B.Sc., CHEMISTRY

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

(For the candidate admitted in the academic year 2024-2025)

SYLLABUS

PROGRAMME CODE: 3USCHE

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

(Affiliated to Bharathidasan University, Tiruchirappalli)

Accredited by NAAC-An ISO 9001:2015 Certified Institution

SUNDARAKKOTTAI- MANNARGUDI –614016,

TAMILNADU, INDIA.

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

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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 2024–2025)

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 with in 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.

Core Courses (CC) A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course. These are the courses which provide basic understanding of their main discipline. In order to maintain a requisite standard certain core courses must be included in an academic program. This helps in providing a universal recognition to the said academic program.

Discipline Specific Elective Courses (DSE) Elective course may be offered by the main discipline/subject of study is referred to as Discipline Specific Elective (DSE). These courses offer the flexibility of selection of options from a pool of courses. These are considered specialized or advanced to that particular programme and provide extensive exposure in the area chosen; these are also more applied in nature.

Generic Elective Courses An elective course chosen generally from an **unrelated discipline/subject,** with an intention to seek exposure is called a Generic Elective. Generic Elective courses are designed for the students of **other disciplines**. Thus, as per the CBCS policy, the students pursuing particular disciplines would have to opt Generic Elective courses offered by other disciplines, as per the basket of courses offered by the college. The scope of the Generic Elective (GE) Courses is positively related to the diversity of disciplines in which programmes are being offered by the college.

NonMajor Elective (NME). A student shall choose at least two Non – major Elective Courses (NME) from outside his /her department. Non –Major Elective I – Those who choose Tamil in Part I can choose a non –major elective course offered by other departments. Those who do not choose Tamil in Part I must choose either a) Basic Tamil if Tamil language was not studies in school level or b) Special Tamil if Tamil language was studies up to 10^{th} & 12^{th} std. **Skill Enhancement Courses (SECs)** These courses focus on developing skills or proficiencies in the student, and aim atproviding 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**. 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 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.

Undergraduate Programme:

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

Part -I: Languages (Tamil / Hindi / French / Sanskrit)

Part-II: General English

Part-III: Core Course (Theory, Practical's, Generic Elective courses, Discipline Specific Elective courses, Compulsory and Optional Allied courses, Project)

Part-IV: Non-Major Elective, Foundation Course, Value Education, Environmental studies, Skill Enhancement Courses/ Soft Skills, Internship / field visit / industrial visit/ Case Study), Professional Competency Course

Part –V

Extension activity, Gender studies

EXAMINATION

Continuous Internal Assessment (CIA):

UG - Distribution of CIA Marks Passing Minimum: 50 %

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

Question Paper Pattern

Part A:

Part A 1 (10X1=10 marks)

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

Two Questions from Each unit

Part A 2 (5X2=10 marks)

Match the following Short

Answers

One question from Each unit

Total Marks – 20

Part B: (5X5=25 marks)

Paragraph Answers

Either/ or type, One Question from each unit

Part C: (10X3=30)

Essay Type Answers
Answer 3 out of 5 Questions
One Question from each unit
Part A: K1 Level
Part B: K2, K3 and K4 Level
Part 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	25			30		**75**
Continuous Internal Assessment (CIA)	20	25			30		**75**

QUESTION PATTERN FOR END SEMESTER EXAMINATION/Continuous Internal Assessment		
PART		**MARKS**
PART –A I. (No choice, One Mark) **TWO** questions from each unit	(10x1 =10)	20
II. (No choice, Two Mark) **ONE** question from each unit	(5x2 =10)	
PART -B (Either/ or type ,5-Marks) **ONE** questions from each unit	(5x5 =25)	25
PART -C (3 out of 5) (10 Marks) **ONE** question from each unit	(3x10 =30)	30
	Total	**75**

BLUE PRINT OF QUESTION PAPER FOR END SEMESTER EXAMINATION								
DURATION: 3. 00 Hours.								**Max Mark : 75**
K- LEVELS		**K1**	**K2**	**K3**	**K4**	**K5**	**K6**	**Total**
PART								**Marks**
PART –A (One Mark, No choice)	(10x1 =10)	10						10
(2-Marks, No choice)	(5x2=10)	10						10
PART –B (5- Marks) (Either/or type)	(5x5=25)		5	10	10			25
PART -C (10 Marks) (3 out of 5)	(3x10=30)					20	10	30
Courses having only **K5, K6** levels, K5 level- 3 Questions, K6 level- 2 Questions **(One K6 level question is compulsory)**								
	Total	**20**	**05**	**10**	**10**	**20**	**10**	**75**

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:

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

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

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.

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

CLASSIFICATION OF FINAL RESULTS:

1. For each of the first three parts, there shall be separate classification on the basis of CGPA, as indicated in Table-2.
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.
3. Grade in Part –IV and Part-V shall be shown separately and it shall not be taken intoaccount for classification.
   1. A Pass in PART- V will be mandatory although the marks will not count for the calculation of the CGPA.
   2. 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 includingpervious semester /s is indicated by **Cumulative Grade Point Average (CGPA).**

Table-3: 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 durationof 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 PROGRAMME

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 oneor 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 issuesand 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 **s**peak, read, write and listen clearly in person and through electronic media in English andin 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 andelicit 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 "howto 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 SPECEIFIC OUTCOMES FOR B.Sc. Chemistry

PSO No.	Programme Specific Outcomes (*Upon completion of the Course, the Student will be able to)*
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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B. Sc CHEMISTRY COURSE STRUCTURE UNDER CHOICE BASED CREDIT SYSTEM-LEARNING OUTCOMES BASED CURRICULUM (CBCS-LOCF)

(For the candidates admitted from the academic year 2024-2025)

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

Sem	Part	Nature of the Course	Course Code	Title of the course	T. In. Hrs/ Week	Ins. Hours/ Week				Credit	Exam Hours	Marks		Total
						L	T	P	S			CIA	ESE	
I	I	Language Course– I	U24LC101	Pothu Tamil-I- Tamil Ilakkiya Varalaru-I	6	5	1	-	-	3	3	25	75	100
	II	English Language Course-I	U24ELC101	General English-I	6	5	1	-	-	3	3	25	75	100
	III	Core Course-I	U24CH101	General Chemistry–I	5	4	1	-	-	5	3	25	75	100
		Core Practical-I	U24CH102P	Quantitative Inorganic Estimations and Inorganic Preparations(P)	4	-	-	4	-	4	3	25	75	100
		Allied Course-I	U24AMM101/ U24ABO101	Mathematics – I (Calculus) / Allied Botany – I	3	2	1	-	-	2	3	25	75	100
		Allied Course-II/ Allied Practical-I/	U24AMM102 U24ABO102P	Mathematics – II (Algebra and Analytical Geometry) /Allied Botany Practical	- 2	- -	- -	2	- -	- -	- -	- -	- -	- -
	IV	Non-Major Elective-I			2	2	-	-	-	2	3	25	75	100
		Foundation Course-I	U24FCCH11	Fundamentals of Chemistry	2	2	-	-	-	2	3	25	75	100
				TOTAL	**30**	**20**	**4**	**6**	**-**	**21**	-	-	-	**700**

	Part	Nature of the Course	Course Code	Title of the course	T.In. Hrs/ Week	Ins. Hours/ Week				Credi	Exam Hours	Marks		Total
						L	T	P	S			CIA	ESE	
II	1	Language Course– II	U24LC101	Pothu Tamil-II- Tamil Ilakkiya Varalaru-II	6	5	1	-	-	3	3	25	75	100
	II	English Language Course – II	U24ELC202	General English-II	6	5	1	-	-	3	3	25	75	100
	III	Core Course-II	U24CH203	General Chemistry–II	5	4	1	-	-	5	3	25	75	100
		Core Practical-II	U24CH204P	Qualitative Organic Analysis and Preparation of Organic Compounds(P)	4	-	-	4	-	4	3	25	75	100
		Allied Course-II/ Allied Practical-I	U24AMM102/ U24ABO102P	Mathematics-II (Algebra andAnalytical Geometry)/ Allied Botany Practical	2 2	2 -	- -	-2	- -	2 2	3	25	75	100
		Allied Course – II/III	U24ABO203/ U24AMM203	Allied Botany II/ Mathematics-III (Trigonometry and Fourier Series)	3	2	1	-	-	2	3	25	75	100
	IV	Non-Major Elective-II			2	2	-	-	-	2	3	25	75	100
		Skill Enhancement Course-I	U24SECH21	Cosmetics and Personal Grooming	2	2	-	-	-	2	3	25	75	100
				TOTAL	**30**	**20**	**4**	**6**	**-**	**23**	-	-	-	**800**
III	I	Language Course– III		Pothu Tamil-III- Tamilaga Varalarum Panpadum	6	5	1	-	-	3	3	25	75	100
	II	English Language Course – III		General English-III	6	5	1	-	-	3	3	25	75	100
	III	Core Course-III		General Chemistry–III	5	4	1	-	-	5	3	25	75	100
		Core Practical -III		Qualitative Inorganic Analysis(P)	4	-	-	4	-	4	3	25	75	100
		Allied Course-III/ IV		Allied Physics- I	3	2	1	-	-	2	3	25	75	100
		Allied Practical -I / II		Allied Physics Practical	2	-	-	2	-	--	--	--	--	--
	IV	Skill Enhancement Course-II		Entrepreneurial Skills in Chemistry	2	-	-	2	-	2	3	25	75	100
		Skill Enhancement Course—III		Pesticide Chemistry	2	2	-	-	-	2	3	25	75	100

			TOTAL		**30**	**18**		**4**	**8**	**-**	**21**		-	-	**700**
Sem	**Part**	**Nature of the Course**	**Course Code**	**Title of the course**	**T.In. Hrs/ Week**	**Ins. Hours/Week**					**Credit**	**Exam Hours**	**Marks**		**Total**
						L	**T**	**P**	**S**				**CIA**	**ESE**	
IV	I	Language Course– IV		Pothu Tamil-IV- Tamilum Ariviyalum	6	5	1	-	-		3	3	25	75	100
	II	English Language Course– IV		General English-IV	6	5	1	-	-		3	3	25	75	100
	III	Core Course -IV		General Chemistry–IV	5	4	1		-		5	3	25	75	100
		Core Practical- IV		Gravimetric Analysis (P)	4	-	-	4	-		4	3	25	75	100
		Allied Practical- I/ II		Allied Physics Practical	2	-	-	2	-		2	3	25	75	100
		Allied Course - IV/V		Allied Physics -II	3	2	1	-	-		2	3	25	75	100
	IV	Skill Enhancement Course -IV		Instrumental Methods of Chemical Analysis	2	2	-	-	-		2	3	25	75	100
		Skill Enhancement Course -V		Forensic Science	2	2	-	-	-		2	3	25	75	100
				TOTAL	**30**	**20**	**4**	**6**	**-**		**23**	-	-	-	**800**
V		Core Course –V		Organic Chemistry-I	5	4	1	-	-		5	3	25	75	100
		Core Course –VI		Inorganic Chemistry	5	4	1	-	-		4	3	25	75	100
		Core Course-VII		Physical Chemistry–I	6	5	1	-	-		5	3	25	75	100
		Core Practical- V		Physical Chemistry Practical	4	-	-	4	-		4	3	25	75	100
		Elective Course-I		Nanoscience and Nanotechnology /Biochemistry / Organometallic Chemistry	4	3	1	-	-		3	3	25	75	100
		Elective Course -II		Nuclear, Industrial Chemistry & Metallic State / Solid State Chemistry / Pharmaceutical Chemistry	4	3	1		-		3	3	25	75	100
		Environmental Studies		Environmental Studies	2	2	-		-		2	3	25	75	100
		Internship/ Industrial visit/ Field visit		Internship/ Industrial visit/ Field visit	-	-	-		-		2	-	-	-	-
				TOTAL	**30**	**21**	**5**	**4**	**-**		**28**		-	**-**	**700**

sem	Part	Nature of the Course	Course Code	Title of the course	T.In. Hrs/ Week	Ins. Hours/ Week				Credit	Exam Hours	Marks		Total
						L	T	P	S			CIA	ESE	
VI	III	Core Course-VIII		Organic Chemistry – II	6	5	1	-	-	4	3	25	75	100
		Core Course—IX		Physical Chemistry -II	6	5	1	-	-	4	3	25	75	100
		Core Project- X		Group Project with viva voce /Research Topics	**5**	1	**-**	4	**-**	5	3	25	75	100
		Elective Course-III		Fundamentals of Spectroscopy/ Industrial Chemistry **/** Supramolecular Chemistry	4	3	1		-	3	3	25	75	100
	-	Elective Course-IV		Polymer Chemistry/ Green Chemistry**/** Textile Chemistry	4	3	1			3	3	25	75	100
	IV	Value Education		Value Education	2	2	-	-	-	2	3	25	75	100
		Professional Competency Course		Chemistry for Competitive Examinations	2	2	-	-	-	2	3	25	75	100
	V	Gender Studies		Gender Studies	1	1	-	-	-	1	3	25	75	100
		Extension activity		Extension activity	-	-	-	-	-	1	-	-	-	-
			TOTAL		**30**	**22**	**4**	**4**	**-**	**25**	-	-	-	**800**
			Grand Total		**180**	**121**	**25**	**34**	**-**	**141**	-	-	-	**4500**
Extra Credit			MOOC/SWAYAM/NPTEL			**-**	**-**	**-**	**-**	**2**	-	-	-	**-**
			Value added Courses (At least one per year)			**-**	**-**	**-**	**-**	**2**	-	-	-	**-**

L-Lecture **T- Tutorial** **P-Practical** **S-Seminar**

Credit Distribution for UG PROGRAMME: CHEMISTRY

S. No	Part	Subject	No. of Courses	Total Credits
1	I	Language Course	4	12
2	II	English Language Course	4	12
3	III	Core Course	9	42
4		Core Practical	5	20
5		Core Project	1	05
6		Allied Course- Mathematics/ Botany	5/4	10/8
7		Allied Practical- Mathematics/ Botany	1/2	02/04
8		Elective Course	4	12
9	IV	Non-Major Elective	2	04
10		Foundation Course – FC	1	02
12		Skill Enhancement Course	5	10
13		Internship/ Industrial visit/ Field visit	1	02
14		Environmental Studies	1	02
15		Value Education	1	02
16		Professional Competency Course	1	02
17	V	Gender Studies	1	01
		Extension Activity	1	01
		Total	**47**	**141**

Note:

		CIA	ESE
1	Theory	25	75
2	Practical	25	75

3 Separate passing minimum is prescribed for Internal and External marks

FOR THEORY

The passing minimum for CIA shall be 40% out of 25 marks [i.e. 10 marks]

The passing minimum for University Examinations shall be 40% out of 75 marks [i.e. 30marks]

FOR PRACTICAL

The passing minimum for CIA shall be 40% out of 25 marks [i.e. 10 marks]

The passing minimum for University Examinations shall be 40% out of 75 marks[i.e.30 Marks]

NON -MAJOR ELECTIVE (NME) OFFERED BYTHE DEPARTMENT

Semester	Part	Course	Course code	Title of the Course
I	IV	NME– I	U24NMECH11	Drugs and Cosmetics
II	IV	NME– II	U24NMECH22	Hydro Chemistry

SEMESTER-I

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(For the Candidates admitted in the academic year 2024 – 2025)

DEPARTMENT OF CHEMISTRY

B. Sc CHEMISTRY

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

Ins. Hrs. /Week: 5 **Course Credit: 5** **Course Code: U24CH101**

UNIT I: ATOMIC STRUCTURE (15 Lectures)

Development and History of atom: (J. J. Thomson, Rutherford); Moseley's Experiment and Atomic number, Atomic Spectra; Black-Body Radiation and Planck's quantum theory - Bohr's model of atom; The Franck-Hertz Experiment; Interpretation of H- spectrum; Photoelectric effect, Compton effect; Dual nature of Matter- De- Broglie wavelength- Davisson and Germer experiment.

Quantum Numbers, Filling up of atomic orbitals- Heisenberg's Uncertainty Principle; Electronic Configuration of Atoms and ions- Hund's rule, Pauli 'exclusion principle and Aufbau principle; Hund's rule of maximum multiplicity – electronic configuration. Stabilityassociated with half-filled and completely filled orbitals. Inert Pair effect.

UNIT II: PERIODIC TRENDS AND INTRODUCTION TO QUANTUM MECHANICS (14 Lectures)

M**odern Periodic Table Cause of periodicity;**

Features of the periodic table; classification of elements – Periodic trends for atomic size- atomic radii, Ionic, crystal and covalent radii; ionization energy, electron affinity, electronegativity-electronegativity scales, applications of electronegativity. Problems involving the core concept

Classical mechanics:

Wave mechanical model of atom, distinction between a Bohr orbit and Orbital; Postulates of quantum mechanics; probability interpretation of wavefunctions, Formulation of Schrodingerwave equation - Probability and electron density-visualizing the orbitals -Probability density and significance of Ψ and Ψ2

UNIT III: STRUCTURE AND BONDING - (15 Lectures)

Ionic bond:

Lewis dot structure of ionic compounds; properties of ionic compounds; Energy involved inionic compounds; Born Haber cycle – lattice energies, Madelung constant; relative effect oflattice energy and solvation energy; Ion polarization- polarizing power and polarizability; Fajans' rules –effects of polarization on properties of compounds; problems involving the core concepts.

Covalent bond: Shapes of orbitals, overlap of orbitals – σ and Π bonds- directed valency, hybridization; VSEPR theory - shapes of molecules of the type AB2, AB3, AB4, AB5, AB6 and AB7.

UNIT-IV: STRUCTURE AND BONDING – II (16 Lectures)

VB theory –application to hydrogen molecule; concept of resonance -resonance structures ofsome inorganic species – CO2, NO2, CO3, NO3--; limitations of VBT; MO theory - bonding, antibonding and nonbonding orbitals, bond order; MO diagrams of H2, C2, O2, O2+, O2-, O2- N2, NO, HF, CO2; magnetic characteristics, comparison of VB and MO theories.

Coordinate bond:
Definition, Formation of BF3, NH3, NH4+, H3O+ properties, Metallic bond-electron sea model, VB model; Band theory-mechanism of conduction in solids; conductors, insulator,semiconductor– types, applications of semiconductors

Weak Chemical Forces - Vander Waals forces, ion-dipole forces, dipole-dipole interactions, induced dipole interactions, Instantaneous dipole-induced dipole interactions. Repulsiveforces; Hydrogen bonding – Types, special properties of water, ice, stability of DNA; Effectsof chemical force, melting and boiling points.

UNIT-V: BASIC CONCEPTS IN ORGANIC CHEMISTRY AND ELECTRONIC EFFECTS 15 Lectures)
Types of bond cleavage – heterolytic and homolytic; arrow pushing in organic reactions; reagents and substrates; types of reagents - electrophiles, nucleophiles, free radicals; reaction intermediates – carbanions, carbocations, carbenes, arynes and nitrenes Inductive effect – reactivity of alkyl halides, acidity of halo acids, basicity of amines; inductomerics and electrometric effects. Resonance – resonance energy, conditions for resonance- acidity of phenols, basicity of aromatic amines, stability of carbonium ions, carbanions and freeradicals, reactivity of vinyl chloride, dipole moment of vinyl chloride and nitrobenzene, bondlengths; steric inhibition to resonance.
Hyperconjugation - stability of alkenes, bond length, orienting effect of methyl group, dipole moment of aldehydes and nitromethane. Types of organic reactions-addition, substitution, elimination and rearrangement-, Characteristics of nucleophilic, electrophilic and free radical reactions.

Total lecture Hours: 75

COURSE OUTCOME

The students should be able to

1. Explain the atomic structure, wave particle duality of matter, periodic properties, bonding, andproperties of compounds.
2. Classify the elements in the periodic table, types of bonds, reaction intermediates, electronic effects in organic compounds, types of reagents.
3. Apply the theories of atomic structure, bonding, to calculate energy of a spectral transition, electronegativity, percentage ionic character and bond order.
4. Evaluate the relationship existing between electronic configuration, bonding, geometry of molecules and reactions; structure reactivity and electronic effects.
5. Construct MO diagrams, predict trends in periodic properties, assess the properties of elements, and explain hybridization in molecules,

TEXT BOOKS

1. Rao, C.N. R. University General Chemistry, Macmillan Publication: 2000. New Delhi,
2. Madan, R. D. and Sathya Prakash, Modern Inorganic Chemistry,2nd ed;2003, S. Chand and Company: New Delhi.
3. Bruce, P. Y. and Prasad K. J. R. Essential Organic Chemistry, 2008, Pearson Education: NewDelhi.
4. Dash UN, Dharmarha OP, Soni. 2016. P.L. Textbook of Physical Chemistry,Sultan Chand &Sons: New Delhi,
5. Glasstone, Lewis, D. Elements of Physical Chemistry, London, Mac Millan & Co Ltd.
6. Banerjee, S.P. Advanced Inorganic Chemistry 2nd edn, Vol-1, 2017. Arunabha Sen, BooksandAllied (P) Ltd., Kolkata,
7. Peter Atkin's, Physical Chemistry, 2018.Oxford University Press, International Eleventhedition.,
8. Puri, B.R, Sharma, L.R and Pathania, 2020.M.S. Principles of Physical chemistry. 47thedn,Vishal Publishing Co.
9. Asim K das, Fundamental Concepts of Inorganic Chemistry, 2nd edition, 2023.vol-4, CBSPublishers &Distributors Pvt Ltd,

REFERENCES

1. 1.Madan, R Maron, S. H. and Prutton C. P. 1972. Principles of Physical Chemistry,4 ed.; The Macmillan Company: New York.
2. Hughey, J. E. Inorganic Chemistry: Principles of Structure and Reactivity,*1983,* LongmanHigher Education.
3. Lee, J. D. Concise Inorganic Chemistry, 4th ed.; ELBS William Heinemann: London,1991.
4. Bahl, B.S, and Bahl, A., Advanced Organic Chemistry, (12th edition), 2010, Sultan Chand& Co. New Delhi
5. JerryMarch,2013. "Advanced Organic Chemistry, Reaction, Mechanism and Structure", 7th Edition, Wiley Inter Science
6. Atkins, P.W. & Paula, J. Physical Chemistry, 10th ed.; Oxford University Press: New York,2014
7.. Mathan.D.2000. "Modern Inorganic Chemistry", 2nd edition, Chand. S & Company Ltd.
8. Morrison, R. T and Boyd, Bhattacharjee. R. N, S. K. 2018.Organic Chemistry (7th edition), Masood Books, UP.
9. F. Albert Cotton, Geoffrey Wilkinson, Carlos A. Murillo, Manfred

Bochmann. AdvanceInorganic Chemistry, March 2021, Wiley,

Bengaluru.

E-RESOURCES

1. https://onlinecourses.nptel.ac.in
2. http://www.mikeblaber.org/oldwine/chm1045/notes_m.htm
3. http://www.ias.ac.in/initiat/sci_ed/resources/chemistry/Inorganic.html
4. https://swayam.gov.in/course/64-atomic-structure-and-chemical-bonding
5. https://www.chemtube3d.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
CO1	3	3		2		2		2	2		3	3	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
CO5	3	2	3	2		2		2	2		3	3	2	3

3- Strong 2-Medium 1-Low

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

(Affiliated to Bharathidasan University, Tiruchirappalli)

Accredited by NAAC-An ISO 9001:2015 Certified Institution

SUNDARAKKOTTAI, MANNARGUDI–614016.

(For the Candidates admitted in the academic year 2024 – 2025)

DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY

Semester: I-CP-I: Quantitative Inorganic Estimations and Inorganic Preparations(P)

Ins. Hrs. /Week: 4 **Course Credit: 4** **Course Code: U24CH102P**

UNIT I: Chemical Laboratory Safety in Academic Institutions (10 hours)

Introduction - importance of safety education for students, common laboratory hazards, assessment and minimization of the risk of the hazards, prepare for emergencies from uncontrolled hazards; concept of MSDS; importance and care ofPPE; proper use and operation of chemical hoods and ventilation system; fire extinguishers-types and uses of fire extinguishers, demonstration of operation; chemical waste and safe disposal.

Common Apparatus Used in Quantitative Estimation (Volumetric)

Description and use of burette, pipette, standard flask, measuring cylinder, conical flask, beaker, funnel, dropper, clamp, stand, wash bottle, watch glass, wire gauge and tripod stand.

Principle of Quantitative Estimation (Volumetric)

Equivalent weight of an acid, base, salt, reducing agent, oxidizing agent; concept of mole, molality, molarity, normality; primary and secondary standards, preparation of standard solutions; theories of acid-base, redox, complexometric, iodimetric and iodometric titrations; indicators – types, theory of acid–base, redox, metal ion and adsorption indicators, choice of indicators.

UNIT II
(30 hours)

Quantitative Estimation (Volumetric)

Preparation of standard solution, dilution from stock solution

1. **Permanganometry**
   Estimation of sodium oxalate using standard ferrous ammonium sulphate.
2. **Dichrometry**
   Estimation of ferric alum using standard dichromate (external indicator)Estimation of ferric alum using standard dichromate (internal indicator)
3. **Iodometry**
   Estimation of copper in copper sulphate using standard dichromate
4. **Argentimetry**
   Estimation of chloride in barium chloride using standard sodium chloride/Estimation of chloride in sodium chloride (Volhard's method)

UNIT III: **Complexometry (20Hours)**

1. Estimation of hardness of water using EDTA
2. Estimation of iron in iron tablets
3. Estimation of ascorbic acid.

4. **Preparation of Inorganic compounds**-

1. Potash alum
2. Tetraamine copper (II) sulphate
3. Hexamminecobalt (III) chloride
4. Mohr's Salt

Total Hours: 60

Scheme of Valuation:	**Max. Marks**
Record	10 (Marks)
Procedure Writing	10(Marks)
Results	
<1%	- 45 Marks
1-2%	-35 Marks
2-3%	-25 Marks
4- 4%	- 15 Marks
>4%	- 10 Marks
Preparation	- 10 Marks
Total Marks: 75 Marks	

COURSE OUTCOME

The student should able to

1. Explain the basic principles involved in titrimetric analysis and inorganic Preparations.
2. Compare the methodologies of different titrimetric analysis.
3. Calculate the concentrations of unknown solutions in different ways and develop the skill and estimate the amount of a substance present in a given solution.
4. Assess the yield of different inorganic preparations and identify the end pointof Various Titrations.
5. Handling the glassware and chemicals in a safety manner.

TEXT BOOKS

1. Venkateswaran, V. Veerasamy, R. Kulandaivelu, A.R. 2006. Basic principles of Physical Chemistry Second edition, Sultan Chand & Sons, New Delhi.
2. Gopalan, R. 2000. Elements of analytical chemistry, S. Chand, New Delhi.
3. Gnanapragasam, N, S. Ramamurthy, G. 1998. Organic Chemistry Lab Manual, Viswanathan, S. and Co. Pvt. Ltd. Chennai.
4. McPherson Peter, Practical Volumetric Analysis, Royal Society of Chemistry, 2014.
5. Henry. W. Schimpf, A Text Book of Volumetric Analysis, Legare Street Press, 2023.

REFERENCES

1. Peter McPherson. 2014. Practical Volumetric Analysis, Royal Society of Chemistry.
2. Vogel's Text Book of Qualitative Chemical Analysis, 5th edn. ELBS Longman England.
3. Mendham, J.; Denney, R. C.; Barnes, J. D.; Thomas, M.; Sivasankar, B.;
4. Vogel's Textbook of Quantitative Chemical Analysis, 6th ed; 2000.Pearson Education Ltd: New Delhi,
5. Nad, A. K.; Mahapatra, B.; Ghoshal, A.; An advanced course in Practical Chemistry, 3rd ed.; New Central Book Agency: Kolkata, 2007.
6. Thomas Edward Thorpe: Quantitative Chemical Analysis, Legare Street Press,2022.

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
4. http://www.federica.unina.it/agraria/analytical-chemistry/volumetric- analysis
5. https://chemdictionary.org/titration-indicator/

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
CO1	3	2	3			3			2	3	3	3	2	2
CO2	2	3	3			3	2		2	3	3	3		3
CO3	3	3	3	3		3	3	2	3	2	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- Strong 2-Medium 1-Low

ALLIED MATHEMATICS

SENGAMALA THAYAAR EDUCATIONALTRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2024 – 2025)

DEPARTMENT OF MATHEMATICS

ALLIED MATHEMATICS - I

(For B. Sc., Physics & Chemistry)

Semester: I-AC-I: Calculus

Ins. Hrs. / Week: 3 **Course Credit: 2** **Course Code: U24AMM101**

UNIT– I: Successive Differentiation (9 Hours)

Basic Formulae on Differentiation - Successive Differentiation – Definition with Examples - n^{th} derivative of standard functions (Derivation not needed) - Trigonometrical transformation -Formation of equations involving derivatives - Leibnitz Theorem (proof not needed) and itsapplications - Simple problems.

UNIT– II: Curvature (8 Hours)

Total differential coefficients (proof not needed) – Definition - Curvature and Radius of curvature in Cartesian only (proof not needed) – Centre of curvature (proof not needed) – Definition with Examples - Related problems.

UNIT – III : Evaluation of Integrals (9 Hours)

Evaluation of Integrals of types

1) $\int \frac{px+q}{ax^2+bx+c}\,dx$ 2) $\int \frac{px+q}{\sqrt{ax^2+bx+c}}dx$

3) $\int \frac{dx}{a+b\cos x}$ 4) $\int \frac{dx}{a+b\sin x}$

Integration by trigonometric substitution

1) $\int \sqrt{a^2-x^2}\,dx$ 2) $\int \sqrt{a^2+x^2}\,dx$ 3) $\int \sqrt{x^2-a^2}dx$

UNIT– IV: Reduction Formula (9 Hours)

General Properties of Definite Integrals - Integration by Parts.

Reduction Formula (when n is a positive integer) for

1) $\int e^{ax}x^n\,dx$ 2) $\int \sin^n x\,dx$ 3) $\int \cos^n x\,dx$

UNIT –V: Double Integrals (10 Hours)

Double Integrals –Definition with Examples - Changing the order of Integration – Triple Integrals (Cartesian only) – Definition with Examples – Related Problems.

Total Lecture Hours- 45

COURSE OUTCOME

The students should be able to

1. Analyze the concept of successive Differentiation.
2. Determine the notation of curvature and radius of curvature.
3. Solve the problems in integration using various methods.
4. Analyze the concept of properties of definite integrals, integration by parts and reduction formulae.
5. Describe the concept of double and triple integrals.

TEXT BOOK(S)

1. Narayanan S. and Manicavachagam Pillai T.K. 2003. Calculus Volume I. S.Viswanathan (Printers & Publishers) Pvt. Limited, Chennai.
2. Narayanan S. and Manicavachagam Pillai T.K. 2011. Calculus. Volume II. S.Viswanathan (Printers & Publishers) Pvt. Limited, Chennai.

UNIT - I	Chapter 3	:	Sec. 1.1 to 1.6, 2.1, 2.2 of [1]
UNIT - II	Chapter 8	:	Sec. 1.3 to 1.5 &
	Chapter 10	:	Sec. 2.1 to 2.3 of [1]
UNIT - III	Chapter 1	:	Sec. 7.3, 7.4, 8, 9of [2]
UNIT - IV	Chapter 1	:	Sec. 11,12, 13.1, 13.3, 13.4 of [2]
UNIT - V	Chapter 5	:	Sec. 2.1, 2.2, 4 of [2]

REFERENCE BOOK(S)

1. Arumugam S. and Issac. 2013. Calculus Volume I. New Gamma Publishing House, Palayamkottai.
2. Khanna M.L. 1994. Integral Calculus. 19th Edition. Jai Prakash Nath & Co. Meerut.
3. Hari Krishnan. 2013. Calculus. Atlantic Publishers & Distributions Pvt. Ltd., Chennai.
4. Singh U.P., Srivastava R.J., and Siddiqui N.H. 2003. Calculus. Dominant Publishers and Distributors, New Delhi.
5. Shanthi Narayan and Mittal P.K. 2005. Integral Calculus. S.Chand and Company Ltd., New Delhi.

E_RESOURCES

1. file:///C:/Users/ELCOT/Downloads/AnElementaryTreatiseontheDifferentialandIntegralCalculus_10449393.pdf
2. http://djm.cc/library/Elements_Differential_Integral_Calculus_Granville_edited_2.pdf
3. https://www.slideserve.com/jerod/hyperbolic-functions?fitview=true#ssShare
4. https:// www.slideshare.net/informaticaacademy/ successive differentiation
5. http://www.math.odu.edu/~jhh/counter10.html

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
CO1	3	3	2	3	1	3	1	2	2	2	3	2	1
CO2	3	2	1	2	3	2	2	2	2	2	3	2	1
CO3	3	2	2	1	2	1	2	1	3	2	3	2	1
CO4	2	1	2	2	3	2	2	3	1	2	3	2	1
CO5	3	2	2	2	3	3	2	2	2	1	3	2	1

3- Strong **2-Medium** **1-Low**

SENGAMALA THAYAAR EDUCATIONALTRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2024 – 2025)

DEPARTMENT OF MATHEMATICS

ALLIED MATHEMATICS - II

(For B. Sc., Physics & Chemistry)

Semester: I – AC – II: Algebra and Analytical Geometry (3D)

Ins. Hrs./Week: 4 **Course Credit: 2** **Course Code: U24AMM102**

UNIT-I: Binomial and Exponential Series (7 Hours)

Introduction about Binomial and Exponential Series - Binomial Theorem to evaluate summation of series - Approximate value of the series – Exponential Theorem (Proof not needed) -Summation of the series - Related Problems.

UNIT–II: Matrices (9 Hours)

Formation of Matrices–Special types of matrices – Scalar multiplication of a matrix – Equality of matrices - Addition of matrices – Subtraction – Symmetric matrix – Skew symmetric matrix – Hermition and Skew Hermition matrices – Multiplication of matrices – Inverse matrix – Inner product – Solution of simultaneous equations – Rank of a Matrix - Eigen values, Eigen vectors – Cayley Hamilton's Theorem (proof not needed) related problems only.

UNIT–III: The Plane (11 Hours)

General equation – The equation of the plane passing through the points – Angle between the planes – Equation of a plane through the line of intersection of two planes– length of the perpendicular.

UNIT-IV: The Straight Line (8 Hours)

Intersection of two planes - Symmetrical form of the equations of the line - Equation of a straight line passing through two points – Plane and Straight line – Angle between the Plane and the Line.

UNIT–V: The Sphere (10 Hours)

Equation of a sphere- Length of tangent to the sphere - Plane section of spheres – Intersection of two spheres- Tangent plane to the sphere.

Total Lecture Hours - 45

COURSE OUTCOME

The students should be able to

1. Examine the binomial theorem and its summation and approximations.
2. Analyze the types of matrices and its definitions and compute the Eigen value and Eigen vector.
3. Apply the angle between planes, bisector planes, perpendicular distance from a point to a plane and intersection of two lines.
4. Compute the angle between a line and a plane, length of perpendicular from a point to a line.
5. Describe the equation of a Sphere passing through the circle and tangent of the plane to the Sphere.

TEXT BOOKS

1. Manicavachagam Pillai T.K., Natarajan T., Ganapathy K.S. 2007. Algebra Volume I, S.Viswanathan Pvt. Limited, Chennai.
2. Manicavachagam Pillai.T.K., Natarajan.T., Ganapathy K.S., 2012. Algebra, Volume II, S.Viswanathan Pv.t Limited, Chennai.
3. Manicavachagam Pillai T.K., Natarajan T., 2008. Analytical Geometry (3D), Part II, S.Viswanathan Pvt. Limited, Chennai.

UNIT- I Chapter 3 : Sec. 10 and 14 &
Chapter 4 : Sec. 2,3 of [1]
UNIT- II Chapter 2 : Sec. 1 to 13 and 16, 16.3 of [2]
UNIT- III Chapter 2 : Sec. 2.1 – 2.10 [3]
UNIT- IV Chapter 3 : Sec. 3.1 to 3.6 [3]
UNIT- V Chapter 4: Sec. 4.1 to 4.8 [3]

REFERENCE BOOK(S)

1. Jain P.K.1991. A Textbook of Analytical Geometry of Three Dimensions, Second Edition. New Age International Private Limited, New Delhi.
2. Sannu Rahi. 2009. Algebra, Tata McGraw Hill Publishing Company Limited, New Delhi.
3. Shanti Narayan, P.K. Mittal. 2016. Analytical Solid Geometry. S.Chand & Company Private limited, New Delhi.
4. Vaishtha A.R. 1990. Analytical Solid Geometry. Krishna Prakashan Media Pv.t Ltd., New Delhi.
5. William H. McCrea. 2012. Analytical Geometry of Three Dimensions. Dover Publications, New York.

E-RESOURCES

1. https://www.google.com/amp/s/dokumen.tips/amp/documents/free-download-here-manickavasagam-pillai-volume-1pdf-free-download-here-algebra.html
2. https://www.academia.edu/19646465/Analytical_solid_geometry_Shanti_Narayan
3. http://fhscastormath.weebly.com/uploads/1/2/4/7/12476962/chapter11_precal.pdf
4. https://ncert.nic.in/textbook/pdf/lemh205.pdf
5. https://pdfbookslibs.com/a-textbook-of-analytical-geometry-of-three-dimensions- 2nd.pdf

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
CO1	3	3	2	3	3	3	1	2	2	2	3	2	1
CO2	3	1	2	1	3	2	2	2	2	2	3	2	1
CO3	3	2	2	3	2	3	2	1	3	2	3	2	1
CO4	2	3	1	2	3	2	2	3	1	2	3	2	1
CO5	3	2	2	2	3	3	2	2	3	1	3	2	1

3- Strong 2-Medium 1-Low

ALLIED BOTANY

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI-614016, MANNARGUDI

(For the candidates admitted from the academic year 2024-2025)

PG AND RESEARCH DEPARTMENT OF MICROBIOLOGY

(FOR B.Sc., CHEMISTRY – ALLIED BOTANY)

Semester: I AC-I **ALLIED BOTANY-I**

Hrs./Week: 3 **Course Credit:2** **Course Code: U24ABO101**

UNIT –I ALGAE, FUNGI, BACTERIA, VIRUS AND LICHENS (8 Hours)

General characters of algae - Structure, reproduction and life cycle of the following genera - *Anabaena* and *Sargassum*. Economic importance of algae.
General characters of fungi, structure, reproduction and life cycle of the following genera- *Penicillium* and *Agaricus*. Economic importance of fungi.
General characters of Bacteria and Virus. General features of ***Lichens*** and its economic importance

UNIT –II BRYOPHYTES, PTERIDOPHYTES AND GYMNOSPER (8 hours)

General characters of **Bryophytes**, Structure, reproduction and life cycle of ***Polytrichum***.General characters of **Pteridophytes**, Structure, reproduction and life cycle of ***Lycopodium***. General characters of **Gymnosperms**, Structure, reproduction and life cycle of ***Cycas*.**

UNIT –III CELL BIOLOGY (8 Hours)

Prokaryotic and Eukaryotic cell- structure /organization. Cell organelles –ultra structure and function of chloroplast, mitochondria and nucleus.
Cell division - mitosis and meiosis.

UNIT –IV Genetics (7 Hours)

Mendelism - Law of dominance, Law of segregation and Law of independent assortment, Incomplete dominance. Monohybrid and dihybrid cross - Test cross – Back cross

UNIT –V HORTICULTURE (14 Hours)

Scope and importance of Horticulture, Propagation methods – Cutting, Layering and grafting techniques. Gardening – Medicinal plants garden and Terrace Garden. Importance of Arboretum. Importance of Organic farming, Bonsai, Flower arrangements - western styles and the eastern, Japanese, Ikebana styles.

Total Lecture Hours – 45

COURSE OUTCOME

The students will be able to:

1. Increase the awareness and appreciation of human friendly Algae, Fungi, Bacteria, Virus and Lichens and their economic importance
2. Develop critical understanding on morphology, anatomy and reproduction of Bryophytes Pteridophytes and Gymnosperms
3. Compare the structure and function of cells and explain the development of cells.
4. Understand the core concepts and fundamentals of genetics.
5. Raise plant propagules through various horticulture methods and attain entrepreneur skills in horticulture.

TEXT BOOKS

1. Singh, V., Pande, P.C and Jain, D.K. 2021. A Text Book of Botany. Rastogi Publications, Meerut.
2. Bhatnagar, S.P and Alok Moitra. 2020. Gymnosperms, New Age International (P) Ltd., Publishers,
3. Bengaluru. Sharma, O.P. 2017. Bryophyta, MacMillan India Ltd. Delhi.
4. Lee, R.E. 2008. Phycology, IV Edition, Cambridge University Press, New Delhi.
5. Rao, K., Krishnamurthy, K.V and Rao, G.S. 1979. Ancillary Botany, S. Viswanathan Pvt. Ltd., Madras.
6. Rajaneesh Singh (Author), Bijendra Kumar Singh Textbook on Horticulture. September 2020.

REFERENCES

1. Parihar, N.S. 2012. An introduction to Embryophyte – Pteridophytes - Surjeet Publications, Delhi**.**
2. Alexopoulos, C.J. 2013. Introduction to Mycology. Willey Eastern Pvt. Ltd.
3. Vashishta, P.C. 2014. Botany for Degree Students Gymnosperms. Chand & Company Ltd, Delhi.
4. Coulter, M. Jhon, 2014. Morphology of Gymnosperms. Surjeet Publications, Delhi.
5. Vashishta, P.C. 2014. Botany for Degree Students Algae. 2014. Chand & Company Ltd, Delhi.
6. Parihar, N.S. 2013. An introduction to Embryophyte –Bryophytes-, Surjeet Publications, Delhi.
7. Pandey B.P. 1986, Text Book of Botany (College Botany) Vol I &II, S. Chand and Co. New Delhi.
8. Julian Claude Schilletter (Author), H. Wyatt Richey Textbook of General Horticulture. April 2008.

E- RESOURCES

1. https://www.kobo.com/us/en/ebook/the-algae-world
2..http://www.freebookcentre.net/biology-books-download/Fungi-(PDF-15P).html
3.http://scitec.uwichill.edu.bb/bcs/bl14apl/bryo1.htm
4. https://www.toppr.com/guides/biology/plant- kingdom/pteridophytes/
5. Nhttps://www.us.elsevierhealth.com/medicine/cell-biology.
6.https://www.us.elsevierhealth.com/medicine/genetics

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
CO1	3		2	3			3	3	3	3			3	3
CO2	3	3	3	3			3	3	3	3			3	1
CO3	3	3	2	3			2	2	2	3			3	3
CO4	3		3	1			3	3	3	3			3	1
CO5	3	3	2	3			3	3	3	3			3	3

3- Strong **2-Medium** **1-Low**

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI-614016, MANNARGUDI

(For the candidates admitted from the academic year 2024-2025)

PG AND RESEARCH DEPARTMENT OF MICROBIOLOGY

(**FOR B.Sc., CHEMISTRY – ALLIED BOTANY**)

Semester: II AP-I **ALLIED BOTANY PRACTICAL**

I sem : 2 Hrs **Course Credit:2** **Course Code: U24ABO102P**

EXPERIMENTS

1. Make suitable micro preparation of the types prescribed in Algae, Fungi (permanent slides only), Bryophytes, Pteridophytes and Gymnosperms.
2. Micro photographs of the cell organelle's ultra-structure.
3. Simple genetic problems.
4. To describe in technical terms, plants belonging to respective families and to identify thefamilies.

5.To dissect a flower, construct the floral diagram and write the floral formula.

6.Demonstration experiments

a. Ganong's Light screen

b.Ganong's respiroscope

c. Evaluation of O_2 experiment (Photosynthesis)

7. To make suitable micro preparations of anatomy materials prescribed in the syllabus. Spotters - Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms and Angiosperm anatomy,
8. Embryology, Cell biology, Plant Physiology. Horticulture experiment methods and Preparation.

COURSE OUTCOME

The students will be able to:

1. Understand the internal organization of algae and fungi.
2. Develop critical understanding on morphology, anatomy and reproduction of Bryophytes, Pteridophytes and Gymnosperms.
3. Perform the classical taxonomy with reference to different parameters.

4.Understand the fundamental concepts of plant anatomy and embryology.5.Demonstrate the effect of various physical factors on photosynthesis.

TEXT BOOKS

1. Sharma, O.P. 2017. Bryophyta, MacMillan India Ltd, New Delhi.
2. Sharma, O.P. 2012. Pteridophyta, Tata McGraw-Hills Ltd, New Delhi.
3. Subramaniam, N.S. 1996. Laboratory Manual of Plant Taxonomy. Vikas Publishing HousePvt. Ltd., New Delhi.
4. Benjamin, A. Pierce. 2012. Genetics- A conceptual Approach. W.H. Freeman and Company,New York, England.
5. Noggle G.R and G.J. Fritz. 2002. Introductory Plant Physiology. Prentice Hall of India, New Delhi.
6. Brijesh Kumar Chaturvedi, Kalyani, Vishwanath Mishra Handbook of Practical Horticulture For
   B. Sc, (Agriculture) Students

REFERENCES

1. Strickberger, M.W. 2005. Genetics (III Ed). Prentice Hall, New Delhi, India.
2. Nancy Serediak and M. Huynh. 2011. Algae identification lab Guide. Accompanying Manual to algae identification field guide, Ottawa Agriculture and Agri food Canada Publisher.
3. Mohammed Gufran Khan, Shite Gatew and Bedilu Bekele. 2012. Practical manual for Bryophytes and Pteridophytes. Lambert Academic Publishing.
4. Aler Gingauz. 2001. Medicinal Chemistry. Oxford University Press & Wiley Publications.
5. Steward, F.C. 2012. Plant Physiology Academic Press, US

E- RSOURCES

1.https://www.amazon.in/Practical-Manual-Pteridophyta- Rajan- Sundara/dp/8126106883
2. https://www.google.co.in/books/edition/Gymnosperms/3YrT5E3Erm8C?hl=en&gbpv=1&dq=gymnosperms&printsec=frontcover
3. https://www.amazon.in/Computational-Phytochemistry-Satyajit-Dey- Sarker-ebook/dp/B07CV96NZJ
4.https://medlineplus.gov/genetocs/understanding/basics/cell/
5.https://apan.net/meetings/apan45/files/17/17-01-01-01.pdf
6.http://www.cuteri.eu/microbiologia/manuale_microbiologia_pratica.pdf
7.https://www.amazon.in/Manual-Practical-Bryophyta-Suresh-Kumar/dp/B0072GNFX4

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
CO1	3	1	2	2			1	3	3				3	3
CO2	3	3	3	3			2	3	3				3	3
CO3	3	1	2	2			2	3	3				3	3
CO4	3	1	2	3			3	3	3				3	3
CO5	3	1	2	2			3	3	3				3	3

3- Strong **2-Medium** **1-Low**

NME-I

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

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SUNDARAKKOTTAI, MANNARGUDI–614016.

(For the Candidates admitted in the academic year 2024 – 2025)

DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY

Semester: I-NME-I: Drugs and Cosmetics

Ins. Hrs. /Week: 2 Course Credit: 2 Course Code: U24NMECH11

UNIT I TERMINOLOGIES OF DRUGS (6 Hours)

Definition of the terms-drug, pharmacophore, pharmacodynamics, pharmacopoeia, pharmacology, bacteria, virus, fungus, actinomycetes, metabolites, antimetabolites, LD50, ED50.Therapeutic index and its significance.

UNIT – II ANTIBIOTICS (6Hours)

Antibiotics – Definition-classifications - Antibiotics-penicillin, ampicillin, structure, mode of action and uses.

UNIT – III ANTIPYRETIC ANALGESICS (6 Hours)

Analgesics – definition and actions – narcotic and non – narcotic – morphine, heroin – structure, mode of action and uses. Antipyretic analgesics – salicylic acid derivatives – methyl salicylate, aspirin. Anti-inflammatory agents – structure, mode of action and uses.

UNIT IV – HISTORY OF COSMETICS (6 Hours)

History of cosmetics, classification of cosmetics, professional image of self- grooming, beauty and wellness. Cosmetics emulsions: cream, cleansers, powders, moisturizers, sun screen, acne and anti-aging creams. Chemical peels and peeling agents, lasers and light devices, Electro Chemistry, bath salts, gels, bubble baths and scrubs.

UNIT V- REQUIREMENT AND PREPARATION OF COSMETICS (6 Hours)

Cosmetics- introduction and classification. Face powder- requirements and ingredients of a face powder. Face cream- (cold and vanishing) - ingredients, formulation and uses. Lipstick-requirement of a lipstick and common ingredients of a lipstick. Mascara – requirements and Formulation. Preparation of shampoo, soap-manufacturing of soap (kettle process and hydrolysis process).

Total Lecture Hours – 30

COURSE OUTCOME

The student should able to

1. State the terminologies used in drugs,
2. Explain the mode of action of antibiotics.
3. Explore the mode of action of antipyretic and analgesics.
4. Acquire the knowledge of history of Cosmetics
5. Prepare domestically useful products like soaps, cosmetics.

TEXT BOOKS

1. Industrial Chemistry (Including Chemical Engineering) by B.K. Sharma,2016, Goel Publishing House, 16th Revised and Enlarged Edition.
2. A Text book of Pharmaceutical Chemistry by Jayashree Ghosh, 2010, S. Chand & Company Ltd, New Delhi.
3. A Textbook of Pharmaceutical Chemistry by Dr. S. Lakshmi,2004, S. Chand &Company Ltd, New Delhi.
4. Handbook of cosmetic science and Technology A.O. Barel, M. Paye and H. I.Maibach. 3 rd edition
5. Thankamma Jacob, (1997) Foods, drugs and cosmetics-A consumer guide, Macmillan publication, London.

REFERENCES

1. Chemistry& Manufacture of Cosmetics by M. G. DE Navarre. Text Book of Cosmetic ology – by Harry's.
2. Wilkinson J B E and Moore R J, (1997) Harry's cosmetic ology, 7th ed., Chemical Publishers, London.
3. George Howard, (1987) Principles and practice of perfumes and cosmetics.
4. Jayashree Ghosh, (2017) A text book of Pharmaceutical Chemistry, S Chand &Company, India
5. Heather A.E. Bensor, Michael S. Robert et al, Cosmetic Formulation principles and practice, 2021, Ist edition**,** CRC Press,

E-RESOURCES

1. http://www.khake.com/page75.html
2. Net. foxsm/list/284
3. https://oms.bdu.ac.in/ec/courses.php?subject=B.Sc.%20(chemistry)
4. https://www.fda.gov/
5. https://courseware.cutm.ac.in/content/uploads/2020/06/ANTIBIOTICS.pdf
6. https://personalcarescience.com.au/userfiles/files/Book_sample/Beginner%20book%20V7%20-%20SAMPLE..pdf

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
CO1	3	1	2	2		2					3	3	3	
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
CO4	3	2	2	2		2					3	3	3	
CO5	3	1	2	3		3		3	2		3	3	3	

3- Strong **2-Medium** **1-Low**

FOUNDATION COURSE

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
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DEPARTMENT OF CHEMISTRY
B.Sc., CHEMISTRY

Semester: I-FC-I: Fundamentals of Chemistry

Ins. Hrs. /Week: 2 **Course Credit: 2** **Course Code: U24FCCH11**

UNIT I: PERIODIC TABLE AND ORBITAL HYBRIDISATION AND QUANTUM NUMBERS (6Hours)

Symbols, Atomic number, atomic mass, Molecular mass, Elements –Groups, Periods – Shell - K, L, M, N and O – Orbitals s, p, d and f block elements –Halogens, Inert gases – Transition elements, Lanthanides, Actinides.

Shapes of orbitals – s, p, d and f orbitals - Aufbau Principle, Pauli exclusion principle – Hund's rule –Electronic configuration – Valency, SP, SP^2, SP^3, dsp^2, SP^3d^2, d^2SP^3hybridisation – examples for hybridization – Four types of quantum numbers – Principal, azimuthal, magnetic and spin quantum numbers.

UNIT- II: CHEMICAL BONDING AND NUCLEAR CHEMISTRY (6 Hours)

Types of Bonds – Ionic, Covalent, Coordination, metallic and hydrogen bonding – Intra molecular, intermolecular hydrogen bonding – examples.

Fundamental particles – Neutron, Proton and Electron **-** Isotopes, Isobars and Isotones, Nuclear isomerism - Radio isotopes, Radioactivity – types - α, β and γ rays, Radioactive Series, Nuclear forces, Half-life period, Radioactive disintegration,

UNIT III: FUNCTIONAL GROUPS AND NOMENCLATURE OF ORGANIC COMPOUNDS AND INORGANIC COMPOUNDS (6 Hours)

Hydrocarbons – Alkanes, Alkenes and Alkynes series – derivatives of hydrocarbon – acid, acid chloride, acid anhydride, ester, alcohol, ether, thioether, nitro, nitroso, azo, phenols, aldehydes, ketones, amines, amides etc.

Organic compounds – IUPAC Nomenclature–Hydrocarbons and their derivatives, carbocyclic compounds, heterocyclic compounds. Inorganic compounds – Nomenclature – Co-ordination compounds – metal ion, ligand, co-ordination number, complex ion – definition – Nomenclature of cationic, anionic and neutral complexes.

UNIT IV: ORGANIC REACTIONS AND THERMODYNAMICS AND SPECTROSCOPY (6 Hours)

Definition of Nucleophile and electrophile -Examples, Types of organic reactions – Addition, condensation, Elimination, Substitution, Polymerization and rearrangement reactions. Thermodynamics – Heat – Definition, Exothermic and Endothermic reaction -First, Second and Third law – Entropy, enthalpy, internal energy – work, variables and functions, system and surroundings – spectroscopy – Definition, Wavelength, Frequency, Velocity, EMR- Radiation- Sources and Types. Monochromatic Light-Refraction, Reflection- Definition

UNIT V: ANALYTICAL TERMS AND TECHNIQUES (6 Hours)

Error -Accuracy, Mean, Median. Mode – Quantitative analysis and qualitative analysis definition – solvent, solute, Solution– Definition - example, precipitation - crystallization-Isolation– Separation techniques, Chromatography- Mobile Phase, stationary phase- adsorption, eluent – R_f Value -Column, TLC, PAPER.

Total Lecture Hours: 30

COURSE OUTCOME

The students should be able to

1. Explain the shape of orbital and quantum numbers.
2. Acquire the knowledge of chemical bonding and particles.
3. Know about Nomenclature of organic Compounds.
4. Discuss the types of organic reactions.
5. Understand the analytical terms and techniques.

TEXT BOOKS

1. Bahl, B.S, and Bahl, A., 'Advanced Organic Chemistry', (12th edition), 2010. New Delhi, Sultan Chand & Co.
2. Jerry March,2013. "Advanced Organic Chemistry, Reaction, Mechanism and Structure", 7th Edition, Wiley Inter Science.
3. Gurdeep Raj, 'Advanced Inorganic Chemistry', Vol -II.; Krishna Prakashan Media, 2014.
4. Peter Atkin's, Julio of Paula, James Keeler, 'Physical Chemistry' International Eleventh Edition, Oxford University Press, 2018.
5. Sudarsan Guna., "Wiley's J.D Concise Inorganic Chemistry '5th edition, Wiley.2023

REFERENCES

1. Bahl BS, Bahl A. 2010. Advanced Organic Chemistry, 12th edition, New Delhi, Sultan Chand & Co.
2. Bahl BS, Arun Bahl and Tuli GD. 2012. Essentials of Physical Chemistry, New Delhi, Sultan Chand and Son.
3. Jerry March. 2013. Advanced Organic Chemistry, Reaction, Mechanism and Structure,7th Edition, Wiley Inter Science.
4. Lee JD. 2000. Concise Inorganic Chemistry', 20th revised edition, Sultan Chand &Sons.
5. F. Albert Cotton, Geoffrey Wilkinson, Carlos A. Murillo, Manfred Bochmann., Advanced Inorganic Chemistry, March 2021, Wiley, Bengaluru.
6. M.S Chouan. "Elementary Problems in Organic Chemistry" 11 th edition, 2024. Sri Balaji Publisher. India.

E-RESOURCES

1.https://www.acs.org/content/acs/en/education/whatischemistry/periodictable/ed

2.https://chem.libretexts.org/Bookshelves/Inorganic_Chemistry/Supplemental_Modules_and_Websites_(Inorganic_Chemistry)/Descriptive_Chemistry/PeriodicTrends_of_Elemental_Properties/Periodic_Properties_of_the_Eleme___nts

3.https://onlinecourses.nptel.ac.in

4.https://www.bamu.ac.in/Portals/0/B_Sc-III-Year-Syllabus-Sem_-V-%26-V I-%5BAnalytical-Chemistry%5D-2011.pdf.

5.https://chem.libretexts.org/Bookshelves/Analytical_Chemistry/Analytical_Chemistry_2.1_(Harvey)/01%3A_Introduction_to_Analytical_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
CO1	3	2	3	2		2			2	2	3	3	3	
CO2	3	3	3	3		1			3	2	3	3	3	2
CO3	3	3	3	3		1			3	3	3	3	3	2
CO4	3	2	2	2		2			2	2	3	3	3	2
CO5	3	3	3	3		3			2	3	3	3	3	

3- Strong **2-Medium** **1-Low**

SEMESTER- II

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DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY

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

Ins. Hrs. /Week: 5 **Course Credit: 5** **Course Code: U24CH203**

UNIT-I: ACIDS, BASES AND IONIC EQUILIBRIA (15 Hours)

Concepts of Acids and Bases - Arrhenius concept, Bronsted-Lowry concept- Lewis's concept; Relative strengths of acids, bases and dissociation constant; dissociation of poly basic acids, ionic product of water, pH scale, pH of solutions; Degree of dissociation, common ion effect, factors affecting degree of dissociation; acid base indicators, theory of acid base indicators – action of phenolphthalein and methyl orange, titration curves - use of acid base indicators;

Buffer solutions – types, mechanism of buffer action in acid and basic buffer, Henderson-Hasselbalch equation;

Salt hydrolysis - salts of weak acids and strong bases, - hydrolysis constant, degree of Hydrolysis and relation between hydrolysis constant and degree of hydrolysis - Solubility product - determination and applications;

UNIT -II: CHEMISTRY OF s & p- BLOCK ELEMENTS (15 Hours)

Hydrogen: Position of hydrogen in the periodic table. Alkali metals: Comparative study of the elements with respect to oxides, hydroxides, halides, carbonates and bicarbonates. Diagonal relationship of Li with Mg. Preparation, properties and uses of NaOH, Na_2CO_3**,** KBr, $KClO_3$ alkaline earth metals. Anomalous behavior of Be.

Chemistry of p- Block Elements (Group 13 & 14)

preparation and structure of diborane and borazine. Chemistry of borax. Extraction of Al and its uses. Alloys of Al. comparison of carbon with silicon. Carbon-di- sulphide – Preparation, properties, structure and uses. Percarbonates, per noncarbonates and per decarbonates.

UNIT-III: CHEMISTRY OF P-BLOCK ELEMENTS, HALOGENS AND NOBLE GASES (15 Hours)

Chemistry of p- Block Elements (Group 15-18)

General characteristics of elements of Group 15; Chemistry of $_2HN\text{-}NH_2$, NH_2OH, NH_3 and HNO_3. Chemistry of PH_3, PCl_3, PCl_5, $POCl_3$, P_2O_5 and oxy acids of phosphorous (H_3PO_3 and H_3PO_4). General properties of elements of group16 - Structure and allotropy of elements - Chemistry of ozone - Classification and properties of oxides - oxides of Sulphur and selenium – Oxy acids of Sulphur (Caro's and Marshall's acids).

Chemistry of Halogens: General characteristics of halogen with reference to electro-negativity, electron affinity, oxidation states and oxidizing power. Peculiarities of fluorine. Halogen acids (HF, HCl, HBr and HI), oxides and oxy acids (HClO4). Inter-halogen compounds (ICl, ClF_3, BrF_5 and IF_7), and basic nature of Iodine.

Noble gases: Position in the periodic table. Preparation, properties and structure XeF_2, XeF_4, XeF_6 and XeOF4; uses of noble gases - Clathrate compounds

UNIT-IV: HYDROCARBON CHEMISTRY-I (15 Hours)

Alkanes – sources of alkanes – general preparation – general properties – conformational analysis of ethane and n-butane.

Alkenes-Nomenclature, general methods of preparation – Mechanism of elimination reactions – E1 and E2 mechanism - factors influencing – stereochemistry – orientation – Hofmann and Saytzeff rules. Reactions of alkenes-addition reactions – mechanisms – Markownikoff's rule, Kharasch effect, oxidation reactions-hydroxylation, oxidative degradation, epoxidation, ozonolysis; polymerization.

Alka dienes

Nomenclature - classification – isolated, conjugated and cumulated dienes; stability of conjugated dienes; mechanism of electrophilic addition to conjugated dienes - 1, 2 and 1, 4 additions; free radical addition to conjugated dienes– Diels– Alder reactions –polymerization –polybutadiene, polyisoprene (natural rubber), vulcanization, polychloroprene.

Alkynes

Nomenclature; general methods of preparation, properties and reactions; acidic nature of terminal alkynes and acetylene, polymerization and isomerization.

Cycloalkanes: Nomenclature, Relative stability of cycloalkanes, Bayer's strain theory and its limitations. Conformational analysis of cyclohexane, mono and di substituted cyclohexane's. Geometrical isomerism in cyclohexane.

UNIT-V: HYDROCARBON CHEMISTRY – II (15 Hours)

Benzene: Source, structure of benzene, stability of benzene ring, molecular orbital picture of benzene, aromaticity, Huckell's (4n+2) rule and its applications. Electrophilic substitution reactions - General mechanism of aromatic electrophilic substitution - nitration, sulphonation, halogenation, Friedel-Craft's alkylation and acylation. Mono substituted and disubstituted benzene - Effect of substituent – orientation and reactivity.

Polynuclear Aromatic hydrocarbons: Naphthalene – nomenclature, Haworth synthesis; physical properties, reactions – electrophilic substitution reaction, nitration, sulphonation, halogenation, Friedel – Crafts acylation & alkylation, preferential substitution at 1 - position – reduction, oxidation – uses. Anthracene –synthesis by Elbs reaction, Diels – Alder reaction and Haworth synthesis; physical properties; reactions - Diels-Alder reaction, preferential substitution at C-9 and C-10; uses.

Total Lecture Hours: 75

COURSE OUTCOME

The students should be able to

1. Explain the concept of acids, bases and ionic equilibria; periodic properties of s and p block elements, preparation and properties of aliphatic and aromatic hydrocarbons
2. Discuss the periodic properties of sand p- block elements, reactions of aliphatic and aromatic hydrocarbons and strength of acids.
3. Classify hydrocarbons, types of reactions, acids and bases, examine the properties s and p-block elements, reaction mechanisms of aliphatic and aromatic hydrocarbons.
4. Explain theories of acids, bases and indicators, buffer action and important compounds ofs-block elements.
5. Assess the application of hard and soft acids indicators, buffers, Compounds of s and p-block elements and hydrocarbons.

TEXT BOOKS

1. Madan R D, Sathya Prakash, (2003), Modern Inorganic Chemistry, 2nd ed,S. Chand and Company, New Delhi.
2. Sathya Prakash, Tuli G D, Basu S K and Madan R D, (2003), Advanced InorganicChemistry,17th ed., S. Chand and Company, New Delhi.
3. Arun Bhal, Bahl B S, (2019), 'A Text book of Organic Chemistry", 22 ed., S. Chand and Company, New Delhi.
4. Puri B R, Sharma L R, (2002), Principles of Physical Chemistry,38th ed.,Vishal Publishing Company, Jalandhar.
5. Lakshmi Ravishankar et al, (2024) 'A Text book of Advanced Organic Chemistry", Vol-I, Himalaya Publishing House. India.

REFERENCES

1. Maron S H and Prutton C P, (1972), Principles of Physical Chemistry, 4th ed, The Macmillan Company, New York.
2. Barrow G M, (1992), Physical Chemistry, 5th ed., Tata McGraw Hill, New Delhi.
3. Lee J D, (1991), Concise Inorganic Chemistry, 4 ed., ELBS William Heinemann, London.
4. Hughey J E, (1993), Inorganic Chemistry: Principles of Structure and Reactivity, 4th ed. Addison Wesley Publishing Company, India.
5. Gurdeep Raj, (2001), Advanced Inorganic Chemistry Vol- I,26th ed., Goel Publishing House, Meerut.
6. Bahl BS, Arun Bahl and Tuli GD. (2012), Essentials of Physical Chemistry, New Delhi Sultan Chand and Son.

E-RESOURCES

1. https://chem.libretexts.org/Bookshelves/General_Chemistry/Chem1_(Lower)/13%3A_Acid-Base_Equilibria/13.01%3A_Introduction_to_Acid_Base_Equilibria
2. http://cactus.dixie.edu/smblack/chem1010/lecture_notes/4B.html
3 https://study.com/academy/lesson/aromatic-hydrocarbons-properties-usesexamples.html
4 https://onlinecourses.nptel.ac.inhttp://cactus.dixie.edu/smblack/chem1010/lecture_notes/4B.htm
5 http://www.auburn.edu/~deruija/pdareson.pdfhttps://swayam.gov.in/course/64-atomic-structure-and-chemical-bonding
6. http://nptel.ac.in/courses/104101090/
7. Lecture 1: Classification of elements and periodic propertieshttp://nptel.ac.in/courses/104101090/

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
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CO3	3	3	3	3		2			3	3	3	3	3	2
CO4	3			2		2			3	2	3	3	3	1
CO5	3	3	3	3		3			2	3	3	3	3	1

3- Strong **2-Medium** **1-Low**

Semester: II-CP-II: Qualitative Organic Analysis and Preparation of Organic Compounds (P)

Ins. Hrs. /Week: 4 **Course Credit: 4** **Course Code: U24CH204P**

UNIT I

Safety rules, symbols and first-aid in chemistry laboratory-Basic ideas about Bunsen burner, its operation and parts of the flame. Chemistry laboratory glassware –basis information and uses.

UNIT II

Qualitative Organic analysis (40 hours)

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

UNIT III Preparation of Organic compounds (20 hours)

i. Nitration - picric acid from Phenol

ii. Halogenation - p-bromo acetanilide from acetanilide

iii. Oxidation - benzoic acid from Benzaldehyde

iv. Methyl benzoate to Benzoic acid

v. Salicylic acid from Methyl Salicylate

vi. Rearrangement - Benzil to Benzylic Acid

Vii. Hydrolysis of benzamide to Benzoic Acid

4. Separation and Purification Techniques (Not for Examination)

1. Purification of organic compounds by crystallization (from water / alcohol) and distillation
2. Determination of melting and boiling points of organic compounds.
3. Steam distillation - Extraction of essential oil from citrus fruits/eucalyptus leaves.

5. Chromatography (any one) (Group experiment)

1. Separation of amino acids by Paper Chromatography
2. Thin Layer Chromatography - mixture of sugars / plant Pigments /Permanganate dichromate.
3. Column Chromatography - extraction of carotene, chlorophyll and xanthophyll from leaves / separation of anthracene - anthracene picrate.

6. Electrophoresis – Separation of amino acids and proteins

(Demonstration)

i) Isolation of casein from milk/Determination of saponification value of oil or fat

ii) Estimation of acetic acid from commercial vinegar. (Any one Group experiment) (4,5& 6–not for ESE)

Total Hours: 60

Scheme of Valuation: Max. Marks

Record	-10 (Marks)
Procedure Writing	-10 (Marks)
Qualitative Organic Analysis	– 35 (Marks)
Preparation	- 20 Marks
Total Marks	- 75 Marks

COURSE OUTCOME

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 acids, primary, secondary and tertiary amines, mono and diamides, mono and polyhydric phenols, aldehyde and ketone, reducing and non- reducing sugars and explain the reactionsbehind it.
4. Exhibit a solid derivative with respect to the identified functional group.
5. Acquire the of Knowledge of handling of different chemicals

TEXT BOOKS

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, 1987.

REFERENCES

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.;

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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
4. https://www.vlab.co.in/broad-area-chemical-sciences
5. .https://edu.rsc.org/practical/qualitative-tests-for-organic-functional-groups-practical-videos-16-18-students/4014327.article

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
CO1	3	3	3	2		3	2	2	2	2	3	3	3	1
CO2	3	3	3	3		3	2	2	2	2	3	3	3	3
CO3	3	3	3	2		3	3	2	3	2	3	3	3	1
CO4	3	3	3	2		3	3	2	2	2	3	3	3	1
CO5	3	2	3	2		3	2	2	2	2	3	2	3	1

3- Strong 2-Medium 1-Low

ALLIED MATHEMATICS

SENGAMALA THAYAAR EDUCATIONALTRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

(For the Candidates admitted in the academic year 2024 – 2025)

DEPARTMENT OF MATHEMATICS

ALLIED MATHEMATICS-III

(For B. Sc., Physics & Chemistry)

Semester: II – AC – III: Trigonometry and Fourier series

Ins.Hrs./Week: 3 **Course Credit: 2** **Course Code:** U24AMM203

UNIT-I: Demovier's Theorem for Rational Number **(12 Hours)**

Introduction on Number System - Expansion of sin nθ, cosnθ, tan nθ (n being a positive integer) – Related Problems–Expansion of $\sin^n\theta$, $\cos^n\theta$ – Related Problems – Expansion of sinθ, cosθ and tan θ in terms of powers of θ – Related Problems.

UNIT –II: Hyperbolic Functions **(10 Hours)**

Introduction on Hyperbolic functions – Results – Related Problems – Relation between Hyperbolic and Circular functions–Related Problems–Expansion of Inverse Hyperbolic functions–Related Problems–Separation of real and imaginary parts–Related Problems.

UNIT –III: Logarithm of a Complex Number **(8 Hours)**

Introduction - Logarithm of a complex number – Related Problems – Summation of a series – Related Problems – Difference Method – Related Problems – Angles in Arithmetic Progression method – Related Problems.

UNIT- IV: Fourier series **(9 Hours)**

Fourier Series – Definition – Related Problems – Fourier Series Expansion of Periodic Functions with period 2π– Definition – Related Problems – Odd and Even Functions – Definition– Properties of Odd and Even Functions – Related Problems.

UNIT –V: Half Range Fourier series **(6 Hours)**

Half range sine series – Definition – Related Problems - Half range cosine series – Definition – Related Problems.

Total Lecture Hours-45

COURSE OUTCOME

The students should be able to

1. Examine the expansion of sin nθ and cos nθ and its related problems.
2. Analyze the hyperbolic functions and its relation between hyperbolic and circular functions.
3. Describe the summation of series and its methods.
4. Apply the concept of Fourier series and familiarizes with odd, even Fourier series with their periodic functions.
5. Analyze the half range sine and cosine functions and its change of interval.

TEXT BOOKS

1. Arumugam S, Thangapandi Issac A and Somasundaram A. 1999. Trigonometry and Fourier Series. New Gamma Publications, Palayamkkottai.
2. Narayanan S and Manicavachagam Pillay. T.K 2014. Calculus Volume III. Viswanathan Publishing Company, Chennai.

UNIT-I Chapter 1 : Sec. 1.2 to 1.3 of [1]
UNIT-II Chapter 2 : Sec. 2.1 and 2.2 of [1]
UNIT-III Chapter 3 : Sec 3.1 of [1]
Chapter 4 : Sec. 4.1 &4.2, 4.3 of [1]
UNIT- IV Chapter 6 : Sec. 1 to 3 of [2]
UNIT- V Chapter 6 : Sec. 4 & 5 of [2]

REFERENCE BOOK(S)

1. Dyke P.G 2001. An Introduction to Laplace Transforms and Fourier Series. Spinger – Verlag, London.
2. Gelfand I.F. and Saul M. 2012. Trigonometry. Spinger – Verlag, London.
3. Jain S.K. 2001. Fourier Series and Fourier Transforms. Sarup and Sons, New Delhi.
4. Rawat K.S. 2005. Trigonometry. Sarup and Sons, New Delhi.
5. Robert T Seeley. 2006. An Introduction to Fourier Series and Integrals. Dover Publications, New York.

E-RESOURCES

1. https://orion.math.iastate.edu/butler/PDF/trig_notes.pdf
2. http://users.auth.gr/~siskakis/GelfandSaul-Trigonometry.pdf
3. https://lib.alfaisal.edu/pdf/AlgebraAndTrigonometry-LR.pdf
4. https://math.mit.edu/~gs/cse/websections/cse41.pdf
5. https://fenedebiyat.siirt.edu.tr/dosya/personel/uygulamali-matematik-siirt-201935221347541.pdf

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
CO1	3	3	2	3	1	3	1	2	2	2	3	2	1
CO2	3	2	1	2	3	2	2	2	2	2	3	2	1
CO3	3	2	2	1	2	1	2	1	3	2	3	2	1
CO4	2	1	2	2	3	2	2	3	1	2	3	2	1
CO5	3	2	2	2	3	3	2	2	2	1	3	2	1

3- Strong 2-Medium 1-Low

ALLIED BOTANY

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI-614016, MANNARGUDI

(For the candidates admitted from the academic year 2024-2025)

PG AND RESEARCH DEPARTMENT OF MICROBIOLOGY

(FOR B.Sc., CHEMISTRY – ALLIED BOTANY)

Semester: II AC-III ALLIED BOTANY-II

Hrs./ Week: 3 Course Credit:2 Course Code:U24ABO203

UNIT –I MORPHOLOGY OF FLOWERING PLANTS (6 Hours)

Plant and its parts. Structure and function of root and stem. Leaf and its parts. Leaf types simple and compound. Types of Phyllotaxy. Inflorescence - Racemose, Cymose and Special types.

UNIT–II TAXONOMY (16 Hours)

General outline of Bentham and Hooker's system of classification with merits and demerits. Study of the range of characters and plants of economic importance in the following families:

Polypetalae- *Annonaceae, Rutaceae* **Gamopetalae** - *Rubiaceae, Solanaceae*,

Monochlamydeae- Euphorbiaceae, **Monocots -** *Arecaceae* and *Poaceae.*

UNIT –III PLANT ANATOMY (8 Hours)

Tissue and tissue systems: Simple and complex tissues. Anatomy of monocot and dicot roots anatomy of monocot and dicot stems - anatomy of dicot and monocot leaves. Secondary thickening of Dicot stem.

UNIT –IV EMBRYOLOGY (7 Hours)

Structure of mature anther, Pollen grain and development of male Gametophyte.

Structure of ovule - Types of ovules, development of female gametophyte, Pollination

-double fertilization, structure of dicotyledonous seeds.

UNIT –V PLANT PHYSIOLOGY (8 Hours)

Absorption of water, photosynthesis -light reaction - Calvin cycle; respiration - Glycolysis –Krebs cycle - electron transport system. Growth hormones - auxins and cytokinin's and their applications.

Total lecture Hours – 45

COURSE OUTCOME:
The students will be able to:

1. Understand the fundamental concepts of Morphology in flowering plants.
2. Understand and appreciate the Plant systematics role in daily life and their economic importance in global scenario
3. Analyze and recognize the different organs of plants and secondary growth.
4. Understand the fascinating structure of reproduction in green plants and also the process of pollination and fertilization changes.
5. Understand the water relation of plants with respect to various physiological processes.

TEXT BOOKS

1. Sharma, O.P. 2017. Plant Taxonomy. (II Edition).The McGraw Hill Companies.
2. Bhojwani, S.S. Bhatnagar, S.P and Dantu, P.K. 2015. The Embryology of Angiosperms (6th revised and enlarged edition). Vikas Publishing House, New Delhi.
3. Maheshwari, P. 1963. Recent Advances in Embryology of Angiosperms. Intl. Soc. Plant Morphologists, New Delhi.
4. Salisbury, F. B.C.W. Ross.1991. Plant Physiology. Wassworth Pub. Co. Belmont.
5. Ting, I.P. 1982. Plant Physiology. Addison Wesley Pb. Philippines.

REFERENCE BOOKS

1. Lawrence. G.H.M. 1985. An Introduction to Plant Taxonomy, Central BookDepot, Allahabad.
2. Bhojwani, S.S and Bhatnagar, S.P. 2000. The Embryology of Angiosperms (4th revised and enlarged edition). Vikas Publishing House, New Delhi.
3. Pandey, B.P. 2012. Plant Anatomy. S Chand Publishing.
4. Jain, VK. 2006. Fundamentals of Plant Physiology, S. Chand and Company Ltd.
5. Rajni Gupta. 2012. Plant Taxonomy: Past, Present and Future. Vedams (P) Ltd, New Delhi.
6. Jain, V.K. 2006. Fundamentals of Plant Physiology, S. Chand and Company Ltd., New Delhi.
7. Verma, S.K. 2006. A Textbook of Plant Physiology, S. K. Chand & Co., New Delhi.

E-RESOURCES

1. https://books.google.co.in/books/about/Plant_Taxonomy.html?id=0bYs8F0Mb9gC&redir_esc=y
2. https://books.google.co.in/books/about/PLANT_TAXONOMY_2E.html?idRoi0lwSXFnUC&redir_esc=y
3. https://archive.org/EXPERIMENTS/plantanatomy031773mbp
4. https://www.amazon.in/Embryology-Angiosperms-6th-S-P-Bhatnagar-ebook/dp/B00UN5KPQG
5. https://www.crcpress.com/PlanPhysiology/Stewart-Globig/p/book/9781926692692

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
CO1		2	3	1				2	3	2			3	
CO2		3	3	2				3	2	2			3	
CO3		3	3	3				2	3	2			3	
CO4		2	3	3				3	2	3			3	
CO5		3	3	3				3	3	1			3	

3- Strong 2-Medium 1-Low

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI-614016, MANNARGUDI

(For the candidates admitted from the academic year 2024-2025)

PG AND RESEARCH DEPARTMENT OF MICROBIOLOGY

(FOR B.Sc.,CHEMISTRY – ALLIED BOTANY)

Semester: II AP-I **ALLIED BOTANY PRACTICAL**

Sem II: 2 Hrs. **Course Credit:2** **Course Code: U24ABO102P**

EXPERIMENTS

1. Make suitable micro preparation of the types prescribed in Algae, Fungi (permanent slides only), Bryophytes, Pteridophytes and Gymnosperms.
2. Micro photographs of the cell organelle's ultra-structure.
3. Simple genetic problems.
4. To describe in technical terms, plants belonging to respective families and to identify the families.
5. To dissect a flower, construct the floral diagram and write the floral formula.
6. Demonstration experiments
   a. Ganong's Light screen
   b. Ganong's respiroscope
   c. Evaluation of O_2 experiment (Photosynthesis)
7. To make suitable micro preparations of anatomy materials prescribed in the syllabus. Spotters - Algae, Fungi, Bryophytes, Pteridophytes, Gymnosperms and Angiosperm anatomy,
8. Embryology, Cell biology, Plant Physiology. Horticulture experiment methods and Preparation.

COURSE OUTCOME

The students will be able to:

1. Understand the internal organization of algae and fungi.
2. Develop critical understanding on morphology, anatomy and reproduction of Bryophytes, Pteridophytes and Gymnosperms.
3. Perform the classical taxonomy with reference to different parameters.
4. Understand the fundamental concepts of plant anatomy and embryology.
5. Demonstrate the effect of various physical factors on photosynthesis.

TEXT BOOKS

1. Sharma, O.P. 2017. Bryophyta, MacMillan India Ltd, New Delhi.
2. Sharma, O.P. 2012. Pteridophyta, Tata McGraw-Hills Ltd, New Delhi.
3. Subramaniam, N.S. 1996. Laboratory Manual of Plant Taxonomy. Vikas Publishing House Pvt. Ltd., New Delhi.
4. Benjamin, A. Pierce. 2012. Genetics- A conceptual Approach. W.H. Freeman and Company New York, England.
5. Noggle G.R and G.J. Fritz. 2002. Introductory Plant Physiology. Prentice Hall of India, New Delhi.
6. Brijesh Kumar Chaturvedi, Kalyani, Vishwanath Mishra Handbook Of Practical Horticulture For B.Sc, (Agriculture) Students

REFERENCES

1. Strickberger, M.W. 2005. Genetics (III Ed). Prentice Hall, New Delhi, India.
2. Nancy Serediak and M. Huynh. 2011. Algae identification lab Guide. Accompanying manual to algae identification field guide, Ottawa Agriculture and Agri food Canada publisher.
3. Mohammed Gufran Khan, Shite Gatew and Bedilu Bekele. 2012. Practical manual for Bryophytes and Pteridophytes. Lambert Academic Publishing.
4. Aler Gingauz. 2001. Medicinal Chemistry. Oxford University Press & Wiley Publications.
5. Steward, F.C. 2012. Plant Physiology Academic Press, US

E- RESOURCES

8. https://www.amazon.in/Practical-Manual-Pteridophyta-Rajan-Sundara/dp/8126106883
9. https://www.google.co.in/books/edition/Gymnosperms/3YrT5E3Erm8C?hl=en&gbpv=1&dq=gy mnosperms&printsec=frontcover
10. https://www.amazon.in/Computational-Phytochemistry-Satyajit-Dey-Sarker-ebook/dp/B07CV96NZJ
11. https://medlineplus.gov/genetocs/understanding/basics/cell/
12. https://apan.net/meetings/apan45/files/17/17-01-01-01.pdf
13. http://www.cuteri.eu/microbiologia/manuale_microbiologia_pratica.pdf
14. https://www.amazon.in/Manual-Practical-Bryophyta-Suresh-Kumar/dp/B0072GNFX4

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
CO1	3	1	2	2			1	3	3				3	3
CO2	3	3	3	3			2	3	3				3	3
CO3	3	1	2	2			2	3	3				3	3
CO4	3	1	2	3			3	3	3				3	3
CO5	3	1	2	2			3	3	3				3	3

3- Strong 2-Medium 1-Low

NME-II

SENGAMALA THAYAAR EDUCATIONAL TRUST WOME N'S COLLEGE

(AUTONOMOUS)

(Affiliated to Bharathidasan University, Tiruchirappalli)

Accredited by NAAC-An ISO 9001:2015 Certified Institution

SUNDARAKKOTTAI, MANNARGUDI–614016.

(For the Candidates admitted in the academic year 2024-2025

DEPARTMENT OF CHEMISTRY

B.Sc., CHEMISTRY

Semester: II-NME--II: Hydro Chemistry

Ins. Hrs. /Week: 2 Course Credit: 2 Course Code: U24NMECH22

UNIT-I INTRODUCTION (6 Hours)

Sources of water- Surface sources and ground sources. Hydrology- precipitation, rain and snowfall water and runoff water. Water as universal solvent- classification of water- soft water and hard water. Water pollution- Causes for water pollution - Effects of water pollution- prevention of pollution and water pollution control

UNIT-II WATER QUALITY PARAMETERS (6 Hours)

Physical parameters- Characteristics of water depending on source-color, taste, odor, turbidity, Total Dissolved Solids (TDS) and Electrical Conductivity. Chemical parameters- pH, Total Alkalinity, Total Hardness- permissible quantities and tests for sodium, potassium, chloride, chlorine, fluoride, calcium, magnesium, iron, manganese, ammonia, nitrite, nitrate, phosphate and sulphate.

UNIT-III QUALITY OF WATER (6 Hours)

Water quality Standards- WHO- standard of water quality for domestic and industrial purposes. Ground water quality and Surface water quality- Significance and Health effects of water quality. Impurities in water- suspended impurities, colloidal impurities and dissolved impurities. Water contaminants- organic, inorganic, microbiological and biological contaminants.

UNIT-IV WATER DEMAND AND TREATMENT OF WATER (6 Hours)

Domestic water demand- Chemical and industrial demand- Factors affecting the water demand Disadvantages of Hard water- in domestic use- in industrial use and in boilers,

Removal of color, odor and taste, reverse osmosis process and desalination of sea water. Disinfecting water- by boiling, by UV ray, with Iodine and Bromine with ozone, by excess lime, by potassium permanganate and by chlorine**.**

UNIT-V WATER ANALYSIS **(6 Hours)**

Physical test- Nephelometric Method of measurement of turbidity, Chemical test- COD and BOD. Infectious Diseases: Water borne diseases- By Bacterial organisms, Bacteriophage and by Protozoa. water-based diseases, water-related diseases and preventive measures**.**

Total Lecture Hours- 30

COURSE OUTCOME

The students should be able to

1. Explain the sources of water and properties of water and water pollution.
2. Analyze the Physical and Chemical parameters of water quality.
3. Get knowledge of water quality and hazards.
4. learn about water demand in future and disadvantages of hard water.
5. Determine the COD and BOD test.

TEXT BOOKS

1. Environmental Chemistry, De A.K, New Age International Private Ltd, New Delhi, Fourth Edition (2000).
2. Water supply and Sanitary Engineering, Birdie G.S, Birdie J.S, Dhanpat Rai Publishing Company, New Delhi.
3. Chemtech I, Venkateswarlu & Co., S. Chand and Company Ltd.
4. Leo M.L. Nollet, Leen S.P. De Gels, Handbook of water analysis
5. Kanwaljit., 2007, Handbook of water and waste water analysis., Atlantic.

REFERENCES

1. Water pollution, Tripathi A.K, Pandey S.N, Ashish Publishing House, New Delhi(1990).
2. Water Pollution, Goel P.K, New Age International Private Limited, New Delhi (1997).
3. Environmental Chemistry, Kudesia V.P, Pragati Prakashan Publication, Meerut, First Edition ,(2000)
4. Pollution Conversation and Forestry, Siddiqui K.A, Kitab Mahal Publication, Allahabad, Second Edition (2002).
5. Samuel Cate Prescott, Elements of Water Bacteriology., 2019, Forgotten Books,

E- RESOURCES

1. https://www.scpscience.com/Company%20Literature/Pdf/Catalogs/wateranalysis%20vol2(Oct%207).pdf.
2. https://www.essence-journal.com/wp-content/uploads/Volume_IX/December_2018/An-Introduction-to-water-quality- analysis.pdf
3. **https://ocw.mit.edu/courses/1-77-water-quality-control-spring-**

2006/pages/lecture-notes/
4. https://coronell.web.unc.edu/wp-content/uploads/sites/1698/2014/06/2014-06- 27-Full-course-packet.pdf
5. https://iris.who.int/bitstream/handle/10665/44584/9789241548151_eng.pdf.

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
CO1	3	1		2		1			2	2	3	3	3	3
CO2	3	3		3	3	3			3	3	3	3	3	3
CO3	3	1	3	3		1			2	2	3	3	3	3
CO4	3	1	2	2		2			2	2	3	3	3	3
CO5	3	3	3	2	3	3			3	3	3	3	3	3

3- Strong 2-Medium 1-Low

SEC-I

SENGAMALA THAYAAR EDUCATIONAL TRUST WOME N'S COLLEGE

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SUNDARAKKOTTAI, MANNARGUDI–614016.

(For the Candidates admitted in the academic year 2024-2025)

DEPARTMENT OF CHEMISTRY

B. Sc CHEMISTRY

Semester: II-SEC-I: Cosmetics and Personal Grooming

Ins. Hrs. /Week: 2 Course Credit:2 Course Code: U24SECH21

UNIT-I; SKIN CARE (7 Hours)

Nutrition of the skin, skin care and cleansing of the skin; Face powder – constituents, uses,side effects; creams and lotions – cleansing, moisturizing all purpose, shaving and sunscreen (formulation only); Gels – formulation and advantages; astringent and skin tonics – key ingredients, skin lightness, depilatories.

UNIT-II: HAIR CARE & DENTAL CARE (7 Hours)

Shampoos – types – powder, cream, liquid, gel – ingredients; conditioner – types – ingredients-hair dye –composition and side effects Tooth powder -Composition and manufacture, Tooth pastes – ingredients,

mouth wash.

UNIT- III: MAKE UP (4 Hours)

Base-foundation–types – ingredients; lipstick, eyeliner, mascara, eye shadow**,**Concealers, rouge.

UNIT- IV: PERFUMES (4 Hours)

Classification - Natural – plant origin – parts of the plant used, chief constituents; animal origin – amber Gries from whale, civetone from civet cat, musk from musk deer;synthetic – classification, emphasizing characteristics –esters – alcohols – aldehydes – ketones.

UNIT-V: BEAUTY TREATMENTS (8 Hours)

Facials - types – advantages – disadvantages; face masks – types; bleach - types -advantages– disadvantages; shaping the brows; eyelash tinting; perming types;hair coloring and dyeing; permanent waving – hair straightening; wax types -waxing; pedicure, manicure - advantages – disadvantages.

Total Lecture Hours:30

COURSE OUTCOME

1. Know about the composition of various cosmetic products.
2. Understand chemical aspects and applications of hair care and dental care and skincare products.
3. Explore chemical aspects and applications of perfumes and skin care products.
4. Explain the methods of beauty treatments and their advantages and disadvantages.
5. Discuss the hazards of cosmetic products.

TEXT BOOKS:

1. Thankamma Jacob, (1997) Foods, drugs and cosmetics – A consumer guide, Macmillan publication, London.
2. Wilkinson J B E and Moore R J, (1997) Harry's cosmetic ology, 7th ed., Chemical Publishers, London.
3. George Howard, (1987) Principles and practice of perfumes and cosmetics.
4. A Text book of Pharmaceutical Chemistry by Jayashree Ghosh, 2010, S. Chand & Company Ltd, New Delhi.
5. A Textbook of Pharmaceutical Chemistry by Dr. S. Lakshmi,2004, S. Chand & Company Ltd, New Delhi.

REFERENCES

1. W.A. Poucher, Joseph A Brink,Jr. Perfumes, Cosmetics and Soaps,Springer,2000.
2. Jayashree Ghosh, Fundamental Concepts of Applied Chemistry, S. Chand & Co. Publishers, second edition, 2006.
3. Jayashree Ghosh, (2017) A text book of Pharmaceutical Chemistry, S Chand &Company, India.
4. Heather A.E. Bensor, Michael S. Robert et al, Cosmetic Formulation Principles and Practice, 2021, Ist edition**,** CRC Press,
5. Chemistry& Manufacture of Cosmetics by M. G. DeNavarre. Text Book of Cosmetology – by Harry's

E-RESOURCES

1. **https://personalcarescience.com.au/userfiles/files/Book_sample/Beginner%20 book%20V7%20-%20SAMPLE..pdf**
2. http://www.khake.com/page75.html
3. Net.foxsm/list/284
4. **https://personalcarescience.com.au/userfiles/files/Book_sample/Beginner%20 book%20V7%20-%20SAMPLE..pdf**
5. http://www.khake.com/page75.html

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
CO1	3	1	3	3					2		3	2	3	2
CO2	3	2	3	3		2		3	3		3	2	3	3
CO3	3	3	3	3		2		3	3		3	2	2	2
CO4	3	2	1	3		2		3	3	2	3	2	3	2
CO5	3	2	1	3					3	2	3	2	2	1

3- Strong 2-Medium 1-Low