester: II- Interdisciplinary Course-II: Agricultural Chemistry

Ins. Hrs. /Week: 2

Course Credit: 2

Course Code: U26IDCH22

COURSE OBJECTIVES

- To learn the origin of soil.
- To understand the soil organic matter.
- To emphasize the Plant nutrients and their deficiencies.
- To understand the Fertilizers.
- To characterize the safe handling of pesticides.

UNIT I ORIGIN OF SOIL

(6 HOURS)

Origin of soils, their properties, acid, alkali and saline soils- diagnosis – remediation of acid and salt affected soils – methods of reclamation and after care.

UNIT II CHEMISTRY ASPECTS OF SOIL

(6 HOURS)

Soil testing – concept, objectives and basis – soil sampling, tools, collection processing, dispatch of soil samples – soil organic matter – its decomposition and effect on soil fertility.

UNIT III PLANT NUTRIENTS

(6 HOURS)

Plant nutrients – macro and micro nutrients – their role in plant growth – sources – forms of nutrient absorbed by plants – factors affecting nutrient absorption – deficiency symptoms in plants – corrective measures – chemicals used for correcting nutritional deficiencies – nutrient requirement of crops – their availability fixation and release of nutrients.

UNIT IV FERTILIZERS

(6 HOURS)

Fertilizers – classification of NPK fertilizers – sources – natural and synthetic – straight – complex – liquid fertilizers, their properties, use and relative efficiency secondary and micronutrient fertilizers – mixed

fertilizers.

UNIT V PESTICIDES AND FUNGICIDES

(6 HOURS)

Pesticides : definition – Classification – organic and inorganic pesticides – mechanism of action – characteristics safe handling of pesticides – impact of pesticides on soil, plants and environment.

Fungicides : Definition – Classification – mechanism of action – sulphur, copper, Bordeaux mixture, cuproban, mercury compounds – phenyl compounds – phenyl mercury acetate (PMA), Methoxyethyl mercuric chloride (MMC), sulphur – Ethylene Bis Dithiocarbamates (EBDC's), Thiocarbomates, cypermethrin acid chloride.

UNIT – VI CURRENT CONTOURS (For Continuous Internal Assessment Only):

An assignment on applications of current contours often focus on modern topics like Soil Health & Nutrient Management, Environmental Impact & Remediation, Agro-Chemicals, Laboratory & Field Practices

COURSE OUTCOMES

Students will be able to:

1. Learn the properties and remediation of the soil.
2. Understand the soil organic matter.
3. Emphasize the Plant nutrients and their deficiencies.
4. Understand the Fertilizers.
5. Characterize the safe handling of pesticides.
6. Impact the environmental and agro-chemicals.

TOTAL LECTURE HOURS: 30

TEXT BOOK(S)

1. Biswas T.D and Mukherjee S.K. Text book of soil science 1987.
2. Daji A.J. A text book of soil science, Asia publishing House, Madras – 1970.
3. Tisdale S.L. Nelson W.L. and Beaton J.D. Soil fertility and fertilizers, Macmillan Pub Co New York 1990.
4. Hesse P.R, A text book of soil chemical analysis John Murray, New York, 2023.
5. Buchel K.H, Chemistry of Pesticides, John Wiley & Sons New York 2026.

REFERENCE(S)

1. Dr. B. S. Chauhan., Applied Chemistry, 2013, Vayu Education of India
2. K.Bagavathi Sundari., Applied chemistry, 2019. MJP Publishers, 1st Edition
3. G.T. Austin : shreve's Chemical Process Industries, 5th edition, Mc-Graw-Hill, 1984
4. B.A. Yagodin (Ed). Agricultural Chemistry, 2 Volumes, Mir Publishers (Moscow), 1976
5. Biswas, A.K., Frontiers in Applied Chemistry, Narosa publishing house, 1989
6. Vermain, O.P, Narula A.C., Applied chemistry theory and books2025..
7. Dr.Varadbal, Mhatre, Text book of Chemistry-2 , 2026.
8. Gesser, Applied Chemistry: A text book for engineers and technologist, Springer,2026

E-RESOURCES

1. https://edurev.in/studytube/Chapter-3-Fuels-IC-Engine--Mechanical-Engineering/9fca2b17-ea53-49c1-93a8-70aa2fe1195b_t
2. [https://freebookcentre.net/biology-books-download/Agriculture-lecture-notes-\(PPT\).html](https://freebookcentre.net/biology-books-download/Agriculture-lecture-notes-(PPT).html)
3. https://edurev.in/studytube/NCERT-Summary-Sugar-Industry/70dc942d-bf20-4ef9-bb42-fbd368ab7bab_t
4. <http://web.mit.edu/5.33/www/lec/poly.pdf>
5. <https://nebstudent.com/materials-used-in-daily-life/job>
6. www.springer.com
7. www.sciencedirect.com

MAPPING WITH PROGRAMME OUTCOMES

	PO 1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3	PSO 4	PSO5
CO1	3	3	3	2		3	2	2	2	2	3	3	3	1	2
CO2	3	3	3	3		3	2	2	2	2	3	3	3	3	2
CO3	3	3	3	2		3		2	3	2		3	3		2
CO4	3		3	2		3	3	2	2	2	3	3	3	1	2
CO5	3	2	3	2		3	2	2		2	3	2		1	2
CO6	3	3	3	2		3	3	2	3	2	3	3	3	1	2

3- Strong

2-Medium

1-Low

**MINOR COURSES
OFFERED
BY THE DEPARTMENT**



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(For the Candidates admitted in the academic year 2026 – 2027)

DEPARTMENT OF CHEMISTRY

B.Sc., BIO CHEMISTRY

Semester: I-AC-I: Chemistry-I

Ins. Hrs. /Week 3

Course Credit: 3

Course Code:U26ACH101

COURSE OBJECTIVES

- To learn the theories of chemical bonding, nuclear reactions and its applications.
- To evaluate the efficiencies and uses of various fuels and fertilizers.
- To understand the type of hybridization, electronic effect and mechanism involved in the organic reactions.
- To emphasize the structure of antibiotics, anesthetics, antipyretics and artificial sugars.
- To analyze the various methods for the separation of chemical components.

UNIT -I: CHEMICAL BONDING AND METALS IN MEDICINE

(9 HOURS)

Chemical Bonding: Molecular Orbital Theory-bonding, antibonding and non-bonding orbitals. M.O diagrams for Hydrogen, Helium, Nitrogen; discussion of bond order and magnetic properties.

Metals in medicine:

Metal Toxicity of Hg, Cd, Zn, Pb, As, Sb. Therapeutic Compounds: Vanadium-Based Diabetes Drugs; Platinum-Containing Anticancer Agents. Chelation therapy; Cancer treatment. Diagnostic Agents: Technetium Imaging Agents; Gadolinium MRI Imaging Agents. temperature and critical Magnetic Field.

UNIT- II: INDUSTRIAL CHEMISTRY

(9 HOURS)

Fuels: Fuel gases: Natural gas, water gas, semi water gas, carbureted water gas, producer gas, CNG, LPG, Gobar gas and oil gas (manufacturing details not required).

Silicones: Synthesis, properties and uses of silicones.

Fertilizers: Urea, ammonium sulphate, potassium nitrate NPK fertilizer, superphosphate, triple superphosphate-soaps and detergents. Preparation properties and uses

UNIT- III: FUNDAMENTAL CONCEPTS IN ORGANIC CHEMISTRY (9 HOURS)

Hybridization: Orbital overlap hybridization and geometry of CH_4 , C_2H_4 , C_2H_2 and C_6H_6 . Polar effects: Inductive effect and its consequences on K_a and K_b of organic acids and bases, electromeric, mesomeric, hyper conjugation and steric-examples and explanation.

Reaction Mechanisms: Types of reactions- aromaticity-aromatic electrophilic substitution; nitration, halogenation, Friedel-Craft's alkylation and acylation. Heterocyclic compounds: Preparation, properties of pyrrole and pyridine.

UNIT -IV: DRUGS AND SPECIALITY CHEMICALS (9 HOURS)

Definition, structure and uses: Antibiotics viz., Penicillin, Chloramphenicol and Streptomycin; Anesthetics viz., Chloroform and ether; Antipyretics viz., aspirin, paracetamol and ibuprofen; Artificial Sweeteners viz., saccharin, Aspartame and cyclamate; Organic Halogen compounds viz., Freon, Teflon.

Chemotherapy: Explanation with two examples each for analgesics, antibacterial, anti-inflammatory, antibiotics, antiseptic and disinfectant, anesthetics local and general (Structures not necessary).

UNIT- V: ANALYTICAL AND SURFACE CHEMISTRY (9 HOURS)

Introduction -qualitative and quantitative analysis. Principles of volumetric analysis. Separation and purification techniques: extraction, distillation and crystallization. Chromatography: principle and application of column, paper and thin layer chromatography.

Surface Chemistry: Emulsions, gels- Preparation, Properties and uses- Electrophoresis and its applications.

UNIT – VI CURRENT CONTOURS (For Continuous Internal Assessment Only-Self Study):

It is designed to evaluate your practical application and understanding of the broader course material through assignments, seminars, and chart preparations. Chart preparations of molecular orbital theory (MOT) diagrams, assignments on modern inorganic, and seminars on the mode of action of antibiotics, analgesics, and anti-inflammatory drugs. Assignments on the industrial applications of coordination compounds and determining the thermodynamic conditions required for processes like Haber (ammonia) and Contact (sulfuric acid) processes. Practical-based assignments, virtual laboratory simulations, or chart preparation emphasizing laboratory hygiene, safety measures.

TOTAL LECTURE HOURS: 45

COURSE OUTCOMES

1. State the theories of chemical bonding, nuclear reactions and its applications.
2. Evaluate the efficiencies and uses of various fuels and fertilizers.
3. Explain the type of hybridization, electronic effect and mechanism involved in the organic reactions.
4. Demonstrate the structure and uses of antibiotics, anesthetics, antipyretics and artificial sugars.
5. Analyze various methods to identify an appropriate method for the separation of chemical components.
6. Practical-based assignments, virtual laboratory simulations, or chart preparation emphasizing laboratory hygiene and safety measures.

TEXT BOOK(S)

1. Sathya Prakash, T., Vallinayagam, S., & Dharmaraj, D. (2022). *Allied chemistry* (Revised ed.). S. Viswanathan Printers and Publishers.
2. Gopalan, R., Rangarajan, K., & Subramanian, P. S. (2003). *Elements of analytical chemistry* (3rd rev. ed.). Sultan Chand & Sons.
3. Arun Bahl, B.S. Bahl, *Advanced Organic Chemistry*; S.Chand and Company, New Delhi, twenty third edition, 2012
4. P. L. Soni, H.M. Chawla, *Text Book of Inorganic Chemistry*; Sultan Chand & sons, New Delhi, 29th edition, 2024.
5. Banerjee, S.P.(2026), *Advanced Inorganic Chemistry 2nd edn, Vol-1.*, Arunabha Sen, Booksand Allied (P) Ltd., Kolkata,

REFERENCE(S)

1. P. L Soni, Mohan Katyal, (2007), *Text book of Inorganic chemistry*; Sultan Chand and Company, New Delhi, twentieth edition.
2. B. K, Sharma,(2014) *Industrial Chemistry*; GOEL publishing house, Meerut, sixteenth edition,
3. Jayashree gosh, (2006), *Fundamental Concepts of Applied Chemistry*; Sultan & Chand, Edition.
4. B. R. Puri, L.R. Sharma, M.S. Pathania, (2018), *Text book Physical Chemistry*; Vishal Publishing Co., New Delhi, forty 7th editions.
5. Arun Bahl, B.S. Bahl, (2025), *Advanced Organic Chemistry*; S. Chand and Company, New Delhi,

23rd edition.

6. B.R. Puri, Sharma, Kalia,(2026), ‘Principles of Inorganic Chemistry’ 33rd edition, Vishal Publishing Co, Pvt Ltd,.

E- RESOURCES:

1. <https://www.chem.tamu.edu/class/majors/chem470/Notes.html>
2. <https://ncert.nic.in/textbook/pdf/kech104.pdf>
3. <https://www.amazon.in/Fundamental-Organic-Chemistry-R>
4. <https://www.pharmamanufacturing.com/ebooks>
5. <https://open.umn.edu/opentextbooks/textbooks/486>
6. [www. ncert.nic.in.com](http://www.ncert.nic.in)

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
C01	3	3	3					3	2		3	3			3
C02	3	3	3					3	3	3	3	3	3		3
C03	3	3	3					3	2		3	3			3
C04	3	3	3	2				3	3	3	3	3	3		3
C05	3	3	3	2				3	3	3	3	3	3	3	3
C06	3	3	3	2				3	3	3	3	3	3	3	3

3-Strong

2- Medium

1- Low



**SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)**

(Affiliated to Bharathidasan University, Tiruchirappalli)

(Accredited by NAAC)

SUNDARAKKOTTAI, MANNARGUDI-614016.

(For the Candidates admitted in the academic year 2026 – 2027)

**DEPARTMENT OF CHEMISTRY
B.Sc., BIOCHEMISTRY**

Semester: I AP-I: Chemistry- I Practical

Ins. Hrs./Week: 3

Course Credit: 3

Course Code: U26ACH102P

COURSE OBJECTIVES

- To learn the technique titrimetric analysis.
- To analyze the water hardness.
- To know the estimation of several cations and anions.
- To understand the chemical constituents.
- To acquire the knowledge of handling of Chemicals

VOLUMETRIC ANALYSIS

1. Estimation of sodium hydroxide using standard sodium carbonate.
2. Estimation of hydrochloric acid using standard oxalic acid.
3. Estimation of ferrous sulphate using standard Mohr's salt.
4. Estimation of oxalic acid using standard ferrous sulphate.
5. Estimation of potassium permanganate using standard sodium hydroxide.
6. Estimation of magnesium using EDTA.
7. Estimation of ferrous ion using diphenyl amine as indicator

TOTAL LECTURE HOURS: 45

Volumetric Analysis : 50

Record : 10

Procedure - 10 marks

Results

<2%- 40 marks

2-3%- 35marks

3-4%- 30marks

>4%- 20 marks

TOTAL MARKS: 60

COURSE OUTCOMES

The student should be able to

1. Gain an understanding of the use of standard flask and volumetric pipettes, burette.
2. Evaluate the several cations and anions.
3. Design, carry out, record and interpret the results of volumetric titration.
4. Apply their skill in the analysis of water hardness.
5. Analyze the Chemical constituents in allied chemical products.
6. Acquire the Knowledge of handling of Chemicals.

TEXT BOOK(S)

1. Gopalan R. (2000). Elements of analytical Chemistry, S. Chand, New Delhi.
2. Gnanapragasam, N.S, Ramamurthy G.(1998).Organic Chemistry Lab Manual,S. Viswanathan and Co. Pvt. Ltd. Chennai.
3. Manna, A.K. (2018),Practical Organic Chemistry, Books and Allied: India.
4. McPherson Peter , (2014) Practical Volumetric Analysis, Royal Society of Chemistry,.
5. Henry. W. Schimpf, (2023), A Text Book of Volumetric Analysis, Legare Street Press.

REFERENCE(S)

1. Venkateswaran, V.; Veeraswamy, R.; Kulandaivelu, A.R. (2012), Basic Principles of Practical Chemistry, 2nd ed.; Sultan Chand: New Delhi.
2. Martens-Menzel, R., Harwardt, L., & Krauss, H.-J. (Eds.). (2025). *Volumetric analysis: Titrations with chemical and physical indications* (based on 20th German ed.). De Gruyter.
3. McPherson Peter , (2014), Practical Volumetric Analysis, Royal Society of Chemistry.
4. Harris, D. C., & Lucy, C. A. (2024). *Quantitative Chemical Analysis (10th ed.)*. W. H. Freeman.
5. Thomas Edward Thorpe: (2022.), Quantitative Chemical Analysis, Legare Street Press.

E-RESOURCES

1. <https://chemistryvce.weebly.com/volumetric-analysis.html>
2. [https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Supplemental_Modules_\(Analytical_Chemistry\)](https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Supplemental_Modules_(Analytical_Chemistry))

- y)/Quantifying Nature/Volumetric Chemical Analysis (Shiundu)/14.2%3A Learning Activity
3. <https://byjus.com/chemistry/volumetric-analysis/>
 4. https://www.researchgate.net/publication/344658899_Volumetric_Analysis_-Titration_for_Beginners
 5. <https://chemdictionary.org/titration-indicator/>
 6. [www. byjus.com.com](http://www.byjus.com.com)
 7. [www. chem.libretexts.org.com](http://www.chem.libretexts.org.com)

MAPPING WITH PROGRAMME OUTCOMES

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3					3	2		3	3			3
CO2	3	3	3					3	3	3	3	3	3		3
CO3	3	3	3					3	2		3	3			3
CO4	3	3	3	2				3	3	3	3	3	3		3
CO5	3	3	3	2				3	3	3	3	3	3	3	3
CO6	3	3	3	2				3	3	3	3	3	3		3

3-Strong

2- Medium

1- Low

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(For the Candidates admitted in the academic year 2026 – 2027)

DEPARTMENT OF CHEMISTRY

B.Sc., BIO CHEMISTRY



Semester: II-AC-II: Chemistry-II

Ins. Hrs. /Week: 3

Course Credit: 3

Course Code: U26ACH203

COURSE OBJECTIVES

- To explain the bonding in coordination compounds and water technology.
- To learn the preparation and property of Carbohydrate.
- To enlighten the biological role of transition metals, amino acids and nucleic acids.
- To apply the electrochemistry principles in corrosion, electroplating and fuel cells.
- To understand the various type of photochemical process.

UNIT-I: CO- ORDINATION CHEMISTRY AND WATER TECHNOLOGY (9 HOURS)

Co-ordination Chemistry: Definition of terms - IUPAC Nomenclature - Werner's theory, and - EAN rule - Pauling's theory – Postulates - Applications to $[\text{Ni}(\text{CO})_4]$, $[\text{Ni}(\text{CN})_4]^{2-}$, $[\text{Co}(\text{CN})_6]^{3-}$ - Chelation -, Biological role of Hemoglobin and Chlorophyll (elementary idea) - Applications in qualitative and quantitative analysis.

Water Technology: Hardness of water, determination of hardness of water using EDTA method, zeolite method-Purification techniques – BOD and COD

UNIT -II: CARBOHYDRATES (9 HOURS)

Classification, preparation and properties of glucose and fructose. Discussion of open chain ring structures of glucose and fructose. Glucose-fructose inter conversion. Preparation and properties of sucrose, starch and cellulose.

UNIT- III: AMINO ACIDS AND ESSENTIAL ELEMENTS OF BIO SYSTEM (9 HOURS)

Classification - Essential and non- essentials amino acids- preparation and properties of alanine, preparation of dipeptides using Bergmann method. - Proteins classification – structure - Color reactions – Biological functions – Enzymes- Introduction and properties -nomenclature and classification- Factors contributing to the efficiency of enzyme -nucleosides -nucleotides – RNA and DNA – structure.

Essentials of trace metals in biological system-Na, Cu, K, Zn, Fe, Mg

UNIT -IV: ELECTROCHEMISTRY

(9 HOURS)

Galvanic cells - Standard hydrogen electrode - calomel electrode - standard electrode potentials - electrochemical series. Strong and weak electrolytes - ionic product of water -pH, pKa, pKb. Conductometric titrations - pH determination by colorimetric method – buffer solutions and its biological applications - electroplating - Nickel and chrome plating – Types of cells -fuel cells-corrosion and its prevention.

UNIT-V: PHOTO CHEMISTRY

(9 HOURS)

Photochemical reaction- definition- Laws of photochemistry - Grothus - Drapper's law and Stark-Einstein's law of photochemical equivalence, Quantum yield - Hydrogen -chloride reaction. Phosphorescence, fluorescence, chemiluminescence and photosensitization and photosynthesis (definition with examples) and applications.

UNIT – VI CURRENT CONTOURS (For Continuous Internal Assessment Only-Self study):

It is designed to evaluate your practical application and understanding of the broader course material through assignments like IUPAC Nomenclature, seminars like Discussion of open chain ring structures of glucose and fructose., and chart preparations like Amino Acids And Essential Elements of Bio System .

TOTAL LECTURE HOURS: 45

COURSE OUTCOMES

1. Write the IUPAC name for complex, different theories to explain the bonding in coordination compounds and water technology.
2. Explain the preparation and property of Carbohydrate.
3. Enlighten the biological role of transition metals, amino acids and nucleic acids.
4. Apply and demonstrate the electrochemistry principles in corrosion, electroplating and fuel cells.
5. Outline the various type of photochemical process.
6. Understand the Amino Acids And Essential Elements of Bio System

TEXT BOOK(S)

1. Sathya Prakash, T., Vallinayagam, S., & Dharmaraj, D. (2022). *Allied chemistry* (Revised ed.). S. Viswanathan Printers and Publishers.
2. Gopalan, R., Rangarajan, K., & Subramanian, P. S. (2003). *Elements of analytical chemistry* (3rd rev. ed.). Sultan Chand & Sons.
3. Arun Bahl, B. S. Bahl, (2023), *Advanced Organic Chemistry*; S.Chand and Company, New Delhi, twenty third edition,
4. P. L. Soni, H. M. Chawla, (2007.), *Text Book of Organic Chemistry*; Sultan Chand & sons, New Delhi, twenty ninth edition.
5. Gurudeep Raj, (2001), *Advanced Inorganic Chemistry Vol – I*, 26th ed., Goel Publishing House, Meerut

REFERENCE(S)

1. Bahl, B.S, and Bahl, A.(2010), *Advanced Organic Chemistry*, (12th edition),. New Delhi, Sultan Chand & C
2. P.L. Soni, Mohan Katyal, (2007), *Text book of Inorganic Chemistry*; Sultan Chand and Company, New Delhi, twentieth edition,.
3. B. R. Puri, L. R. Sharma, M. S. Pathania,(2018.), *Text book Physical Chemistry*; Vishal Publishing Co., New Delhi, forty seventh edition,
4. B. K, Sharma, (2014.), *Industrial Chemistry*; GOEL publishing house, Meerut, sixteenth edition,
5. House, J. E. (2025). *Inorganic Chemistry* (4th ed.). Elsevier.

E-RESOURCES

1. https://chandand.weebly.com/uploads/9/2/2/7/92278224/inorganic_chemistry_a_textbook_series_lawrance_g.a.-introduction_to_coordination_chemistry-wiley_2010_.pdf
2. <https://onlinelibrary.wiley.com/doi/book/10.1002/9783527618255>
3. <https://www.amazon.in/Amino-Acids-Nutrition-Health-Experimental-ebook/dp/B08FD6ZH86>
4. <https://www.freebookcentre.net/Chemistry/ElectroChemistry-Books-Download.html>
5. authors.library.caltech.edu/25034/21/BPOCchapter20.pdf
6. www.sciencedirect.com
7. www.elsevier.com

MAPPING WITH PROGRAMME OUTCOMES

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C04	3	3	3	2				3	3	3	3	3	3		3
C05	3	3	3	2				3	3	3	3	3	3	3	3
C06	3	3	3	2				3	3	3	3	3	3	3	3

3-Strong

2- Medium

1- Low



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DEPARTMENT OF CHEMISTRY

B.Sc., BIOCHEMISTRY

Semester: II AP-II: Chemistry -II Practical

Ins. Hrs./Week: 3

Course Credit: 3

Course Code: U26ACH204P

COURSE OBJECTIVES

- To introduce the fundamental methods and procedures used in the synthesis of organic compounds at micro and semi-microscale.
- To illustrate the experimental laboratory work with modern synthetic reactions.
- To execute the importance of organic chemistry for our society.
- To understand the chemical constituents.
- To acquire the knowledge of handling of Chemicals

QUALITATIVE ORGANIC ANALYSIS

Analyze the following organic Compounds.

1. Carbohydrate
2. Amide
3. Aldehyde
4. Ketone
5. Acid
6. Amine

TOTAL LECTURE HOURS: 45

The students may be trained to perform the specific reactions like tests for elements (nitrogen only), aliphatic or aromatic, saturated or unsaturated and functional group present and record their observations

Scheme of Evaluation.

Organic Qualitative Analysis - 60

Record – 10

Organic Qualitative Analysis -50 marks

Identification of Nitrogen	- 5 marks
Saturated and unsaturated	- 5 marks
Aliphatic or Aromatic	- 5 marks
Preliminary reactions with Procedure	- 15 marks

Functional group identification Correctly - 15 marks

Confirmative test - 10 marks

TOTAL MARKS: 60

COURSE OUTCOMES

The student should be able to

1. The fundamental practical knowledge in the synthesis of organic compounds on lab scale.
2. Got the practical knowledge in isolating and purifying synthetic organic compounds.
3. Gain the knowledge on the characterization of organic compounds by the use of infrared spectroscopy.
4. Emphasize the synthesis of organic compounds at micro and semi-microscale.
5. Analyze the Chemical constituents in allied chemical products.
6. Acquire the Knowledge of handling of Chemicals.

TEXT BOOK(S)

1. R. Gopalan, Elements of analytical chemistry, S. Chand, New Delhi, 2000.
2. N.S. Gnanapragasam and G. Ramamurthy, Organic Chemistry lab manual, S. Viswanathan and Co. Pvt. Ltd. Chennai-1998
3. Manna, A.K. (2018), Practical Organic Chemistry, Books and Allied: India.
4. McPherson Peter, (2024) Practical Volumetric Analysis, Royal Society of Chemistry.
5. Henry. W. Schimpf, (2026), A Text Book of Volumetric Analysis, Legare Street Press.

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2. Martens-Menzel, R., Harwardt, L., & Krauss, H.-J. (Eds.). (2025). *Volumetric analysis: Titrations with chemical and physical indications* (based on 20th German ed.). De Gruyter.
3. McPherson Peter, (2014), Practical Volumetric Analysis, Royal Society of Chemistry.
4. Harris, D. C., & Lucy, C. A. (2024). *Quantitative Chemical Analysis (10th ed.)*. W. H. Freeman.
5. Thomas Edward Thorpe: (2026.), Quantitative Chemical Analysis, Legare Street Press.

E-RESOURCES

1. <https://chemistryvce.weebly.com/volumetric-analysis.html>
2. [https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Supplemental_Modules_\(Analytical_Chemistry\)/Quantifying_Nature/Volumetric_Chemical_Analysis_\(Shiundu\)/14.2%3A_Learning_Activity](https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Supplemental_Modules_(Analytical_Chemistry)/Quantifying_Nature/Volumetric_Chemical_Analysis_(Shiundu)/14.2%3A_Learning_Activity)
3. <https://byjus.com/chemistry/volumetric-analysis/>
4. https://www.researchgate.net/publication/344658899_Volumetric_Analysis_-Titration_for_Beginners
5. <https://chemdictionary.org/titration-indicator/>
6. www.Pubs.acs.org

MAPPING WITH PROGRAMME OUTCOMES

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CO1	3	3	3					3	2		3	3			3
CO2	3	3	3					3	3	3	3	3	3		3
CO3	3	3	3					3	2		3	3			3
CO4	3	3	3	2				3	3	3	3	3	3		3
CO5	3	3	3	2				3	3	3	3	3	3	3	3
CO6	3	3	3	2				3	3	3	3	3	3		3

3-Strong

2- Medium

1- Low