B.Sc. CHEMISTRY

LOCF SYLLABUS 2023

Department of Chemistry
School of Physical Sciences
St. Joseph's College (Autonomous)
Tiruchirappalli - 620 002, Tamil Nadu, India

Vision

Forming globally competent, committed, compassionate and holistic persons, to be men and women for others, promoting a just society.

Mission

- Fostering learning environment to students of diverse background, developing their inherent skills and competencies through reflection, creation of knowledge and service.
- Nurturing comprehensive learning and best practices through innovative and value-driven pedagogy.
- Contributing significantly to Higher Education through Teaching, Learning, Research and Extension.

Programme Educational Objectives (PEOs)

- Graduates will be able to accomplish professional standards in the global environment.
- Graduates will be able to uphold integrity and human values.
- Graduates will be able to appreciate and promote pluralism and multiculturalism in working environment.

Programme Outcomes (POs)

1. Graduates will be able to comprehend the concepts learnt and apply in real life situations with analytical skills.
2. Graduates with acquired skills and enhanced knowledge will be employable/ become entrepreneurs or will pursue higher Education.
3. Graduates with acquired knowledge of modern tools communicative skills and will be able to contribute effectively as team members.
4. Graduates are able to read the signs of the time analyze and provide practical solutions.
5. Graduates imbibed with ethical values and social concern will be able to understand and appreciate social harmony, cultural diversity ensure sustainable environment.

Programme Specific Objectives (PSOs)

1. Graduates will be able to understand the concepts in chemistry and apply in real life situations with analytical proficiency.
2. Graduates with acquired practical skills and enhanced theoretical knowledge will be employable or entrepreneurs or will pursue higher education.
3. Graduates with acquired knowledge of advanced tools in chemistry and communicative skills will be able to contribute effectively as team members.
4. Graduates will be able to recognize, analyze, and provide practical solutions to ever demanding chemistry based issues.
5. Graduates inculcated with ethical, scientific social responsibility will be able to create sustainable chemical alternatives to the contemporary environmental challenges.

CONTINUOUS INTERNAL ASSESSMENT
Categorizing Outcome Assessment Levels Using Bloom's Taxonomy

Level	Cognitive Domain	Description
K1	Remember	It is the ability to remember the previously learned concepts or ideas.
K2	Understand	The learner explains concepts or ideas.
K3	Apply	The learner uses existing knowledge in new contexts.
K4	Analyse	The learner is expected to draw relations among ideas and to compare and contrast.
K5	Evaluate	The learner makes judgements based on sound analysis.
K6	Create	The learner creates something unique or original.

Question Paper Blueprint for Mid and End Semester Tests

<table>
<tr><td colspan="3">Duration: 2 Hours</td><td colspan="6">Maximum Marks: 60</td></tr>
<tr><td colspan="2" rowspan="2">Section</td><td colspan="6">K level*</td><td rowspan="2">Marks</td></tr>
<tr><td>K1</td><td>K2</td><td>K3</td><td>K4</td><td>K5</td><td>K6</td></tr>
<tr><td colspan="2">A (no choice)</td><td>7</td><td></td><td></td><td></td><td></td><td></td><td>7 × 1 = 7</td></tr>
<tr><td colspan="2">B (no choice)</td><td></td><td>5</td><td></td><td></td><td></td><td></td><td>5 × 3 = 15</td></tr>
<tr><td colspan="2">C (either… or type)</td><td></td><td></td><td>3</td><td></td><td></td><td></td><td>3 × 6 = 18</td></tr>
<tr><td rowspan="4">D (2 out of 3)</td><td>Courses with K4 as the highest cognitive level</td><td></td><td></td><td></td><td>2</td><td></td><td></td><td rowspan="4">2 × 10 = 20</td></tr>
<tr><td>Courses with K5 as the highest cognitive level wherein one question each on K4 and K5 is compulsory.
(Note:K4 has two questions whereas, K5 has no choice.)</td><td></td><td></td><td></td><td>1</td><td>1</td><td></td></tr>
<tr><td rowspan="2">Courses with K6 as the highest cognitive level wherein one question each on K5 and K6 is compulsory.
(Note: Mid Sem: K4 has two questions whereas, K5 has no choice; End sem: K5 has two questions whereas, K6 has no choice)</td><td></td><td></td><td></td><td colspan="2">Mid Sem</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td colspan="2">End Sem</td></tr>
<tr><td colspan="6">Total</td><td>60</td></tr>
</table>

** K4 and K5 levels will be assessed in the Mid semester test whereas K5 and K6 levels will be assessed in the End semester test.*

Question Paper Blueprint for Mid and End Semester Tests *(For quantitative courses only)*

Duration: 2 Hours						**Maximum Marks: 60**
Section	**K level**					**Marks**
	K1	**K2**	**K3**	**K4**	**K5**	
A *(no choice)*	9					9 × 1 = 9
B *(either… or type)*		2	1			3 × 5 = 15
C *(2 out of 3)*				1	1*	2 × 18 = 36
					Total	**60**

** K5 compulsory*

SEMESTER EXAMINATION
Question Paper Blueprint for Semester Examination

Duration: 3 Hours								**Maximum Marks: 100**
Section		**K level**						**Marks**
		K1	**K2**	**K3**	**K4**	**K5**	**K6**	
A *(no choice, two questions from each unit)*		10						10 × 1 = 10
B *(no choice, two questions from each unit)*			10					10 × 3 = 30
C *(either… or type, one question from each unit)*				5				5 × 6 = 30
D *(3 out of 5, one question from each unit)*	*Courses with K4 as the highest cognitive level*				3			3 × 10 = 30
	Courses with K5 as the highest cognitive level wherein two K4 questions and one K5 question are compulsory. (Note: Three questions on K4 and two questions on K5)				2	1		
	Courses with K6 as the highest cognitive level wherein one question each on K4, K5, and K6 is compulsory. (Note: Two questions each on K4 and K5 and one question on K6)				1	1	1	
							Total	**100**

Question Paper Blueprint for Semester Examination *(For quantitative courses only)*

Section	Marks	K level
A	10 × 1 = 10	K1
B	5 × 6 = 30 *(either…or)*	K2 *(Q. No. 11 & 12)* K3 *(Q. No. 13, 14 & 15)*
C	4 × 15 = 60 *(4 out of 5)*	K4 *(Q. No. 16, 17 & 18)* K5 *(Q. No. 19 & 20)*
Total Marks: 100		

Evaluation Pattern for Part IV One/Two Credit Courses

Title of the Course	CIA	Semester Examination	Total Marks
Internship	100		**100**
UG Skill Enhancement Course (Non Major Elective) Foundation Course **PG** Ability Enhancement Course	20 + 10 + 20 = 50	50 *(External member from the Department)*	**100**
Value Education	50	50 *(CoE)*	**100**

B.Sc. CHEMISTRY								
PROGRAMME PATTERN								
Course Details						**Scheme of Exams**		
Sem	**Part**	**Course Code**	**Title of the Course**	**Hours**	**Credits**	**CIA**	**SE**	**Final**
1	1	23UTA11GL01A	General Tamil - 1	5	3	100	100	100
		23UFR11GL01	French-1					
		23UHI11GL01	Hindi - 1					
		23USA11GL01	Sanskrit - 1					
	2	23UEN12GE01	General English - 1	5	3	100	100	100
	3	23UCH13CC01	**Core Course - 1:** General Chemistry - 1	5	3	100	100	100
		23UCH13CP01	**Core Practical - 1:** Quantitative Inorganic Estimation (Titrimetry) and Inorganic Preparations	3	3	100	100	100
		23UCH13AC01	**Allied Course - 1:** Mathematics for Chemistry - 1	6	4	100	100	100
	4	23UCH14FC01	**Foundation Course:** Fundamentals of Chemistry	2	1	100	-	100
		23UCH14SE01A	**Skill Enhancement Course - 1: (Non Major Elective):** Food Chemistry	2	1	100	-	100
		23UCH14SE01B	**Skill Enhancement Course - 1: (Non Major Elective):** Role of Chemistry in Daily Life					
		23UHE14VE01	**Value Education - 1:** Essentials of Humanity*	2	1	50	50	50
		23UEN14AE01	**Ability Enhancement Compulsory Course - 1:** Communicative English	(6)	3	100	-	100
			Total	**30**	**22**			
2	1	23UTA21GL02	General Tamil - 2	4	3	100	100	100
		23UFR21GL02	French - 2					
		23UHI21GL02	Hindi - 2					
		23USA21GL02	Sanskrit - 2					
	2	23UEN22GE02	General English - 2	5	3	100	100	100
	3	23UCH23CC02	**Core Course - 2:** General Chemistry - 2	5	4	100	100	100
		23UCH23CP02	**Core Practical - 2:** Qualitative Analysis	6	4	100	100	100
		23UCH23AC02	**Allied Course - 2:** Allied Mathematics for Chemistry - 2	6	4	100	100	100
	4	23UHE24VE02	**Value Education - 2:** Fundamentals of Human Rights*	2	1	50	50	50
		23UHE24AE01	**Ability Enhancement Compulsory Course - 2:** Environmental Studies*	2	1	50	50	50
		-	Extra Credit courses (MOOC / Certificate courses) - 1	-	(3)			
			Total	**30**	**20(3)**			
3	1	23UTA31GL03	General Tamil - 3	4	3	100	100	100
		23UFR31GL03	French - 3					
		23UHI31GL03	Hindi - 3					
		23USA31GL03	Sanskrit - 3					
	2	23UEN32GE03	General English - 3	5	3	100	100	100
	3	23UCH33CC03	**Core Course - 3:** General Chemistry - 3	5	4	100	100	100
		23UCH33CC04	**Core Course - 4:** General Chemistry - 4	5	4	100	100	100
		23UCH33CP03	**Core Practical - 3:** Physical Chemistry - 1	3	2	100	100	100
		23UCH33AO01A	**Allied Optional - 1:** Physics - 1	4	3	100	100	100
		23UCH33AO01B	**Allied Optional - 1:** Principles of Electronics					
		@	**Allied Optional Practical- 1:** Physics	2	-	-	-	-
		@	**Allied Optional Practical - 1:** Electronics					
	4	23UHE34VE03A	**Value Education - 3:** Social Ethics - 1*	2	1	50	50	50
		23UHE34VE03B	**Value Education - 3:** Religious Doctrine - 1*					
		-	Extra Credit courses (MOOC / Certificate courses) - 2	-	(3)			
			Total	**30**	**20(3)**			

4	1	23UTA41GL04C	General Tamil - 4 *வணிகத் தமிழ்* (Business Tamil)	4	3	100	100	100
		23UFR41GL04	French - 4					
		23UHI41GL04	Hindi - 4					
		23USA41GL04	Sanskrit - 4					
	2	23UEN42GE04	General English - 4	5	3	100	100	100
	3	23UCH43CC05	**Core Course - 5:** General Chemistry - 5	5	4	100	100	100
		23UCH43CC06	**Core Course - 6:** General Chemistry - 6	5	4	100	100	100
		23UCH43CP04	**Core Practical - 4:** Physical Chemistry - 2	3	2	100	100	100
		23UCH43AO02A	**Allied Optional - 2:** Physics - 2	4	3	100	100	100
		23UCH43AO02B	**Allied Optional - 2:** Communication Electronics					
		23UCH43OP01A	**Allied Optional Practical- 1:** Physics	2	2	100	100	100
		23UCH43OP01B	**Allied Optional Practical - 1:** Electronics					
	4	23UHE44VE04A	**Value Education - 4:** Social Ethics - 2*	2	1	50	50	50
		23UHE44VE04B	**Value Education - 4:** Religious Doctrine - 2*					
		-	Extra Credit courses (MOOC / Certificate courses) - 3		(3)			
			Total	**30**	**22(3)**			
5	3	23UCH53CC07	**Core Course - 7:** Organic Chemistry - 1	6	5	100	100	100
		23UCH53CP05	**Core Practical -5:** Organic Qualitative Analysis and Determination of Physical Constants	8	5	100	100	100
		23UCH53ES01A	**Discipline Specific Elective - 1:** Inorganic Chemistry - 1	5	3	100	100	100
		23UCH53ES01B	**Discipline Specific Elective - 1:** Inorganic Chemistry - 2					
		23UCH53ES02A	**Discipline Specific Elective - 2:** Physical Chemistry - 1	5	3	100	100	100
		23UCH53ES02B	**Discipline Specific Elective - 2:** Physical Chemistry - 2					
		23UCH53IS01	Internship	-	1	100	-	100
		23UCH53SP01	**Self-paced Learning:** Essentials of Chemistry*	-	2	50	50	50
	4	23UCH54EG01	**Generic Elective - 1:** Health Science	4	2	100	100	100
		23USS54SE01	**Skill Enhancement Course - 2:** Soft Skills	2	1	100	-	100
		-	Extra Credit courses (MOOC / Certificate courses) - 4		(3)			
			Total	**30**	**22(3)**			
6	3	23UCH63CC08	**Core Course - 8:** Organic Chemistry - 2	6	5	100	100	100
		23UCH63CP06	**Core Practical - 6:** Gravimetric Analysis and Organic Preparation	8	5	100	100	100
		23UCH63ES03A	**Discipline Specific Elective - 3:** Inorganic Chemistry - 3	5	3	100	100	100
		23UCH63ES03B	**Discipline Specific Elective - 3:** Inorganic Chemistry - 4					
		23UCH63ES04A	**Discipline Specific Elective - 4:** Physical Chemistry - 3	5	3	100	100	100
		23UCH63ES04B	**Discipline Specific Elective - 4:** Physical Chemistry - 4					
		23UCH63PW01	Project Work and Viva Voce	-	2	100	100	100
		23UCH63CE01	Comprehensive Examination*	-	2	50	50	50
	4	23UCH64EG02	**Generic Elective - 2:** Solid Waste Management	4	2	100	100	100
		23UCH64SE02	**Skill Enhancement Course - 3 (WS):** Instrumental Analysis	2	1	100	-	100
		-	Extra Credit courses (MOOC / Certificate courses) - 5		(3)			
			Total	**30**	**23(3)**			
2 - 6	5	23UCW65OR01	Outreach Programme (SHEPHERD)	-	4			
1 - 6			**Total (3 years)**	**180**	**133**			

*- for grade calculation 50 marks are converted into 100 in the mark statements

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	23UTA11GL01A	General Tamil – 1	5	3

கற்றலின் நோக்கங்கள்
தமிழ்ச் செவ்வியல் இலக்கியங்களையும் காப்பியங்களையும் மாணவர்கள் அறிந்துகொள்ளல்
தமிழர் பேணி வளர்த்த அறம்சார் விழுமியங்களை மாணவர்கள் தம் வாழ்வில் பின்பற்றுதல்
தமிழில் பக்திஇயக்கப் பங்களிப்பையும் பகுத்தறிவுச் சிந்தனை மரபையும் உணர்தல்
மாணவர்கள் தம் எழுத்தாற்றலையும் மொழிப்புலமையையும் வளர்த்தெடுத்தல்
போட்டித்தேர்வுகளை எதிர்கொள்ளும் வகையில் இலக்கணம், இலக்கியம் கற்றல்

அலகு I: தமிழ் இலக்கிய, இலக்கண வரலாறு அறிமுகம் (15 மணி நேரம்)

1. இலக்கணம் :

அ. தொல்காப்பியம், இறையனார் களவியல் உரை , நம்பியகப் பொருள், புறப்பொருள் வெண்பா மாலை, நன்னூல், தண்டியலங்காரம், யாப்பருங்கலக்காரிகை- நூல்கள்

ஆ. மொழிப் பயிற்சி- ஒற்றுப்பிழை தவிர்த்தல்

- வல்லினம் மிகும் இடங்கள்
- வல்லினம் மிகா இடங்கள்
- ஈரொற்று வரும் இடங்கள்
- ஒரு, ஓர் வரும் இடங்கள்
- அது, அஃது வரும் இடங்கள்
- தான், தாம் வரும் இடங்கள்

பயிற்சி : வல்லினம் மிகும் இடங்கள், மிகா இடங்கள் தவறாக வரும்வகையில் ஒரு பத்தி கொடுத்து ஒற்றுப் பிழை திருத்தி எழுதச் செய்தல்.

2. சங்க இலக்கியம் - எட்டுத்தொகை, பத்துப்பாட்டு
3. அற இலக்கியம் - பதினெண்கீழ்கணக்கு நூல்கள்
4. காப்பிய இலக்கியம் - ஐம்பெருங் காப்பியங்கள், ஐஞ்சிறு காப்பியங்கள், சமயக் காப்பியங்கள்
5. பக்தி இலக்கியமும் (பன்னிரு திருமுறைகள், நாலாயிர திவ்வியப் பிரபந்தம் -- பகுத்தறிவு இலக்கியமும் (சித்தர் இலக்கியங்கள், புலவர் குழந்தையின் இராவண காவியம்)

அலகு II: சங்க இலக்கியம் (15 மணி நேரம்)

எட்டுத்தொகை:

6. நற்றிணை-முதல் பாடல் -நின்ற சொல்லர்
7. குறுந்தொகை 3 ஆம் பாடல் -நிலத்தினும் பெரிதே
8. ஐங்குறுநூறு –நெல் பல பொலிக! பொன் பெரிது சிறக்க!' (முதல் பாடல்)-வேட்கைப் பத்து
9. கலித்தொகை- 51 - சுடர்த்தொடீஇக் கேளாய் -குறிஞ்சிக் கலி
10. புறநானூறு -189 தெண்கடல் வளாகம் பொதுமையின்றி, நாடா கொன்றோ -187

பத்துப்பாட்டு:

11. முல்லைப்பாட்டு (முழுவதும்)

அலகு III: அற இலக்கியம் **(15 மணி நேரம்)**

12. திருக்குறள் -அறன் வலியுறுத்தல் அதிகாரம்
13. நாலடியார்-பாடல்: 131 (குஞ்சியழகும்)
14. நான்மணிக்கடிகை-நிலத்துக்கு அணியென்ப
15. பழமொழி நானூறு- தம் நடை நோக்கார்
16. இனியவை நாற்பது- 37. இளமையை மூப்பு என்று

அலகு IV: காப்பிய இலக்கியம் **(15 மணி நேரம்)**

17. சிலப்பதிகாரம் – வழக்குரைகாதை
18. மணிமேகலை- பாத்திரம் பெற்ற காதை
19. பெரியபுராணம் - பூசலார் நாயனார்புராணம்
20. கம்பராமாயணம்- குகப் படலம்
21. சீறாப்புராணம் – மானுக்குப் பிணை நின்ற படலம்
22. இயேசு காவியம் -ஊதாரிப்பிள்ளை

அலகு V: பக்தி இலக்கியமும், பகுத்தறிவு இலக்கியமும் **(15 மணி நேரம்)**

23. பக்தி இலக்கியம்:

- திருநாவுக்கரசர் தேவாரம் - நாமார்க்கும் குடியல்லேம் எனத் தொடங்கும் பாடல் மட்டும்
- மாணிக்கவாசகர் திருவாசகம் - நமச்சிவாய வாஅழ்க நாதன்தாள் வாழ்க முதல் சிரம்குவிவார் ஓங்குவிக்கும் சீரோன் கழல் வெல்க வரை
- பொய்கையாழ்வார்-வையந் தகளியா வார்கடலே
- பூதத்தாழ்வார்-அன்பே தகளியா
- பேயாழ்வார்-திருக்கண்டேன் பொன்மேனி கண்டேன்
- ஆண்டாள் – திருப்பாவை மார்கழித் திங்கள் (முதல் பாடல்)

24. பகுத்தறிவு இலக்கியம் :

- திருமூலர் – திருமந்திரம் (270,271, 274, 275 285)
- பட்டினத்தார் -திருவிடை மருதூர் (காடே திரிந்து – எனத் தொடங்கும் பாடல் பா.எண்.279, 280)
- கடுவெளி சித்தர் - பாபஞ்செய் யாதிரு மனமே (பாடல் முழுவதும்)
- இராவண காவியம் – தாய்மொழிப் படலம் - 18. (ஏடுகை யில்லா ரில்லை முதல் - 22. செந்தமிழ் வளர்த்தார் வரை)

பாடநூல்

பொதுத்தமிழ்-1. (தமிழ் இலக்கிய வரலாறு-1), தமிழாய்வுத்துறை, தூய வளனார் தன்னாட்சிக் கல்லூரி, திருச்சிராப்பள்ளி, 2023

பார்வை நூல்கள்

1. வரதராசன்.மு. (2021) தமிழ் இலக்கிய வரலாறு, சாகித்ய அக்காதெமி.
2. விமலானந்தன். மது. ச. (2019). தமிழ் இலக்கிய வரலாறு, முல்லை நிலையம்.
3. தமிழண்ணல். (2022). புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, பாரி நிலையம்.
4. சிற்பி பாலசுப்பிரமணியன் & சேதுபதி.சொ. (2015). தமிழ் இலக்கிய வரலாறு, கவிதா வெளியீடு.
5. சிற்பி பாலசுப்ரமணியம், & பத்மநாபன். நீல. (2013). புதிய தமிழ் இலக்கிய வரலாறு (3 தொகுதிகள்), சாகித்ய அக்காதெமி.
6. பெருமாள். அ.கா. (2014). தமிழ் இலக்கிய வரலாறு, சுதர்சன் புக்ஸ்.

7. ஏசுதாசன். ப.ச. (2015). தமிழ் இலக்கிய வரலாறு, நியூ செஞ்சுரி புக் ஹவுஸ்.
8. ஸ்ரீகுமார். எஸ். (2014). தமிழ் இலக்கிய வரலாறு, ஸ்ரீசெண்பகா பதிப்பகம்.
9. பாக்கியமேரி எஃப். (2022). வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு, பூவேந்தன் பதிப்பகம்.
10. சுப்புரெட்டியார்.ந., (1980). தமிழ் பயிற்றும் முறை, மணிவாசகர் நூலகம்.

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- https://www.sirukathaigal.com
- https://www.tamilvirtualuniversity.org
- https://www.noolulagam.com
- https://www.katuraitamilblogspot.com

கற்பித்தல் முறை	***விரிவுரை* (Lecture), *காணொளிக் காட்சி* (Videos), *விளக்கக் காட்சி* (PPT presentation)**

Course Outcomes		
CO No.	**CO–Statements** ***இப்பாடத்தின் நிறைவில் மாணவர்கள்***	**Cognitive Levels (K –Levels)**
CO1	சங்க இலக்கியங்கள்வழி பண்டைத்தமிழரின் வாழ்வியலையும் பண்பாட்டையும் அறிந்து கொள்வர்	**K1**
CO2	அற இலக்கியங்கள், காப்பியங்கள் வெளிப்படுத்தும் அறம்சார் விழுமியங்களைத் தம் வாழ்வில் பின்பற்றுவர்	**K2**
CO3	இலக்கணக் கோட்பாடுகளை இக்கால வாழ்வியலோடு பொருத்திப் பார்ப்பர்	**K3**
CO4	மொழியறிவோடு இலக்கியங்களைப் பகுத்தாராயும் திறன் பெறுவர்	**K4**
CO5	பக்தி இயக்கங்களின் செல்வாக்கையும், தமிழரின் பகுத்தறிவு மரபையும் மதிப்பிடுவர்	**K5**

Relationship Matrix											
Semester	**Course code**		**Title of the Paper**						**Hours/Week**		**Credits**
1	**23UTA11GL01A**		**General Tamil – 1**						**5**		**3**
Course Outcomes (COs)	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO–1	**1**	**2**	**3**	**2**	**2**	**3**	**3**	**2**	**2**	**2**	**2.2**
CO–2	**2**	**2**	**3**	**2**	**2**	**2**	**3**	**2**	**3**	**2**	**2.3**
CO–3	**1**	**2**	**2**	**3**	**2**	**2**	**2**	**3**	**3**	**3**	**2.3**
CO–4	**2**	**2**	**3**	**2**	**2**	**3**	**2**	**3**	**3**	**2**	**2.4**
CO–5	**3**	**1**	**2**	**2**	**2**	**2**	**3**	**2**	**3**	**3**	**2.3**
Mean overall Score											**2.3 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	23UFR11GL01	French - 1	5	3

Course Objectives
To identify the basic sentence structure of the French language.
To define and describe the various grammatical tenses and use them to communicate in French.
To examine the documents presented and discuss/reply to the questions asked.
To analyze and interpret expressions used to convey the cause, the effect, the purpose and the opposition in French.
To evaluate the grammatical nature of a given passage.

Unit I **(15 hours)**

1. Salut !
2. Enchanté

Unit II **(15 hours)**

3. J'adore

Unit III **(15 hours)**

4. Tu veux bien ?

Unit IV **(15 hours)**

5. On se voit quand ?

Unit V **(15 hours)**

6. Bonne idée

Teaching Methodology	Videos, Audios, PPT presentation, Role-play, Quiz

Book for Study

Mérieux, R & Loiseau, Y. (2017). *Latitudes* -1- (A1 /A2), méthode de français, Didier, (Units 1-6 only)

Books for Reference

1. Dauda, P, Giachino, L and Baracco, C. (2020). *Generation A1*. Didier, Paris.
2. Girardet, J and Pecheur, J. (2017). *Echo A1* (2nd ed.). CLE International.
3. Fournier, I. (2011). *Talk French*. Goyal Publishers.

Websites and eLearning Sources

1. https://www.wikihow.com/Pronounce-the-Letters-of-the-French-Alphabet
2. https://francais.lingolia.com/en/grammar/tenses/le-present
3. https://www.lawlessfrench.com/grammar/articles/
4. https://www.frenchpod101.com/french-vocabulary-lists/10-lines-you-need-for-introducing- yourself
5. https://www.tolearnfrench.com/exercises/exercise-french-2/exercise-french-3295.php

Course Outcomes		
CO No.	**CO–Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K –Levels)**
CO1	recall the usage of grammatical tenses during conversations.	**K1**
CO2	apply the grammar rules in practice exercises	**K3**
CO3	explain the nuances in the usage of various grammatical tenses and their aspects	**K2**
CO4	demonstrate knowledge of various expressions used to express opinions, emotions, cause, effect, purpose and hypothesis in French	**K4**
CO5	communicate in French and summarize a given text	**K5**

Relationship Matrix											
Semester	**Course code**	**Title of the Course**								**Hours**	**Credits**
1	**21UFR11GL01**	**French - 1**								**5**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	1	3	1	3	3	2	3	2	2.4
CO2	2	3	3	2	1	3	3	3	3	2	2.5
CO3	1	3	2	1	2	2	2	2	3	2	2.0
CO4	3	3	3	3	3	3	3	2	3	2	2.8
CO5	3	3	3	3	2	3	3	3	3	2	2.8
Mean overall Score											**2.5 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	23UHI11GL01	Hindi - 1	5	3

Course Objectives
To understand the basics of the Hindi Language.
To make the students familiar with the Hindi words.
To enable the students to develop their effective communicative skills in Hindi.
To introduce the socially relevant subjects in Modern Hindu Literature.
To empower the students with globally employable soft skills.

Unit I: Buniyadi Hindi **(15 Hours)**

1. Swar
2. Vyanjan
3. Barah Khadi
4. Shabd aur
5. Vakya Rachna

Unit II: Hindi Shabdavali **(15 Hours)**

6. Rishto ke Naam
7. Gharelu padartho ke Naam

Unit III: Vyakaran **(15 Hours)**

8. Sadharan Vakya aur Sangya
9. Sarvanam
10. Visheshan
11. Kriya aadi shabdo ka prayog

Unit IV: Chote Gadyansh ka pattan **(15 Hours)**

12. Bachom ki Kahaniyam
13. Patra-Patrikao mein Prakashit Gadyansho ka Pattan

Unit V: Nibandh **(15 Hours)**

14. Sant Tiruvalluvar
15. E.V.R Thandai Periyar
16. Naari Sashakthikaran
17. Paryavaran Sanrakshan
18. Vibhinna pratiyogi parikshao ke bare mein jaankari dena
19. Pratiyogi priksha par adharit nibandho dwara bhasha ki kshamta badhane vale prashikshan kary.

Teaching Methodology	Videos, PPT, Quiz, Group Discussion, Project Work.

Books for Study

1. *Prathamic Patya Pusthak* (2022). Dakshina Bharath Hindi Prachara Sabha, Chennai,
2.Chandran, R.M. (2017). *Concise Trilingual Dictionary,* Lotus Publications, Madurai.
3. Gupth, K.M. (2020). *Hindi Vyakaran*, Anand Prakashan, Kolkatta.
4. *Madyama Patya Pusthak* (2022). Dakshina Bharath Hindi Prachara Sabha, Chennai.

Books for Reference

1. Abdul Kalam, A.P.J. (2020). *Mere sapnom ka Bharath*. Prabath Prakashan, Noida.
2. *Meri Pratham Hindi Sulekh Shabd Gyaan*, Wonder House Books, Noida.
3. Kumar, A. (2019). *Sampoorna Hindi Vyakaran our Rachana*. Lucent publisher.
4. *Adhunik Hindi Vyakaran our Rachana.* (2018). Bharati Bhavan Publishers & distributors.
5. Shukla, A.R. (2021). *Hindi Sahitya Ka Itihas.*. Prabhat Prakashan.

Websites and e-Learning Sources

1. https://learningmole.com/hindi-alphabet-letters-pronunciation-guide/
2. https://www.careerpower.in/hindi-alphabet-varnamala.html
3. https://www.youtube.com/watch?v=b0UvXnIC8qc
4. https://www.importanceoflanguages.com/learn-hindi-language-guide/
5. https://parikshapoint.com/hindi-sahitya/

Course Outcomes		
CO No.	**CO-Statements**	**Cognitive Levels (K - Level)**
	On successful completion of this course, students will be able to	
CO1	match the sounds of Hindi letters with their written counterparts.	**K1**
CO2	infer the meaning of unknown words from the given context	**K2**
CO3	construct sentences in Hindi	**K3**
CO4	analyse stories and other passages	**K4**
CO5	interpret general essays given in competitive exams	**K5**

Relationship Matrix											
Semester	**Course code**	**Title of the Course**								**Hours**	**Credits**
1	**23UHI11GL01**	**Hindi - 1**								**5**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	2	1	3	3	3	1	3	2	**2.3**
CO2	2	3	2	3	1	2	3	3	3	2	**2.4**
CO3	3	2	2	2	1	3	2	3	2	3	**2.3**
CO4	3	1	2	3	2	3	2	3	3	2	**2.4**
CO5	2	3	3	2	3	2	3	3	1	3	**2.5**
Mean overall Score											**2.38 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	23USA11GL01	Sanskrit- 1	5	3

Course Objectives
To help students learn the Sanskrit alphabet.
To understand Sanskrit grammar and *sabdas*.
To have an idea of the epics.
To closely understand the literary works in Sanskrit with special reference to *Pancamahakavyas*.
To understand the *Raghuvasa Mahakava* and *Kalidasa*.

Unit I: Introduction to Sanskrit **(15 Hours)**
(Alphabet, Two letter words and three letter words) Grammar
akārāntaḥpuṁliṅgaḥśabda-s - 1. बाल (*Bāla*) and
2. देव (*Deva*) *ākārāntaḥstrīliṅgaḥśabda-s* - 1. बाला (*Bālā*) and
2. लता (*Latā*) *akārāntaḥnapuṁsakaliṅgaḥśabda-s* - 1. फल (*Phala*) and 2. वन (*Vana*)

Unit II: Introduction to *Rāmāyana, Kālidāsa* and his poetic works **(15 Hours)**
Raghuvaṁśa (Canto I) Verses 1-15

Unit III: Introduction to the Works of *Bhāravi* **(15 Hours)**
Raghuvaṁśa (canto I) Verses 16-30

Unit IV: Introduction to the works of *ŚrīHarṣha* **(15 Hours)**
Raghuvaṁśa (Canto I) Verses 31-45

Unit V: Grammar **(15 Hours)**
Conjugations -*Laṭlakāra-s* – (Present tense)
(i) गच्छतत (*Gacchati*)
(ii) ततष्ठतत (*Tiṣṭhati*)
(iii) पठतत (*Paṭhati*)
(iv) नृत्यतत (*Nṛtyati*)
(v) कुप्यतत (*Kupyati*)
(vi) कथयतत (*Kathayati*) गणयतत (*Gaṇayati*)
(viii) अततत (*Asti*)
(ix) करोतत (*Karoti*)
(x) शृणोतत (*Śṛṇoti*) Indeclinables (Avyayaani) - अतप (*api*), कदा (*kadā*), च (*ca*), अद्य (*adya*), तवना (*vinā*),सह (*saha*),तत्र (*tatra*), ककमे (*kim*), यकद (*yadi*) - तर्हि (*tarhi*), यथा

(*yathā*) - तथा (*tathā*) Prefixes (*Upasargas*) - आङ् (*āṅ*), तव (*vi*), परर (*pari*), अनु (*anu*), अित (*adhi*), उत् (*ut*), प्रतत (*prati*), उप (*upa*), प्र (*pra*) तनर् (*nir*)

Teaching Methodology	Videos, PPT, demonstration.

Book for Study

Murugan, C., et al. (eds.). (2022) *Kalasala-Samskrta-Sukhabodhini-I* (For Undergraduate Foundation Course).University of Madras.

Book for Reference

Vadhyar, R. S. (2017). *Sabdha Manthari.* Vadhyar & Sons.

Websites and e-Learning Sources

1. https://www.arlingtoncenter.org/Sanskrit%20Alphabet.pdf
2. https://courses.lumenlearning.com/suny-hccc-worldcivilization/chapter/sanskrit/
3. https://www.newworldencyclopedia.org/entry/Sanskrit_literature
4. https://archive.org/details/AShortHistoryOfsanskritLiterarure
5. https://archive.org/details/raghuvamsha_with_sanjivini_edited_by_mr_kale

Course Outcomes		
CO No.	**CO-Statements**	**Cognitive Levels (K - Level)**
	On successful completion of this course, students will be able to	
CO1	remember the usage of grammatical tenses in constructing sentences in dialogue.	**K1**
CO2	apply the rules of usage in practice exercises and spot the errors	**K2**
CO3	explain the nuances in the usage of various grammatical tenses and aspects	**K3**
CO4	demonstrate knowledge of various expressions of opinion, emotions, cause, effect, purpose, and hypothesis in Sanskrit	**K4**
CO5	communicate in Sanskrit and summarize a given text	**K5**

Relationship Matrix											
Semester	**Course code**		**Title of the Course**							**Hours**	**Credits**
1	**23USA11GL01**		**Sanskrit - 1**							**5**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	1	3	2	3	1	3	2	3	2	2	**2.2**
CO2	2	3	2	3	1	2	2	3	2	3	**2.3**
CO3	3	2	2	2	2	2	3	2	3	2	**2.3**
CO4	3	2	3	2	2	3	3	2	3	2	**2.3**
CO5	3	2	3	3	2	2	3	2	3	3	**2.6**
Mean overall Score											**2.38 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	**23UEN12GE01**	General English - 1	**5**	**3**

Course Objectives
To enable learners to acquire self awareness and positive thinking required in various life situations
To help them acquire the attribute of empathy
To assist them in acquiring creative and critical thinking abilities
To enable them to learn the basic grammar
To assist them in developing LSRW skills

UNIT I: Self-awareness ELF-A (WHO) & Positive Thinking (UNICEF) (15 Hours)

Life Story

1. Chapter 1 from Malala Yousafzai, I am Malala
2. An Autobiography or The Story of My Experiments with Truth (Chapters 1, 2 & 3) M.K. Gandhi

Poem

3. Where the Mind is Without Fear – Gitanjali 35 – Rabindranath Tagore
4. Love Cycle – Chinua Achebe

UNIT II: Empathy (15 Hours)

Poem

5. Nine Gold Medals – David Roth
6. Alice Fell or poverty – William Wordsworth

Short Story

7. The School for Sympathy – E.V. Lucas
8. Barn Burning – William Faulkner

UNIT III: Parts of Speech (15 Hours)

9. Articles
10. Noun
11. Pronoun
12. Verb
13. Adverb
14. Adjective
15. Preposition

UNIT IV: Critical & Creative Thinking. (15 Hours)

Poem

16. The Things That Haven't Been Done Before – Edgar Guest
17. Stopping by the Woods on a Snowy Evening – Robert Frost

Readers Theatre

18. The Magic Brocade – A Tale of China

19. Stories on Stage – Aaron Shepard (Three Sideway Stories from Wayside School" by Louis Sachar)

Unit V: Paragraph and Essay Writing (15 Hours)

20. Descriptive
21. Expository
22. Persuasive
23. Narrative
24. Reading Comprehension

Teaching Methodology	Interactive methods, and multimedia presentations

Books for Study

1. Yousafzai, M. (2013). *I am Malala, Little.* Brown and Company.
2. Gandhi, M. K. (2011). *An Autobiography or The Story of My Experiments with Truth (Chapter – I).* Rupa Publications.
3. Tagore, R. (1913). *"Gitanjali 35" from Gitanjali (Song Offerings): A Collection of Prose Translations Made by the Author from the Original Bengali.* MacMillan.
4. Shepard, A. (2017). *Stories on Stage.* Shepard Publications.

Books for Reference

1. Krishnasamy. N. (1975). *Modern English: A Book of Grammar, Usage and Composition.* Macmillan.
2. Nesfield, J. C. (2019). *English Grammar Composition and Usage.* Macmillan.

Web Reources

1. https://archive.org/details/i-am-malala
2. https://www.indiastudychannel.com/resources/146521- Book-Review-An-Autobiography-or-The-story-of-my-experiments-with-Truth.aspx
3. https://www.poetryfoundation.org/poems/45668/gitanjali-35
4. https://amzn.eu/d/9rVzlNv
5. https://archive.org/details/in.ernet.dli.2015.44179

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Levels)**
CO1	discover self awareness and positive thinking required in various life situations	**K1**
CO2	classify the attributes of empathy	**K2**
CO3	apply creative and critical thinking skills	**K3**
CO4	focus on grammar for functional purposes	**K4**
CO5	integrate the LSRW skills for effective communication	**K5**

Relationship Matrix											
Semester	**Course code**		**Title of the Course**							**Hours**	**Credits**
1	**23UEN12GE01**		General English - 1							**5**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
CO2	**2**	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**2.5**
CO3	**3**	**3**	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**2**	**2.8**
CO4	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
CO5	**3**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2.8**
Mean overall Score											**2.82 (High)**

Semester	Course code	Title of the Course	Hours/Week	Credits
1	23UCH13CC01	**Core Course -1**: General Chemistry-I	5	5

Course Objectives
To understand the various atomic models and atomic structure
To know about the wave particle duality of matter
To discuss periodic table, periodicity in properties and its application in explaining the chemical behaviour
To highlight nature of chemical bonding
To familiarize about fundamental concepts of organic chemistry

UNIT I: Atomic Structure and Periodic Trends (15 hours)

History of atom (J.J. Thomson, Rutherford); Moseley's Experiment and Atomic number, Atomic Spectra; Black-Body Radiation and Planck's quantum theory - Bohr's model of atom; The Franck-Hertz Experiment; Interpretation of H- spectrum; Photoelectric effect, Compton effect; Dual nature of Matter - De-Broglie wavelength - Davisson and Germer experiment- Heisenberg's Uncertainty Principle; Electronic Configuration of Atoms and ions - Hund's rule, Pauli's exclusion principle and Aufbau principle. Numerical problems involving the core concepts.

UNIT II: Introduction to Quantum Mechanics (15 Hours)

Classical mechanics, Wave mechanical model of atom, distinction between Bohr orbit and orbital; Postulates of quantum mechanics; probability interpretation of wave functions, Formulation of Schrodinger wave equation - Probability and electron density - visualizing the orbitals - Probability density and significance of Ψ and Ψ_2. Modern Periodic Table: Cause of periodicity; Features of the periodic table; classification of elements - Periodic trends for atomic size - Atomic radii, Ionic, crystal and Covalent radii; ionization energy, electron affinity, electronegativity - electronegativity scales, applications of electronegativity. Problems involving the core concepts.

UNIT III: Structure and Bonding - I (15 Hours)

Ionic bond: Lewis dot structure of ionic compounds; properties of ionic compounds; Energy involved in ionic compounds; Born Haber cycle – lattice energies, Madelung constant; relative effect of lattice energy and solvation energy; Ion polarisation – polarising power and polarizability; Fajans' rules - effects of polarisation on properties of compounds; problems involving the core concepts. Covalent bond: Shapes of orbitals - overlap of orbitals – σ and Π bonds; directed valency - hybridization; VSEPR theory - shapes of molecules of the type AB_2, AB_3, AB_4, AB_5, AB_6 and AB_7. Partial ionic character of covalent bond - dipole moment, application to molecules of the type A_2, AB, AB_2, AB_3, AB_4; percentage ionic character - numerical problems based on calculation of percentage ionic character.

UNIT IV: Structure and Bonding – II (15 Hours)

VB theory – application to hydrogen molecule; concept of resonance - resonance structures of some inorganic species – CO_2, NO_2, CO_3^{2-}, NO_3- ; limitations of VBT; MO theory -

bonding, antibonding and nonbonding orbitals, bond order; MO diagrams of H_2, C_2, O_2, O_2^+, O_2^-, O_2^{2-}, N_2, NO, HF, CO; magnetic characteristics, comparison of VB and MO theories. Coordinate bond: Definition, Formation of BF_3, NH_3, NH_4^+, H_3O^+ 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. Repulsive forces; Hydrogen bonding – Types, special properties of water, ice, stability of DNA; Effects of chemical force, melting and boiling points.

UNIT V: Basic Concepts In Organic Chemistry And Electronic Effects (15 Hour)
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 nitrynes. Inductive effect - reactivity of alkyl halides, acidity of halo acids, basicity of amines; inductomeric and electromeric effects. Resonance – resonance energy, conditions for resonance - acidity of phenols, basicity of aromatic amines, stability of carbonium ions, carbanions and free radicals, reactivity of vinyl chloride, dipole moment of vinyl chloride and nitrobenzene, bond lengths; steric inhibition to resonance. Hyperconjugation - stability of alkenes, bond length, orienting effect of methyl group, dipole moment of aldehydes and nitromethane. Types of organic reactions – addition, substitution, elimination and rearrangements.

Teaching Methodology	Interactive videos, PPT, demonstration and creation of models

Books for Study

1. Madan, R. D. & Prakash, S. (2003). *Modern inorganic chemistry* (2nd ed.). S.Chand & Company.
2. Rao, C.N. R. (2000). *University General Chemistry*. Macmillan Publication.
3. Puri, B. R. & Sharma, L. R. (2002). *Principles of physical chemistry (*38th ed.) Vishal Publishing Company.
4. Bruce, P. Y. & Prasad, K. J. R. (2008). *Essential organic chemistry*. Pearson Education.
5. Dash, U. N., Dharmarha, O. P.,& Soni P. L. (2016). *Textbook of physical chemistry*. Sultan Chand & Sons.
6. Lee, J. D. (1991). *Concise inorganic chemistry,* (4th ed.). ELBS WilliamHeinemann.
7. Atkins, P.W. & Paula, J. (2014). *Physical chemistry* (10th ed.). Oxford University Press.

Books for Reference

1. Maron, S. H. & Prutton C. P. (1972). *Principles of physical chemistry* (4th ed.). The Macmillan Company.
2. Raj, G. (2001). *Advanced inorganic chemistry* (26th ed.). Goel Publishing House.
3. Huheey, J. E. (1993). *Inorganic chemistry: Principles of structure and reactivity* (4th ed.). Addison-Wesley Publishing Company.

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	Explain the atomic structure, wave particle duality of matter, periodic properties bonding, and properties of compounds.	**K1**
CO2	Classify the elements in the periodic table, types of bonds, reaction intermediates electronic effects in organic compounds, types of reagents.	**K2**
CO3	Apply the theories of atomic structure, bonding, to calculate energy of a spectral transition, Δx, Δp electronegativity, percentage ionic character and bond order.	**K3**
CO4	Evaluate the relationship existing between electronic configuration, bonding, geometry of molecules and reactions; structure reactivity and electronic effects	**K4**
CO5	Construct MO diagrams, predict trends in periodic properties, assess the properties of elements, and explain hybridization in molecules, nature of H – bonding and organic reaction mechanisms.	**K5**

Relationship Matrix											
Semester	**Course code**	**Title of the Course**								**Hours**	**Credits**
1	23UCH13CC01	**Core Course -1**:General Chemistry-I								5	5
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	**3**	**2**	**2**	**2**	**2**	**2**	**2**	**3**	**2**	**1**	**2.1**
CO2	**2**	**2**	**2**	**3**	**2**	**3**	**2**	**2**	**2**	**3**	**2.3**
CO3	**3**	**3**	**3**	**2**	**2**	**3**	**3**	**3**	**2**	**3**	**2.7**
CO4	**2**	**2**	**2**	**2**	**2**	**2**	**3**	**3**	**2**	**2**	**2.2**
CO5	**3**	**3**	**3**	**2**	**2**	**3**	**2**	**3**	**2**	**2**	**2.5**
Mean overall Score											**2.3 (High)**

Semester	Course code	Title of the Course	Hours/Week	Credits
1	23UCH13CP01	**Core Practical -1:** Quantitative Inorganic Estimation (Titrimetry) and Inorganic Preparations	3	3

Course Objectives
To learn laboratory safety
To learn to handle glassware in chemistry laboratory
To know the principles behind the quantitative estimation of inorganic compounds
To analyze active ingredients in some pharmaceutical formulations like iron content in iron tablets.
To know the preparative methods of simple inorganic compounds

UNIT I: Chemical Laboratory Safety in Academic Institutions

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

Common Apparatus Used in Quantitative Estimation (Volumetric)

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

Principle of Quantitative Estimation (Volumetric)

Equivalent weight of an acid, base, salt, 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: Quantitative Estimation (Volumetric)

- Preparation of standard solution, dilution from stock solution Permanganometry
- Estimation of sodium oxalate using standard ferrous ammonium sulphate Dichrometry
- Estimation of ferric alum using standard dichromate (external indicator)
- Estimation of ferric alum using standard dichromate (internal indicator) Iodometry
- Estimation of copper in copper sulphate using standard dichromate Argentimetry
- Estimation of chloride in barium chloride using standard sodium chloride/Estimation of chloride in sodium chloride (Volhard's method)

UNIT III: Complexometry

- Estimation of hardness of water using EDTA
- Estimations
- Estimation of iron in iron tablets
- Estimation of ascorbic acid.
- Preparation of Inorganic compounds

- Potash alum
- Tetraammine copper (II) sulphate
- Hexamminecobalt (III) chloride
- Mohr's Salt

Books for Study

1. Venkateswaran, V., Veeraswamy, R., & Kulandivelu, A.R. (1997). *Basic principles of practical chemistry* (2nd ed.). Sultan Chand & Sons.
2. Nad, A. K., Mahapatra, B.,& Ghoshal, A. (2007). *An advanced course in practical chemistry* (3rd ed.). New Central Book Agency.

Books for Reference

1. Mendham, J.& et al.(2000). *Textbook of quantitative chemical analysis* (6^{th} ed.). Pearson Education Ltd.

Web Source

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

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	To recall the basic principles of laboratory safety	**K1**
CO2	To know the handling of chemicals and glassware in the laboraory.	**K2**
CO3	To know the terms and principles in volumetric estimations.	**K3**
CO4	To develop strategies to analyze inorganic compounds.	**K4**
CO5	To know the basics, methodology and procedure of simple inorganic compounds.	**K5**

Relationship Matrix											
Semester	**Course code**	**Title of the Course**								**Hours**	**Credits**
1	23UCH13CP01	**Core Practical -1:**Quantitative Inorganic Estimation (Titrimetry) and Inorganic Preparations								3	3
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	**3**	**2**	**3**	**2**	**2**	**3**	**1**	**2**	**2**	**2**	**2.2**
CO2	**3**	**3**	**2**	**2**	**2**	**2**	**3**	**2**	**2**	**3**	**2.4**
CO3	**2**	**2**	**3**	**3**	**2**	**2**	**3**	**2**	**2**	**2**	**2.3**
CO4	**3**	**2**	**2**	**3**	**2**	**2**	**1**	**3**	**2**	**2**	**2.2**
CO5	**3**	**1**	**2**	**3**	**2**	**1**	**2**	**2**	**3**	**3**	**2.2**
Mean overall Score											**2.26 (High)**

Semester	Course code	Title of the Course	Hours/Week	Credits
1	23UMA13AC01B	**Allied Course 1:** Mathematics for Chemistry 1	6	5

Course Objectives
Training the students in mastering the techniques of various branches of Mathematics
Motivating the students to apply the techniques in their respective major subjects
Introducing the basic knowledge of differentiation
Understanding the concept of matrices and its applications
Solving the problems in trigonometry and in Series summations

UNIT I **(18 Hours)**

Partial fractions – Binomial series – Summation of series – Finding terms – Coefficient of x^n.

UNIT II **(18 Hours)**

Exponential series – Summation – Logarithmic series – Summation.

UNIT III **(18 Hours)**

Matrices – Rank of a matrix – Solving simultaneous linear equation in three unknowns using Elementary Operations method – Eigen values and Eigen vectors – Verification of Cayley Hamilton theorem.

UNIT IV **(18 Hours)**

Expansion of cos $n\theta$ and sin $n\theta$ – Powers of sines and cosines of θ in terms of functions of multiples of θ -Expansion of sinθ and cosθ in a series of ascending powers of θ.

UNIT V **(18 Hours)**

Higher Derivatives – Formation of equations involving derivatives – Applications of Leibnitz's theorem.

Teaching Methodology	Chalk and Talk method, PPT

Book for Study

1. Narayanan, S., Rao, S. H. & Pillay, T. K. M. (2009). *Ancillary mathematics vol.-I.* Viswanathan, S., Printers & Publishers Pvt Ltd.

Unit I: Chapter 1, Sections 1.1 – 1.2 *(Page No: 1 – 27)*

Unit II: Chapter 1, Sections 1.3 – 1.4 *(Page No: 28 – 53)*

Unit III: Chapter 3, Sections 3.2 – 3.4 *(Page No: 137 – 160)*

Unit IV: Chapter 5, Sections 5.1 – 5.3 *(Page No: 220 – 242)*

Unit V: Chapter 6, Section 6.1 *(Page No: 266 – 281)*

Books for Reference

1. Pillay, T. K. M., Natarajan, T. & Ganapathy, K. S. (2013). *Algebra vol - I*. Viswanathan, S., Printers & Publishers Pvt Ltd.
2. Narayanan, S. & Pillay, T. K. M. (2013). *Calculus vol - I*. Viswanathan, S., Printers & Publishers Pvt Ltd.
3. Narayanan, S. & Pillay, T. K. M. (2013). *Trigonometry*. Viswanathan, S., Printers & Publishers Pvt Ltd.

Course Outcomes		
CO No.	**CO-Statements**	**Cognitive Levels**
	On successful completion of this course, students will be able to	**(K - Level)**
CO1	acquire knowledge of basics of mathematics like series, matrices, trigonometry and differential calculus.	**K1**
CO2	understand the process of finding the sum of the series, eigen values and eigen vectors, higher derivatives of a function and trigonometric expansions.	**K2**
CO3	apply the binomial theorem, Cayley Hamilton Theorem, trigonometric expressions, higher derivatives of functions in working out problems they encounter in chemistry.	**K3**
CO4	analyse the importance of mathematical concepts in giving solution to chemistry based real time problems.	**K4**
CO5	evaluate eigen values, eigen vectors, summation of series in solving problems on chemistry.	**K5**

Relationship Matrix

Semester	**Course code**			**Title of the Course**					**Hours**	**Credits**
1	**23UMA13AC01B**			**Allied Course 1:** Mathematics for Chemistry 1					**6**	**5**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**				**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	**3**	**3**	**2**	**3**	**1**	**2**	**3**	**2**	**3**	**1**	**2.3**
CO2	**3**	**3**	**1**	**2**	**2**	**3**	**3**	**2**	**2**	**2**	**2.3**
CO3	**2**	**3**	**2**	**2**	**2**	**3**	**2**	**2**	**2**	**2**	**2.2**
CO4	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**2**	**3**	**2**	**2.1**
CO5	**3**	**2**	**2**	**1**	**2**	**3**	**2**	**2**	**3**	**2**	**2.2**
Mean overall Score											**2.22 (High)**

Semester	Course code	Title of the Course	Hours/Week	Credits
1	23UCH14FC01	**Foundation Course:** Fundamentals of Chemistry	2	2

Course Objectives
To understand the basic concentration terms in volumetric analysis
To practice using the chemicals in laboratory
To understand the significance of modern periodic table.
To analyse different methods of volumetric techniques
To understand the structure of organic compounds on the basis of hybridization

UNIT I: Concentration Terms **(6 Hours)**

International system of units, The distinction between mass and weight, The Mole, Calculating amount of substances in moles, and molecular weight calculations, Molar volume, oxidation number, Concentration of solutions- molality, molarity, normality, mole fraction and parts per million, parts per billion.

UNIT II: Chemicals and Apparatus Using in Laboratory **(6 Hours)**

Selecting and handling reagents and other chemicals, classifying chemicals, reagent grade, primary standard grade and special purpose reagent grade. Rules for handling reagents and soluions, cleaning and making of laboratory ware. Measuring mass using electronic analytical balance. Desiccators and Desicants. Apparatus for precisely measuring volume pipet, buret and volumetric flask.

UNIT III: Periodic Table **(6 Hours)**

Significance of the modern periodic table (IYPT 2019), Using interactive periodic table (rsc.org/periodic-table), format of the modern periodic table. grouping of elements as metals, non-metals and metalloids. Atomic number, mass number, atomic weight, isotopes, writing electronic configuration of elements, valency and variable valency, calculation of oxidation state of inorganic compounds.

UNIT IV: Volumetric Analysis **(6 Hours)**

Principles of Titrations, Theory of Indicators, Types of Titrations – Acidimetry, Alkalimetry, Permanganometry, Dichrometry, Iodometry, Argentometry, Complexometry. Error analysis: Accuracy, Precision, Error: Types of Errors.

UNIT V: Basics of Organic Chemistry **(6 Hours)**

Ionic, covalent, and polar bonds, dipole moment, Lewis structures, atomic orbitals, an introduction to molecular orbital theory, hybridization concept (Example, methane, ethane, ethylene and acetylene), Electrophile, nucleophile

Teaching Methodology	Interactive videos, PPT, demonstration and creation of models

Books for Study

1. Skoog. D. A., West, D. M., Holler, J. and Crouch, S. R. (2014). *Fundamentals of analytical chemistry* (9th ed.). Brooks/Cole-Cengage Learning, Belmont.
2. Lee, J. D. (1991). *Concise inorganic chemistry* (4th ed.). ELBS William Heinemann,
3. Morrison R. T, Boyd R. N. (1987). *Organic chemistry* (4th ed.). Prentice-Hall of India, Pvt, Ltd.
4. Bruice. P. Y. (2007). *Organic chemistry* (4th ed.). Pearson Education, Inc.

Books for Reference

1. Maron, S. H.,& Prutton C. P. (1972). *Principles of physical chemistry* (4th ed.). The Macmillan Company.
2. Lee, J. D. (1991). *Concise inorganic chemistry* (4th ed). ELBS William Heinemann.
3. Raj, G. (2001). *Advanced inorganic chemistry* (26th ed.). Goel Publishing House.
4. Huheey, J. E. (1993*). Inorganic chemistry: Principles of structure and reactivity* (4th ed.). Addison-Wesley Publishing Company.

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Web Source

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/

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	Recall the basics of laboratory operations	**K1**
CO2	Remember the basic concentration terms in volumetric analysis	**K2**
CO3	Identify the properties of elements in the periodic table	**K3**

Relationship Matrix											
Semester	**Course code**		**Title of the Course**							**Hours**	**Credits**
1	23UCH14FC01		**Foundation Course:** Fundamentals of Chemistry							2	2
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	**2**	**3**	**2**	**2**	**2**	**3**	**3**	**2**	**2**	**2**	**2.1**
CO2	**3**	**3**	**3**	**2**	**2**	**3**	**2**	**3**	**2**	**2**	**2.3**
CO3	**2**	**2**	**2**	**2**	**2**	**2**	**3**	**2**	**2**	**2**	**2.5**
										Mean overall Score	**2.3 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	23UCH14SE01A	**Skill Enhancement Course - 1(Non Major Elective):** Food Chemistry	2	2

Course Objectives
To know the types of food
To analyze and detect the food for adulteration
To acquire the knowledge about food poisoning
To discuss the chemistry of food additives
To know about the chemistry of food preservatives, Beverages and Edible oils

UNIT I: Food Adulteration **(6 Hours)**

Sources of food, types, advantages and disadvantages. Food adulteration - contamination of wheat, rice, milk, butter etc. with clay stones, water and toxic chemicals-Common adulterants, Ghee adulterants.

UNIT II: Food Poison **(6 Hours)**

Food poisons - natural poisons (alkaloids - nephrotoxin) - pesticides, (DDT, BHC, Malathion) -Chemical poisons - First aid for poison consumed victims.

UNIT III: Food Additives **(6 Hours)**

Food additives -artificial sweeteners – Saccharin - Cyclomate and Aspartate Food flavours esters, aldehydes and heterocyclic compounds – Food colours – Emulsifying agents – preservatives -leavening agents. Baking powder –yeast – tastemakers – MSG - vinegar.

UNIT IV: Beverages **(6 Hours)**

Beverages-soft drinks – soda-fruit juices-alcoholic beverages-examples. Carbonation-addiction to alcohol– diseases of liver and social problems.

UNIT V: EDIBLE OILS **(6 Hours)**

Fats and oils - Sources of oils - production of refined vegetable oils - preservation. Saturated and unsaturated fats - iodine value - role of MUFA and PUFA in preventing heart diseases

Books for Study

1. Chopra, H. K., Panesar, P. S. (2010). *Food chemistry*. Narosa Publishing House.
2. Subbulakshmi, G., Udipi, S. A., & Ghugre, P S. (2021). *Food processing and preservation* (2nd ed.). New Age International Publishers.
3. Cheung, P. C.K. &. Mehta B. M. (2015). *Handbook of Food Chemistry*, Springer.
4. Velisek, J. (2014). *The chemistry of food*. Wiley Blackwell.
5. Swaminathan, M. (1979). *Food science and experimental foods*. Ganesh and Company.
6. Hasenhuettl, G. L. & Hartel, R. W. (2008) *Food emulsifiers and their applications* (2nd ed.). Springer.

Books for Reference

1. Ghosh, J. (2006). *Fundamental concepts of applied chemistry* (2nd ed.). S.Chand &Co. Publishers.
2. Hasenhuettl, G. L. & Hartel, R. W. (2008). *Food emulsifiers and their applications* (2nd ed.). Springer.
3. Belitz, H. D. & Grosch, W. (2009). *Food chemistry* (4th ed.). Springer Science & Business Media.
4. Swaminathan, M. (1979). *Food Science and experimental foods*. Ganesh and Company.

Web resources:

1. https://vikaspedia.in/health/health-campaigns/beware-of-adulteration/methods-for-detection-of-common-adulterants-in-food
2. https://fssai.gov.in/dart/
3. http://ecoursesonline.iasri.res.in/mod/page/view.php?id=111840

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	Apply the iodine value in MUFA and PUFA in prevention of heart disease.	**K3**
CO2	Comprehend the concepts of food additives	**K4**
CO3	Acquire the knowledge of the adulteration in food	**K5**

Relationship Matrix											
Semester	**Course code**	**Title of the Course**								**Hours**	**Credits**
1	23UCH14SE01A	**Skill Enhancement Course - 1(Non Major Elective):** Food Chemistry								**2**	**2**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO3	**1**	**3**	**1**	**1**	**3**	**2**	**2**	**3**	**3**	**1**	**2**
CO4	**1**	**3**	**1**	**3**	**2**	**2**	**3**	**2**	**1**	**2**	**2**
CO5	**2**	**1**	**3**	**3**	**2**	**2**	**3**	**2**	**2**	**3**	**2.3**
Mean overall Score											**2.2 (High)**

Semester	Course code	Title of the Course	Hours/ Week	Credits
1	23UCH14SE01B	**Skill Enhancement Course – 1(Non Major Elective):** Role of Chemistry in Daily Life	2	2

Course Objectives
To understand the importance of Chemistry in everyday life
To compare electrodes between current density and over potential.
To discuss the chemistry of building materials
To highlight the different types of fertilizers and their applications
To know the biological functions of drugs and pharmaceuticals

UNIT I: Chemistry of Air and Water (6 Hours)

General survey of chemicals used in everyday life. Air - components and their importance; photosynthetic reaction, air pollution, green - house effect and the impact on our life style. Water - Sources of water, qualities of potable water, soft and hard water, methods of removal of hardness-water pollution

UNIT II: Cement, Ceramics and Plastics (6 Hours)

Building materials - cement, ceramics, glass and refractories - definition, composition and application only. Plastics - polythene, PVC, bakelite, polyesters, melamine-formaldehyde resins -preparation and uses only.

UNIT III: Food and Cosmetics (6 Hours)

Food and Nutrition - Carbohydrates, Proteins, Fats - definition and their importance as food constituents – balanced diet – Calories minerals and vitamins (sources and their physiological importance). Cosmetics – tooth paste, face powder, soaps and detergents, shampoos, nail polish, perfumes - general formulation and preparations - possible hazards of cosmetic use.

UNIT IV: Fertilizers and Fuels (6 Hours)

Chemicals in food production – fertilizers - need, natural sources; urea, NPK fertilizers and super phosphate. Fuel – classification - solid, liquid and gaseous; nuclear fuel examples and uses.

UNIT V: Drugs, Pigments and Explosives (6 Hours)

Pharmaceutical drugs - analgesics and antipyretics - paracetamol and aspirin. Colour chemicals - pigments and dyes - examples and applications. Explosives - classification and examples.

Teaching Methodology	Videos, PPT, demonstration, group discussion and creation of models

Books for Study

1. Chopra, H. K. & Panesar, P. S. (2010). *Food chemistry.* Narosa publishing house.
2. Ghosh, J. (2012). *A textbook of pharmaceutical chemistry.* S Chand publishing.
3. Sharma, B. K. (2014). *Industrial Chemistry* (16th ed). GOEL publishing house, Meerut.
4. Elkins, K. M. (2019) *Introduction to forensic chemistry* CRC Press Taylor & Francis Group.

Books for Reference

1. Ghosh, J. (2006). *Fundamental concepts of applied chemistry* (2nd ed.). S. Chand & Co.Publishers.
2. Vaithyanathan, S. (2006). *Text book of ancillary chemistry*. Priya Publications, Karur.
3. Shreve, R. N. (1977). *Chemical process industries* (4th ed.). McGraw-Hill, Texas.
4. Poucher, W.A. &.Brink, Jr. J. A. (2000). *Perfumes, cosmetics and soaps*. Springer.
5. De, A.K. (1990). *Environmental chemistry*. New Age International Public Co.

Web Sources

1. https://youtu.be/gsqvO5uF1-c

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K – Level)**
CO1	discuss about the fertilizers like urea, NPK fertilizers and super phosphate and their applications	**K4**
CO2	understand the pharmaceutical drugs, analgesics and antipyretics likeparacetamol and aspirin and also about pigments and dyes and its applications.	**K5**
CO3	explain the fuelclassification solid, liquid and gaseous, nuclear fuel - examples and uses	**K6**

Relationship Matrix											
Semester	**Course code**			**Title of the Course**						**Hours**	**Credits**
1	**23UCH14SE01B**			**Skill Enhancement Course – 1(Non Major Elective):** Role of Chemistry in Daily Life						**2**	**2**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	**3**	**1**	**3**	**3**	**2**	**3**	**3**	**1**	**3**	**2**	**2.4**
CO2	**3**	**2**	**3**	**2**	**3**	**2**	**3**	**2**	**3**	**1**	**2.4**
CO3	**2**	**3**	**2**	**3**	**2**	**3**	**2**	**3**	**2**	**3**	**2.5**
Mean overall Score											**2.4 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
1	23UHE14VE01	**Value Education - 1:** Essentials of Humanity	2	1

Course Objectives
To identify one's own potentials, strengths and weaknesses
To identify various challenges (physical, emotional, and social) in adolescence
To consciously overcome one's challenges and move towards self-esteem
To maximize one's own potential in enabling a holistic development
To assimilate human values comprehensively

UNIT I: Principles of Value Education

Introduction to values - Characteristics and Roots of Values - Value Education & Value Clarification - Moral Characters - Kinds of Values - Objectives of Values

UNIT II: Development of Human Personality

Personality: Introduction, Theories, Integration & Factors influencing the development of personality - SEL Series - Discovering self - Defence Mechanism Power of positive thinking - Why worry?

UNIT III: The Dimensions of Human Development

Areas of Development: Physical, Intellectual, Emotional, Social Development, Moral & Spiritual development

UNIT IV: Responsible Parenthood

Human Sexuality - Marriage and Family - Sex and Love - Characteristics of Responsible parent - Causes of Marriage disharmony - Art of wise parenting

UNIT V: Gender Equality and Empowerment

Historical perspective - Women in Independence struggle - Women in Independent India - Education & Economic development - Crimens against Women - Women rights - Time-line of Women achievements in India

Teaching Methodology	

Book for Study

Department of Human Excellence. (2021). *Essentials of Humanity.* St. Joseph's College.

Books for Reference

1. Xavier, A. (2012). *You Shall Overcome,* (6th ed.). ICRDE Publication.
2. Alex, K. (2009). *Soft Skills.* S. Chand.
3. Kalam, A.A. P. J. (2012). *You Are Unique.* Punya Publishing.

Websites and eLearning Sources

1. http://livingvalues.net. Accessed 05 March 2021.
2. http://www.apa.org/topics/personality#. Accessed 05 March 2021.
3. http://www.peacecorps.gov/educators/resources/global-issues-gender-equaligy-and-womens-empowerment/. Accessed 05 March 2021.

Course Outcomes		
CO No.	**CO-Statements**	**Cognitive Levels (K - Level)**
	On completion of this course, students will be able to	
CO1	recall the prescribed values and their dimensions.	**K1**
CO2	examine themselves by learning the developmental changes happening in the course of their lifetime.	**K2**
CO3	Apply the trained values in the day-to-day life.	**K3**

Relationship Matrix											
Semester	**Course code**	**Title of the Course**								**Hours**	**Credits**
1	**23UHE14VE01**	**Value Education - 1:** Essentials of Humanity								**2**	**1**
Course Outcomes	**Programme Outcomes(POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	3	3	2	3	3	2	3	3	
CO2	3	2	2	3	3	2	3	3	2	2	
CO3	2	3	3	3	2	3	3	3	3	3	
Mean overalls core											

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23UTA21GL02	General Tamil - 2	4	3

கற்றலின் நோக்கங்கள்
தமிழ் இலக்கிய வரலாற்றை அறிதல்.
எழுத்து, சொல் இலக்கணங்களின் அடிப்படைகளைக் கண்டறிதல்.
அயலகக் கவிதை வடிவங்களை விளங்கிக் கொள்ளுதல்.
மொழிபெயர்ப்புக் கவிதைகளின் வாயிலாக மொழிபெயர்ப்புத் திறனை வளர்த்தெடுத்தல்.
போட்டித் தேர்வுகளை எதிர்கொள்வதற்கான இலக்கண அறிவு பெறுதல்.

அலகு – 1 **(12 மணிநேரம்)**

பாரதியார் கவிதைகள் – குயில்பாட்டு (குயில் தன் பூர்வ ஜென்மக் கதை உரைத்தல்)
பாரதிதாசன் கவிதைகள் – சஞ்சீவி பர்வதத்தின் சாரல்
நற்றமிழ்க்கோவை – முதல் மூன்று கட்டுரைகள்

அலகு - 2 **(12 மணிநேரம்)**

வெ.இராமலிங்கனார் – சொல், தமிழன் இதயம்
முடியரசனார் – உயிர் வெல்லமோ, மனத்துயர்மை
பெருஞ்சித்திரனார் – அஞ்சாதீர், மொழி,இனம்,நாடு
பட்டுக்கோட்டை கலியாண சுந்தரனார் – வருங்காலம் உண்டு, உழைக்காமல் சேர்க்கும் பணம்
இலக்கணம் – எழுத்து
இலக்கிய வரலாறு – புதுக்கவிதை, தமிழில் புதிய கவிதை வடிவங்கள்

அலகு–3 **(12மணி நேரம்)**

சுரதா - நல்ல தீர்ப்பு
கண்ணதாசன் - ஒரு பானையின் கதை
அப்துல் ரகுமான்- வீடு
மேத்தா - ஒரேகுரல்
இலக்கிய வரலாறு – தமிழ்ச்சிறுகதைகள், இருபதாம் நூற்றாண்டு உரைநடை வளர்ச்சி
சிறுகதை – முதல் மூன்று சிறுகதைகள்

அலகு – 4 **(12 மணிநேரம்)**

அரசியல் கவிதைகள்
ஈரோடு தமிழன்பன்- அகல் விளக்காக இரு
ஆதவன் தீட்சண்யா– இன்னும் இருக்கும் சுவர்களின் பொருட்டு
சுகிர்தராணி– என் கண்மணியே இசைப்பிரியா
சக்தி ஜோதி – யுகாந்திர உறக்கம்
பழநி பாரதி- வெள்ளைக்காகிதம்
லிவிங்ஸ்மைல் வித்யா – நினைவில் பால்யம் அழுத்தம்
இலக்கணம் - சொல்

அலகு – 5 **(12 மணிநேரம்)**

அயலகக் கவிதைகள்
ஓசேரிசால் (தமிழில் நெய்தல்)- விடைகொடு என்தாய் மண்ணே
ஹைபுன் கவிதைகள்
சிறுகதை – நான்கு முதல் ஆறு சிறுகதைகள்
நற்றமிழ்க் கோவை – நான்கு முதல்ஆறு கட்டுரைகள்

கற்பித்தல் முறை (Teaching Methodology)	**விரிவுரை** (Lecture), **காணொளிக் காட்சி** (Videos), **விளக்கக் காட்சி** (PPT presentation)

பாடநூல்கள்

1. *தமிழாய்வுத்துறை* (2023). *பொதுத்தமிழ் -2, தூய வளனார் தன்னாட்சிக் கல்லூரி.*
2. *தமிழாய்வுத்துறை* (2021). *நற்றமிழ்க் கோவை, தூய வளனார் தன்னாட்சிக் கல்லூரி.*

Websites and eLearning Sources

1. https://www.chennailibrary.com/bharathiyar/kuyilpattu.html
2. www.tamildigitallibrary.in
3. https://eluthu.com/kavithai
4. https://podhutamizh.blogspot.com/2017/09/blog-post_42.html
5. https://thamizhsudar.com
6. https://ta.wikipedia.org/wiki

Course Outcomes		
CO No.	**CO-Statements** ***இப்பாடத்தின் நிறைவில் மாணவர்கள்***	**Cognitive Levels (K - Level)**
CO1	*தமிழ் இலக்கிய நூல்கள் பற்றிய அறிவைப் பெறுவர்.*	**K1**
CO2	*தமிழ் இலக்கண வளர்ச்சியைப் புரிந்து கொள்வர்.*	**K2**
CO3	*பிழையின்றி எழுதும் திறன் பெறுவதோடு கற்றல் திறனையும் வளர்த்துக்கொள்வர்.*	**K3**
CO4	*பிற கவிதை வடிவங்களைக் கையாளும் திறன் பெறுவர்.*	**K4**
CO5	*போட்டித் தேர்வுகளை எதிர்கொள்ளும் திறனைப் பெறுவர்.*	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
2	**23UTA21GL02**			General Tamil - 2					**4**		**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	1	2	2	3	3	3	2	3	2	**2.3**
CO2	2	1	2	2	2	3	2	2	2	2	**2.0**
CO3	2	1	2	2	3	3	3	2	3	2	**2.3**
CO4	1	2	1	2	2	3	2	2	3	2	**2.0**
CO5	1	1	2	2	3	3	3	2	3	2	**2.2**
										Mean Overall Score	**2.16 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23UFR21GL02	French - 2	4	3

Course Objectives
To construct simple phrases with pronominal verbs
To apply the different types of articles
To understand the usage of pronouns
To analyse the French culture through French culinary art
To evaluate and compare the French fashion in current scenario

UNIT I: **(12 Hours)**

- TITRE: Les Loisirs
- GRAMMAIRE : les adjectifs interrogatifs, les nombres ordinaux, les verbes pronominaux
- LEXIQUE : les différentes activités quotidiennes, les loisirs, les activités quotidiennes, les matières
- PRODUCTION ORALE : parler sur votre passe-temps
- PRODUCTION ECRITE : décrire sa journée

UNIT II: **(12 Hours)**

- TITRE: La routine
- GRAMMAIRE : les pronoms personnels COD, les verbes du premier groupe en e/er/eler/eter, le verbe prendre
- LEXIQUE : exprimer ses goûts et ses préférences, le temps, l'heure, la fréquence
- PRODUCTION ORALE : savoir comment dire l'heure
- PRODUCTION ECRITE : écrire vos préférences en quelques lignes

UNIT III: **(12 Hours)**

- TITRE: Où Faire Ses Courses?
- GRAMMAIRE : les articles partitifs, le pronom en (la quantité), très ou beaucoup
- LEXIQUE : inviter et répondre à une invitation, les commerces et les commerçants, demander et dire le prix, les quantités
- PRODUCTION ORALE : faire des courses pour une soirée
- PRODUCTION ECRITE : écrire un message en acceptant l'invitation

UNIT IV: **(12 Hours)**

- TITRE: Découvrez et Dégustez
- GRAMMAIRE : l'impératif, il faut, les verbes devoir, pouvoir, savoir, vouloir
- LEXIQUE : Commander et commenter sur un plat de la carte, les aliments, les services, les moyens de paiement
- PRODUCTION ORALE : Jeu de rôle – au restaurant (entre vous et le garçon)
- PRODUCTION ECRITE : faire une comparaison avec la carte française et indienne

UNIT V: **(12 Hours)**

- TITRE: Tout le monde s'amuse/ les ados au quotidien
- GRAMMAIRE : les adjectifs démonstratifs, le pronom indéfini on, le futur proche, le passé composé, les verbes en –yer, voir et sortir
- LEXIQUE : connaître les marques connues sur les vêtements, les sorties, situer dans le temps, les vêtements et les accessoires

- PRODUCTION ORALE : décrire une tenue
- PRODUCTION ECRITE : écrire une lettre amicale, une carte postale

Teaching Methodology	Chalk and talk, visual cues like flashcards, one to one conversation

Book for Study

1. Dauda, P., Giachino, L. & Baracco, C. (2016). *Generation A1.* Didier.

Books for Reference

1. Girardet, J. & Pecheur, J. (2017). *Echo A1.* CLE International, (2nd Ed.).
2. Mérieux, R. & Loiseau, Y. (2012). *Latitudes A1.* Didier.
3. Fournier, I. (2011). *Talk French.* Goyal Publishers.

Websites and eLearning Sources

1. https://www.frenchtoday.com/blog/french-verb-conjugation/french-reflexive-verbs-list- exercises/
2. https://www.fluentu.com/blog/french/french-subject-pronouns/
3. https://grammarist.com/french/french-partitive-article/
4. https://www.talkinfrench.com/guide-french-food-habits/
5. https://www.fluentu.com/blog/french/talking-about-clothes-in-french/

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Levels)**
CO1	Relate pronominal verbs in expressing one's day today activity	**K1**
CO2	compare the different types of articles – article partitif and contracte	**K2**
CO3	construct texts using pronouns – passages and dialogues	**K3**
CO4	discover the food habits of the French culture	**K4**
CO5	appraise the French fashion	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
2	**23UFR21GL02**			**French - 2**					**4**		**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	3	3	1	3	1	2	2	2	**2.2**
CO2	2	1	2	3	2	3	1	2	2	2	**2.0**
CO3	3	2	3	2	2	3	3	1	3	2	**2.4**
CO4	3	2	2	1	3	3	3	1	1	3	**2.2**
CO5	2	1	2	2	3	3	3	2	2	2	**2.2**
Mean Overall Score											**2.2 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23UHI21GL02	HINDI - 2	4	3

Course Objectives
To understand the basics of Hindi Language
To make the students to be familiar with the Hindi words
To enable the students to develop their effective communicative skills in Hindi
To introduce the socially relevant subjects in Modern Hindi Literature
To empower the students with globally employable soft skills

UNIT I: **(12 Hours)**

- Kafan
- Letter Writing - Chutti Patra
- Bakthikal - Namakarn
- Sarkari Kariyalayom Ka Naam

UNIT II: **(12 Hours)**

- Baathcheeth - Dookan Mein
- Kriya
- Letter Writing - Rishthedarom Ko Patra
- Bakthikal - Samajik Paristhithiyam

UNIT III: **(12 Hours)**

- Vah Thodthi Patthar
- Adverb
- Letter Writing - Naukari Keliye Avedan Patra
- Bakthikal - Sahithyik Paristhithiyam

UNIT IV: **(12 Hours)**

- Mukthi
- Samas
- Letter Writing - Kitab Maangne Keliye Patra
- Bakthikal - Salient Features, Main Divisions

UNIT V: **(12 Hours)**

- Anuvad
- Sandhi
- Letter Writing - Nagarpalika Ko Patra
- Bakthikal - Visheshathayem

Teaching Methodology	Peer Instruction Exercise, Videos, PPT, Quiz, Group Discussion

Books for Study

1. Viswanath Tripaty. (2018). *Kuchh Kahaniyan*, Rajkamal Prakashan Pvt. Ltd.
2. Kamathaprasad Gupth, M. (2020). *Hindi Vyakaran*. Anand Prakashan.

3. Sadananth Bosalae. (2020). *kavya sarang*, Rajkamal Prakashan.

Books for Reference

1. Acharya Ramchandra Shukla. (2021). *Hindi Sahitya Ka Itihas*. Prabhat Prakashan.
2. Krishnakumar, G. (2016). *Anuvad vigyan ki Bhumika*. Rajkamal Prakashan.
3. Aravind Kumar. (2019). *Sampoorna Hindi Vyakaran our Rachana*, Lucent publisher.
4. Lakshman Prasad Singh. (2017). *Kavya ke sopan*. Bharathy Bhavan Prakashan.

Websites and e-Learning Sources

1. https://hindigrammar.in/sandhi.html
2. https://www.successcds.net/class10/hindi/samas-in-hindi
3. https://mycoaching.in/kriya-ke-bhed-verb-in-hindi
4. https://namastesensei.in/adverb-in-hindi-examples/
5. https://viahindi.in/hindi-vyakaran/sandhi-paribhasha-prakar-or-udaharan

Course Outcomes		
CO No.	**CO-Statements** On successful completion of the course, the student will be able to	**Cognitive Levels (K - Level)**
CO1	Find out the Terms & Expressions related to letter writing.	**K1**
CO2	Explain the works of Hindi writers.	**K2**
CO3	Complete the sentences in Hindi using basic grammar.	**K3**
CO4	Analyze the social & political conditions of Devotional period in Hindi Literature.	**K4**
CO5	Justify the human values stressed on the works of the following authors “Premchand, Nirala, etc.”.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**				**Hours**		**Credits**	
2	**23UHI21GL02**			**HINDI - 2**				**4**		**3**	
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	3	3	2	2	3	3	3	2	2	**2.5**
CO2	1	3	1	2	2	3	3	3	2	3	**2.3**
CO3	3	2	3	2	2	3	2	3	2	2	**2.4**
CO4	2	3	3	1	3	2	3	2	1	2	**2.2**
CO5	3	2	2	2	3	2	3	2	3	2	**2.4**
										Mean Overall Score	**2.36 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23USA21GL02	Sanskrit - 2	4	3

Course Objectives
To bring out the salient aspects of classical Sanskrit poetry
To introduce court epics in Sanskrit
To train students in declensions of pronouns in Sanskrit
To coach the students in the conjugation patterns of verbs in Sanskrit
To offer coaching in morpho-phonemic rules and their applications in Sanskrit

UNIT I **(12 Hours)**

Asmathi usmath tat kim (MFN) sarvanaam asabdaha

UNIT II **(12 Hours)**

Sandhi Niyamaah Abhyaash (Guna , Visarga , Dirgha , Vrddhi)

UNIT III **(12 Hours)**

Lang lakaarah Kriyapadaani Prayoga Vivaranam

UNIT IV **(12 Hours)**

Raguvamsaha Pratama sargaha (1 –15 slokas)

UNIT V **(12 Hours)**

Suvacanani Vakya Prayoga Vivaranam

Teaching Methodology	Videos, PPT, Blackboard, Demonstration, Exercises

Books for Study

1. Saralasamkritham Skisha. (2021).
2. Dhaatu Manjari. (2021).

Books for Reference

1. Paindrapuram Ashram, Srirangam. (2019).
2. Vadhyar, R. S., & Sons, Book – Seller and Publishers. (2021).
3. Kulapthy, K. M. (2018). *Saral Sanskrit Balabodh*. Bharathiys Vidya Bhavan.

Websites and eLearning Sources

1. https://www.meritnation.com
2. https://www.aplustopper.com
3. https://mycoaching.in/lang-lakar
4. https://sanskritdocuments.org/sites/giirvaani/giirvaani/rv/sargas/01_rv.htm
5. https://resanskrit.com/blogs/blog-post/sanskrit-shlok-popular-quotes-meaning-hindi-english

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	Remembering names of different objects, remembering different verbal forms and sandhi	**K1**
CO2	Contrast different verbal forms Explain good sayings, Relate good saying to life.	**K2**
CO3	Apply and build small sentences	**K3**
CO4	Analyze different forms of Verbs and nouns	**K4**
CO5	Appreciate subhashitas and Sanskrit poetry	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
2	**23USA21GL02**			Sanskrit - 2						**4**	**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	1	3	2	2	2	3	3	2	1	**2.1**
CO2	3	2	3	2	2	3	2	3	3	2	**2.5**
CO3	2	2	3	2	2	2	2	3	3	1	**2.1**
CO4	3	2	3	3	1	2	3	3	3	1	**2.4**
CO5	3	2	2	2	3	2	2	3	3	1	**2.3**
										Mean Overall Score	**2.28 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23UEN22GE02	General English - 2	5	3

Course Objectives
To develop an expanded and specialised vocabulary related to diverse themes such as education, entertainment, career, and society through activities like word grids, reading, and discussions.
To enhance problem-solving abilities through activities like debates, role-playing, and scenario analysis.
To enable students to express ideas with precision and clarity by practising different forms of expressing quality, comparison, and actions in various contexts.
To equip students with language skills relevant to professional settings.
To encourage students to explore language as a tool for creative expression and communication.

UNIT I **(15 Hours)**

01. Education Word Grid
02. Reading Problems and Solutions
03. Syllabification
04. Forms for Expressing Quality
05. Expressing Comparison
06. Monosyllabic Comparison
07. Di/polysyllabic Comparison
08. The Best Monosyllabic Comparison
09. The Best Di/Polysyllabic Comparison
10. Practising Quality Words

UNIT II **(15 Hours)**

11. Wh Words
12. Yes/No Recollection
13. Unscramble Wh Questions
14. Wh Practice
15. Education and the Poor
16. Controlled Role Play
17. Debate on Education
18. Education in the Future
19. Entertainment Word Grid
20. Classify Entertainment Wordlist
21. Guess the Missing Letter
22. Proverb-Visual Description
23. Supply Wh Words
24. Rearrange Questions
25. Information Gap Questions

UNIT III **(15 Hours)**

26. Asking Questions
27. More about Actions
28. More about Actions and Uses
29. Crime Puzzle
30. Possessive Quiz
31. Humourous News Report

32. Debate on Media and Politics
33. Best Entertainment Source

UNIT IV **(15 Hours)**

34. Career Word Grid
35. Job-Related Wordlist
36. Who's Who?
37. People at Work
38. Humour at Workplace
39. Profession in Context
40. Functions and Expressions
41. Transition Fill-in
42. Transition Word Selection
43. Professional Qualities
44. Job Procedures
45. Preparing a Resume
46. Interview Questions
47. Job Cover Letter Format
49. Emailing an Application
50. Mock Interview

UNIT V **(15 Hours)**

51. Society Word Grid
52. Classify Society Wordlist
53. Rearrange the Story
54. Storytelling
55. Story Cluster
56. Words Denoting Time
57. Expressing Time
58. What Can You Buy?
59. Noise Pollution
60. Positive News Headlines
61. Negative News Headlines
62. Matching Conditions
63. What Would You Do?
64. If I were the Prime Minister
65. My Dream Country

Teaching Methodology	Lecture Method, Use of ICT Tools and Interactive method

Book for Study

1. Joy, J.L. & Peter, F.M. (2014). *Let's Communicate 2*, Trinity Press.

Books for Reference

1. Ahrens, Sönke. (2017). *How to Take Smart Notes: One Simple Technique to Boost Writing, Learning and Thinking*. Create Space.
2. Aspinall, Tricia. (2002). *Test Your Listening.* Pearson.
3. Bailey, Stephen. (2004). *Academic Writing: A Practical Guide for Students*. Routledge.
4. Fitikides, T.J. (2002). *Common Mistakes in English,* (6th Ed.). Longman
5. Wainwright., Gordon. (2007). *How to Read Faster and Recall More: Learn the Art of Speed Reading with Maximum Recall,* (3rd Ed.). How to Books.

Websites and eLearning Sources

1. https://learnenglish.britishcouncil.org/
2. https://oneminuteenglish.org/en/best-websites-learn-english/

3. https://www.dailywritingtips.com/best-websites-to-learn-english/

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	write paragraphs with apt punctuation marks	**K1**
CO2	discuss basic issues with friends, relatives and members of the family	**K2**
CO3	use polite expressions in appropriate ways	**K3**
CO4	evaluate the language and communication aspects of the topics	**K4**
CO5	create and produce various forms of communication, including professional documents like resumes and cover letters, debates	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**					**Hours**		**Credits**
2	**23UEN22GE02**			**General English - 2**					**5**		**3**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	3	2	2	3	2	3	2	3	2	**2.4**
CO2	2	2	3	2	3	3	2	3	2	2	**2.3**
CO3	2	3	2	3	2	2	3	2	3	2	**2.4**
CO4	2	2	3	2	3	3	2	3	2	3	**2.5**
CO5	2	2	2	3	2	2	2	3	2	2	**2.2**
Mean Overall Score											**2.36 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23UCH23CC02	**Core Couse - 2:** General Chemistry - 2	5	4

Course Objectives
To understand the preparation and reactions of alkenes
To learn the characteristic structural features and reactivity of dienes and alkynes
To comprehend the properties of elements and compounds of group I
To comprehend the properties of elements and compounds of group II
To learn the fundamentals of chemical equilibrium and thermodynamics

UNIT I: Alkenes **(15 Hours)**

Nomenclature - geometrical isomerism - *cis/trans* - *E/Z* - methods of preparation of alkenes - dehydrohalogenation of alkyl halides - regioselectivity - dehydration of alcohols - Saytzeff's rule relative stability of alkenes - dehalogenation of vicinal dihalides - elimination mechanisms (E1, E2, E1cB) - Hoffman elimination and its regioselectivity.

Electrophilic addition - general mechanism - addition of HX - regioselectivity - Markovnikov's and anti-Markovnikov's rules - carbocation stability - addition of bromine and its stereochemistry - halohydrin formation - addition of water (oxymercuration - demercuration, hydroboration - oxidation) - hydroxylation (*syn*- and *anti*-dihydroxylation) - addition of hydrogen- relative stability of alkenes - ozonolysis.

UNIT II: Dienes and Alkynes **(15 Hours)**

Dienes: Types- preparation of conjugated dienes - MO of conjugated diene - 1,2/1,4- addition of HX to conjugated dienes - Diels-Alder reaction - its regio- and stereoselectivity - electrocyclic ring closing and opening reactions - Woodward-Hoffman rules - sigmatropic rearrangements: Cope, Claisen and related rearrangements - ozonolysis of dienes - Addition of HX to allenes.

Alkynes: Preparation of alkynes - reductions of alkynes - *syn*- and *anti*-addition to alkenes - acidity of terminal alkynes - electrophilic addition to alkynes - ozonolysis of alkynes

UNIT III: Chemistry of Group 1 Elements **(15 Hours)**

Differences between lithium and other group 1 elements - general characteristics - sizes of atoms and ions, density, ionization energy, electronegativity and bond type, hardness, melting and boiling points, flame colours and spectra - chemical properties - reaction with water, air and dinitrogen - oxides, hydroxides, peroxides and superoxides- solutions of metals in liquid ammonia - complexes, crowns, crypts and their biological importance.

UNIT IV: Chemistry of Group 2 Elements **(15 Hours)**

Differences between beryllium and other group 2 elements - general characteristics - sizes of atoms and ions - ionization energy - electronegativity - hydration energies - anomalous behaviour of beryllium - solubility and lattice energy - solutions of metals in liquid ammonia - chemical properties - hardness of water - structures and importance of compounds of group 2 elements - oxides, peroxides, sulphates, nitrates, hydrides, halides, nitrides and carbides, basic beryllium acetate - biological role of Ca^{2+} and Mg^{2+}.

UNIT V: Thermodynamics-I **(15 Hours)**

Internal energy, work, heat, and energy - definitions- molecular interpretation of heat and work - molecular interpretation of internal energy - formulation of the First Law - expansion work - general expression for work - expansion against constant pressure - reversible expansion - isothermal reversible expansion - heat transactions - calorimetry - heat capacity - enthalpy - enthalpy change and heat transfer - variation of enthalpy with temperature - heat capacity at constant pressure and volume.

Quantifying w, *q, dU* and *dH* during the reversible and irreversible processes of expansion of ideal and real gases under isothermal and adiabatic conditions - Joule-Thomson effect -relationship between μ_{JT} and other thermodynamic quantities - calculation of Joule -Thomson coefficient for ideal and real gases - inversion temperature- zeroth law of thermodynamics - absolute scale of temperature.

Teaching Methodology	Chalk and Talk, PPT, Videos

Books for Study

1. Bruice, P.Y. (2011) *Organic Chemistry* (8th Ed.), Pearson Ltd., University of California, Santa Barbara.
   Unit - I *Chapters 5 and 6* **Unit- II** *Chapters 7 and 8, 28*
2. Lee, J. D. (1996) *Concise Inorganic Chemistry* (5th Ed.), Blackwell Science Ltd, Oxford, London.
   Unit - III *Chapter 9* **Unit-IV** *Chapter 11*
3. Atkins, P. W. (2018) *Physical Chemistry* (10th Ed.), Oxford University Press.
   Unit-V *Chapter 2*

Books for References

1. Morrison, R. T., & Boyd, R. T. (2011). *Organic Chemistry,* (7th Ed.), Allyn and Bacon Ltd., New York.
2. Solomons, G. T.W. (1996). Organic *Chemistry,* (6th Ed.), John Wiley and Sons, New York.
3. Wade, L. G. (2003). *Organic Chemistry* (5th Ed.), Pearson Ltd., University of California, Santa.
4. Miessler, G.L., Fischer, P. J., & Tarr, D. A. (2014). *Inorganic Chemistry* (5th Ed.), Pearson Education, New York.
5. Housecroft, C. E., & Sharpe, A.G. (2012). *Inorganic Chemistry*, (4th Ed.), Pearson Education, New York.
6. Castellan, G. W. (2004). *Physical Chemistry*, (4th Ed.), Narosa.
7. McQuarrie, D.A., & Simon, J.D. (2004). *Molecular Thermodynamics*, University Science Books, California.
8. Shriver, D., Weller, M., Overton, T., Rourke, J., & Armstrong, F. *(2014). Inorganic Chemistry* (6th Ed.). W H Freeman and Company, New York.

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	understand chemistry of unsaturated hydrocarbons, *s*-block elements, and fundamentals of thermodynamics.	**K1**
CO2	comprehend the preparations and their characteristic reactions of unsaturated hydrocarbons, compounds of *s*-block elements and derive the fundamental processes and energy terms used in thermodynamics.	**K2**
CO3	examine the reactivity, orientation, and stereochemistry of the reaction mechanisms of unsaturated hydrocarbons; structure and bonding in compounds of *s*-block elements.	**K3**
CO4	predict the stereochemistry of the products; physical and chemical nature of compounds; and feasibility of chemical processes	**K4**
CO5	determine the properties of compounds *s*-block elements; and calculate the energetics involved in chemical systems.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
2	**23UCH23CC02**			**Core Couse - 2:** General Chemistry - 2						**5**	**4**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	2	2	2	1	1	2	3	3	2	**2.0**
CO2	2	3	3	1	2	1	2	3	2	1	**2.0**
CO3	3	3	2	3	2	2	2	2	2	1	**2.2**
CO4	2	2	2	2	2	2	2	2	2	2	**2.0**
CO5	1	2	1	3	1	2	1	2	3	3	**1.9**
Mean Overall Score											**2.02 (Medium)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	**23UCH23CP02**	**Core Practical - 2:** Qualitative Analysis	**6**	**4**

Course Objectives
To learn the lab safety and identify nature of chemicals
To learn the techniques of semi micro qualitative analysis of inorganic salt mixtures
To learn and eliminate interfering acid radicals
To learn and separate the basic radicals

UNIT I: Lab Safety, Chemicals and Glassware **(18 Hours)**

Philosophy of lab safety - first-aid techniques - general work culture inside the chemistry lab- importance of wearing lab coat, eye glasses.

Personal protection - nature of chemicals - toxic, corrosive, explosive, inflammable, carcinogenic, other hazardous chemicals - safe storing and handling of chemicals - disposal of chemical wastes - glassware - handling of glassware - handling of different types of equipments like Bunsen burner, centifuger, Kipp's apparatus, etc. - ventilation facilities.

UNIT II: General Principles of Qualitative Analysis **(18 Hours)**

Principle of flame test - concept of solubility and solubility product - theory of acids and bases - concept of *p*H and buffer action - common ion effect - redox reactions - theory of testing acid radicals (simple and interfering) - principle of grouping of cations - theory of testing cations.

UNIT III: Semi-micro Qualitative Analysis - I **(18 Hours)**

Analysis of simple acid radicals:

a) Carbonate
b) Sulphide
c) Sulphate
d) Chloride
e) Bromide
f) Nitrate

Analysis of interfering acid radicals:

a) Oxalate
b) Borate
c) Phosphate
d) Chromate
e) Fluoride

UNIT IV: Semi micro Qualitative Analysis - II **(18 Hours)**

Elimination of interfering acid radicals

a) Oxalate
b) Borate
c) Phosphate
d) Chromate
e) Fluoride

Identifying the groups of basic radicals

Group I : Pb^{2+}

Group II :**IIA-** Cu^{2+},Cd^{2+},Pb^{2+},Bi^{3+} and **IIB -** Sn^{2+},Sn^{4+}

Group III: Fe^{2+},Al^{3+}, Cr^{3+}

Group IV: Co^{2+},Ni^{2+}, Mn^{2+},Zn^{2+}

Group V: Ca^{2+},Ba^{2+}, Sr^{2+}

Group VI: Mg^{2+},NH_4^+

UNIT V: Semi micro Qualitative Analysis - III **(18 Hours)**

Analysis of basic radicals (group-wise): Lead, Copper, Bismuth, Cadmium, Antimony, Iron, Aluminium, Chromium, Zinc, Manganese, Nickel, Calcium, Strontium, Barium, Magnesium, Ammonium.

Analysis of a mixtures containing two cations and two anions (of which one is interfering type)(max. 15 Mixtures).

Books for Study

1. Svehla, G. (2012). *Vogel's Qualitative Analysis*, (7th Ed.). Pearson Education, India.
2. *Lab manual*, Department of Chemistry, St. Joseph's College, Tiruchirappalli.
3. Venkateswaran.V., Veeraswamy, R., & Kulandaivelu, A. R. (1997). *Basic Principles of Practical Chemistry*, (2nd Ed.). New Delhi, Sultan Chand and Sons.

Websites and eLearning Sources

1. https://ncert.nic.in/pdf/publication/sciencelaboratorymanuals/classXII/chemistry/lelm107.pdf
2. https://www.youtube.com/watch?v=cEOvj6jkdDw
3. https://www.bu.edu/ehs/ehs-topics/chemical/safe-handling-and-storage-of-chemicals/

Systematic Qualitative Analysis **Qualitative Analysis of Inorganic Salts** **Handling of Chemicals**

Course Outcomes		
CO No.	**CO-Statements**	**Cognitive Levels (K - Level)**
	On successful completion of this course, students will be able to	
CO1	know the lab safety and identify nature of chemicals	**K1**
CO2	understand the principles of qualitative analysis for detection of inorganic cations.	**K2**
CO3	apply the principles of qualitative analysis for detection of inorganic anions.	**K3**
CO4	illustrate the techniques of semi micro qualitative analysis of inorganic salt mixtures.	**K4**
CO5	eliminate the interfering acid radicals.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
2	**23UCH23CP02**			**Core Practical - 2:** Qualitative Analysis						**6**	**4**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	2	4	1	3	2	2	3	2	2	1	2.2
CO2	1	2	2	1	2	2	3	2	4	3	2.2
CO3	3	3	2	1	3	1	2	4	3	3	2.4
CO4	2	3	1	3	2	1	2	3	2	3	2.2
CO5	3	1	3	2	1	2	2	4	2	3	2.3
Mean Overall Score											**2.26 (Medium)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23UCH23AC02	**Allied Course - 2:** Mathematics for Chemistry -2	6	4

Course Objectives
Motivating students to apply various techniques of integration in their major subjects.
Understanding the concept of definite integral.
Analyzing the concepts of Homogeneous and non-homogeneous equations
Solving problems in differential equations.
Applications of Transforms in Differential equations

UNIT I **(18 Hours)**

Integration - Integrals of functions containing linear functions of x - Integrals of functions involving $a^2 \pm x^2$ - Integrals of rational algebraic functions - Integration of irrational functions.

UNIT II **(18 Hours)**

Properties of definite integrals - Simple applications - Integration by parts- Bernoulli's formula - Evaluation of double integrals (omit problems involving changing the order of Integration and applications).

UNIT III **(18 Hours)**

Differential equations of first order - variable separable - Homogeneous equations - Non- homogeneous equations - Linear equation - Bernoulli's equation.

UNIT IV **(18 Hours)**

Second order linear equations with constant coefficients - Particular Integrals for e^{kx}, sin kx, cos kx, x^n and $e^{kx}X$.

UNIT V **(18 Hours)**

Laplace transforms - Definition - Some general theorems - Inverse transform - Solving ordinary differential equations using Laplace transformation.

Teaching Methodology	Chalk and Talk method, Problem solving

Books for Study

1. Narayanan, S. & Hanumanth, R., Pillay, T.K.M., & Kandaswamy, P. (2009). *Ancillary Mathematics, Volume II.* Viswanathan Pvt. Ltd.
   - **Unit I:** Chapter 1: Sec 6.1, 6.2, 7 (omit 7.4), 8 case (i) to (iv) only, pages: 7-13, 23-31, 39-47.
   - **Unit II:** Chapter 1: Sec. 11, 12, 15, pages: 61 - 72, 93 and 94;
     Chapter 3: Sec. 2.2, pages: 163- 170.
   - **Unit III:** Chapter 4: Sec. 1- 5, pages 205 - 218.

Unit V: Chapter 7: Sec. 7.1 - 7.7, pages 289 - 315.

2. Narayanan, S. & Pillay, T.K.M. (2002). *Ancillary Mathematics Book II*, S. Viswanathan Pvt. Ltd.

Unit IV: Chapter 3: Sec. 1-4, pages: 42 - 60.

Books for Reference

1. Venkatraman, M. K. (1996). *Engineering Mathematics.* National Publishing Company.
2. Narayanan, S. & Pillay, T.K. M (2009). *Differential Equations and its applications.* S. Viswanathan Pvt. Ltd.
3. Narayanan, S & Pillay, T.K.M. (2009). *Calculus Volume I & II.* S. Viswanathan Pvt. Ltd,

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	acquire knowledge in integration, differential equations and Laplace Transform.	**K1**
CO2	understand the various methods of integration, differential equations And the concepts of Laplace transform.	**K2**
CO3	solve problems in integration, differential equations and Laplace transform	**K3**
CO4	identify the suitable methods to solve problems related to integration, Differential equations and Laplace transform.	**K4**
CO5	evaluate integrals, first and second order differential equations with constant coefficients, problems involving Laplace transforms and Ordinary differential equations using Laplace transform.	**K5**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
2	**23UCH23AC02**			**Allied Course - 2:** Mathematics for Chemistry - 2						**6**	**4**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Scores of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	2	2	1	3	3	2	2	1	**2.2**
CO2	3	3	2	1	2	3	3	2	1	2	**2.2**
CO3	2	3	2	2	2	2	3	2	2	2	**2.2**
CO4	3	3	2	2	1	3	3	2	2	1	**2.2**
CO5	3	3	1	3	1	3	3	1	3	1	**2.2**
										Mean Overall Score	**2.2 (High)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23UHE24VE02	**Value Education - 2:** Fundamentals of Human Rights	2	1

Course Objectives
To sensitize students about various human rights and their importance
To empower them with the right understanding of human rights
To enable them to understand the Fundamental rights and the duties in the constitution of India
To help them comprehend the background, principles and the articles of UDHR
To make them involved in activities to defend human rights

UNIT I: Human Rights - An Introduction **(6 Hours)**

Introduction- Classification of Human Rights- Scope of Human Rights-Characteristics of Human Rights - Challenges for Human Rights in the 21st Century.

UNIT II: Historical Development of Human Rights **(6 Hours)**

Human Rights in Pre-World War Era- Human Rights in Post-World War Era- Evolution of International Human Rights Law - the General Assembly Proclamation- Institution Building, Implementation and the Post- Cold War Period. The ICC.

UNIT III: India and Human Rights **(6 Hours)**

Introduction- Preamble to Indian Constitution - Classification of Fundamental Rights-Salient Features of Fundamental Rights-and Fundamental Duties.

UNIT IV: Human Rights of Women and Children **(6 Hours)**

Women's Human Rights- Issues related to women's rights - and Rights of Women's and Children

UNIT V: Human Rights Violations and Organizations **(6 Hours)**

Human Rights Violations - Human Rights Violations in India - the Human Rights Watch Report, January 2012- Human Rights Organizations – NHRC – SHRC.

Teaching Methodology	Chalk and Talk, Power point, Handouts and Group discussion

Book for Study

1. Department of Human Excellence, (2021). *Techniques of Social Analysis: Fundamentals of Human Rights.*

Books for Reference

1. Venkatachalem. (2005). *The Constitution of India*, *Giri Law House.*
2. Naik, V. & Shany, M. (2011). *Human rights education and training*, Crescent Publishing Corporation.
3. Neera, B. (2011). *Human Rights Content and Extent.* Swastika Publications.

Websites and eLearning Sources

1. https://www.un.org/en/universal-declaration-human-rights/
2. https://www.ilo.org/global/lang--en/
3. https://www.amnesty.org/en/

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	Identify the importance and the values of human rights	**K1**
CO2	Understand the historical background and the development of Human Rights and the related organizations	**K2**
CO3	Apply the provisions of National and International human rights to themselves and the society	**K3**

Relationship Matrix											
Semester	**Course Code**			**Title of the Course**						**Hours**	**Credits**
2	**23UHE24VE02**			**Value Education - 2:** Fundamentals of Human Rights						**2**	**1**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	1	2	2	3	2	2	2	2	**2.1**
CO2	3	2	1	2	2	3	2	2	2	2	**2.1**
CO3	3	2	2	2	2	2	3	2	1	2	**2.1**
Mean Overall Score											**2.1 (Medium)**

Semester	Course Code	Title of the Course	Hours/Week	Credits
2	23UHE24AE01	**Ability Enhancement Compulsory Course - 2:** Environmental Studies	2	1

Course Objectives
To enable students connect themselves with nature
To Impart knowledge of the concept of Biodiversity
To create awareness of the causes and consequences of various pollution
To help them recognize the available natural resources and the need to sustain them
To enable them to Identify the environmental problems and offer alternatives by making interventions both individually and collectively

UNIT I: Introduction to Environmental Studies **(6 Hours)**

Introduction – Scope and Importance – Subsystems of Earth – Various recycling Methods – Environmental Movements in India – Eco- Feminism – Public awareness – Suggestions to conserve environment

UNIT II: Natural Resources **(6 Hours)**

Food Resources – Land Resources – Forest resources – Mineral Resources – Water Resources – Energy Resources

UNIT III: Ecosystems, Biodiversity and Conservation **(6 Hours)**

General structure of ecosystem - Functions of Ecosystem - Energy flow and Ecological pyramids – Levels of Biodiversity - Hot spots of Biodiversity - Endangered and Endemic Species - Value of Biodiversity - Threats to Biodiversity - Conservation of Biodiversity

UNIT IV: Environmental Pollution **(6 Hours)**

Air Pollution – Water Pollution – Oil Pollution – Soil Pollution – Marine Pollution – Noise Pollution - Thermal Pollution – Radiation Pollution

UNIT V: Environmental Organizations and Treatise **(6 Hours)**

United Nations Environment Program (UNEP) - International treaties on Environmental protection - Ministry of Environment, Forest and Climate Change - Important National Environmental Acts and rules– Environmental Impact assessment - Issues deals with Population growth.

Teaching Methodology	Chalk and Talk, Power point and Field visit

Book for Study

1. Department of Human Excellence, (2021). *Environmental Studies.*

Books for Reference

1. Rathor, V.S. & Rathor B. S. (2013). *Management of Natural Resources for Sustainable Development*. Daya Publishing House.
2. Sharma P.D. (2010). *Ecology and Environment*, (8th Ed.). Rastogi Publications.
3. Agrawal, A & Gibson, C.C. (2001). *Introduction: The Role of Community in Natural Resource Conservation.* Rutgers University Press.

Websites and eLearning Sources

1. https://www.unep.org/
2. http://moef.gov.in/en/
3. https://www.ipcc.ch/reports/

Course Outcomes		
CO No.	**CO-Statements** On successful completion of this course, students will be able to	**Cognitive Levels (K - Level)**
CO1	Identify the concepts related to global ecology and the environment	**K1**
CO2	Comprehend the natural resources and environmental organizations	**K2**
CO3	Apply the acquired knowledge to sensitize individuals and public about the environmental crisis	**K3**

Relationship Matrix											
Semester	**Course Code**	**Title of the Course**								**Hours**	**Credits**
2	**23UHE24AE01**	**Ability Enhancement Compulsory Course - 2:** Environmental Studies								**2**	**1**
Course Outcomes	**Programme Outcomes (POs)**					**Programme Specific Outcomes (PSOs)**					**Mean Score of COs**
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	1	2	2	3	2	2	2	2	**2.1**
CO2	3	2	1	2	2	3	2	2	2	2	**2.1**
CO3	3	2	2	2	2	2	3	2	1	2	**2.1**
Mean Overall Score											**2.1 (Medium)**