JAYARAJ ANNAPACKIAM COLLEGE FOR WOMEN (AUTONOMOUS)

A Unit of the Sisters of St. Anne of Tiruchirappalli
Accredited with 'A+' Grade (Cycle 4) by NAAC
DST FIST Supported College
Affiliated to Mother Teresa Women's University, Kodaikanal

PERIYAKULAM – 625 601, THENI DT. TAMIL NADU.

B.Sc. CHEMISTRY

(2023-2026)

PG AND RESEARCH CENTRE OF CHEMISTRY

U.G. PROGRAMME OUTCOMES

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Apply scientific knowledge to real life situations to become competent and committed.
2.	Acquire Industry specific skills and equip them to emerge as entrepreneurs.
3.	Explore the knowledge and acclimatize it in the ever changing work environment.
4.	Design and conduct experiments/demos/create models to analyze and interpret data
5.	Communicate effectively on the findings of sciences and incorporate with existing knowledge
6.	Evolve theories and develop innovative discipline specific ideas.

U.G. PROGRAMME SPECIFIC OUTCOMES

PSO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO	PO MAPPED
1.	Emphasize the contextual knowledge in various aspects of chemistry in fields such as organic, inorganic, physical, analytical, spectral, industrial, medicinal, biochemical and environment	PO-1
2.	Explore problem solving skills and analytical skills	PO-3 PO-4
3.	Apply the knowledge and skills of chemistry in small and cottage industrial applications to become an entrepreneur	PO-2
4.	Pursue higher education in pure and applied chemistry and incorporate significantly and effectively in multidiscipline	PO-6
5.	Enhance their career by adopting innovative methods and measures to face the emerging opportunities and challenges	PO-5

U.G. COURSE PATTERN - (2023 - 2026) (UGC/ TANSCHE/ MTU)

Sem.	Part	Code	Title of the Course	Hours	Credit
I	I	23GT1GS01/ 23GH1GS01	Tamil-I/ Hindi-I	6	3
	II	23GE1GS01	English-II	4	3
	III	23CH1MC01	General Chemistry-I	4	4
		23CH1MC02	General Chemistry-II	4	4
		23CH1CP01	Practical: Semimicro Inorganic Qualitative Analysis	3	-
		23MA1AC1A/ 23MA1AC1B 23ZO1AC1A/ 23ZO1AC1B	Allied Mathematics-I / Allied Mathematics-II Allied Zoology-I/ Allied Zoology-II	5/3	4/3
		23ZO1AP1A/ 23ZO1AP1B	Allied Practical-I/ Allied Practical-II	2	1
	IV	23AE1PE01	**AEC -1** (Soft skill - 1) Professional English	2	2
	IV	23CH1FC01	**Foundation Course:** Basics of Chemistry	2	2
	V	23STPNS01/ 23STPNC01/ 23STPPE01/ 23STPCC01/ 23STPRR01/ 23STPRC01	**Students Training Programme:** National Service Scheme/ National Cadet Corps/ Physical Education/ Consumer Club/ Red Ribbon Club/ Youth Red Cross	-	-
			Total	**30**	**22**
II	I	23GT2GS02/ 23GH2GS02	Tamil-II/ Hindi-II	6	3
	II	23GE2GS02	English-II	4	3
	III	23CH2MC03	General Chemistry-III	4	4
		23CH2MC04	General Chemistry-IV	4	4
		23CH2CP01	Practical: Semimicro Inorganic Qualitative Analysis	3	2
		23MA2AC2A/ 23MA2AC2B 23ZO2AC2A/ 23ZO2AC2B	Allied Mathematics-III/ Allied Mathematics-IV Allied Zoology-III/ Allied Zoology-IV	5/3	4/3
		23ZO2AP2A/ 23ZO2AP2B	Allied Practical-III/ Allied Practical-IV	2	1
	IV	23AE2VE02	**AEC - 2** Sustainability Life Skills	2	2
		23SE2CE02	**SEC- 1** Effective English	2	2

Sem.	Part	Code	Title of the Course	Hours	Credit
	V	23STPNS01/ 23STPNC01/ 23STPPE01/ 23STPCC01/ 23STPRR01/ 23STPRC01	**Students Training Programme:** National Service Scheme/ National Cadet Corps/ Physical Education/ Consumer Club/ Red Ribbon Club/ Youth Red Cross	-	-
			Total	**30**	**24**
III	I	23GT3GS03/ 23GH3GS03	Tamil-III/ Hindi-III	6	3
	II	23GE3GS03	English-III	4	3
	III	23CH3MC05	General Chemistry-V	6	6
		23CH3CP02	Practical: Volumetric Estimation	4	3
		23PH3AC3A/ 23PH3AC3B	Allied Physics-I: (Mechanics, Properties of Matter and Thermal Physics/ Gravitation, Heat and Sound)Allied Physics-II	3	3
		23PH3AP3A/ 23PH3AP3B	Allied Practical-I/ Allied Practical-II	2	1
	IV	23SE3CH03	**SEC - 2:** Entrepreneurship Skills in Chemistry	1	1
		23CH3GE01/ 23GE3NC01	**GE -1** Applied Chemistry (Arts to Arts & Science to Science)/ National Integration and Personality Development	2	2
		23AE3ES03	**AEC - 3** Environmental Studies	2	2
	V	23STPNS01/ 23STPNC01/ 23STPPE01/ 23STPCC01/ 23STPRR01/ 23STPRC01	**Students Training Programme:** National Service Scheme/ National Cadet Corps/ Physical Education/ Consumer Club/ Red Ribbon Club/ Youth Red Cross	-	-
			Total	**30**	**24**
IV	I	23GT4GS04/ 23GH4GS04	Tamil/ Hindi	6	3
	II	23GE4GS04	English-4	4	3
	III	23CH4MC06	General Chemistry-VI	5	5
		23CH4CP03	Practical: Microscale Organic Analysis and Preparation	4	3
		23PH4AC4A/ 23PH4AC4B	Allied Physics-II: (Electricity, Electronics and Modern Physics/Optics, Spectroscopy and Relativity) Allied Physics-IV	3	3
		23PH4AP4A/ 23PH4AP4B	Allied Practical-III/ Allied Practical-IV	2	1
	IV	23SE4OA4B	**SEC - 3** Office Fundamentals	3	2
		23CH4GE02/ 23GE4NC02	**GE-2** Usage of chemicals in daily life (Arts to Science & Science to Arts)/ Organization and Health Programme in NCC	2	2
		23AE4CB04	**AEC - 4** (Capacity Building)	1	1

Sem.	Part	Code	Title of the Course	Hours	Credit
	V	23STPNS01/ 23STPNC01/ 23STPPE01/ 23STPCC01/ 23STPRR01/ 23STPRC01	**Students Training Programme:** National Service Scheme/ National Cadet Corps/ Physical Education/ Consumer Club/ Red Ribbon Club/ Youth Red Cross	-	1*
			Total	**30**	**23+1***
V	III	23CH5MC07	Organic Chemistry-I	6	5
		23CH5MC08	Physical Chemistry-I	6	4
		23CH5MC09	Inorganic Chemistry-I	5	4
		23CH5CP04	Practical: Physical Chemistry Experiments	5	3
		23CH5DE1A/ 23CH5DE1B/ 23CH5DE1C	**Discipline Specific Elective - 1** Analytical Chemistry / Textile Chemical Processing/ Diary Chemistry	4	3
	III	23CH5DE2A/ 23CH5DE2B/ 23CH5DE2C	**Discipline Specific Elective - 2** Spectroscopy and its Applications to Chemistry/ Nano Chemistry / Bio and Pharmaceutical Chemistry	4	3
	IV	23CH5IN01/ 23CH5IT01	Internship/ Industrial Training (Carried out in II year Summer Vacation) (30 hours) / atleast 6 days (IV Sem)	-	2
	V	23SLPEX01	**Service Learning Programme:** Extension JACEP	-	-
			Total	**30**	**24**
VI	III	23CH6MC10	Organic Chemistry-II	5	4
		23CH6MC11	Physical Chemistry-II	5	4
		23CH6MC12	Inorganic Chemistry-II	5	4
		23CH6CP05	Practical: Inorganic Preparation and Gravimetric Estimation	5	3
		23CH6PR01	Group Project /Project based learning for CS	4	3
		23CH6DE3A/ 23CH6DE3B/ 23CH6DE3C	**Discipline Specific Elective - 3** Industrial Chemistry/ Molecules of Life / Fuel Chemistry	3	2
	IV	23SE6CH04	**Skill Enhancement Course (SEC) - 4** **(Domain specifc skill courses)** Water, Milk and Food Analysis	3	2
	V	23CH6SS01/ 23CH6SS02/ 23CH6SS03/ 23CH6SS04/ 23CH6SM01	**Self Study Course:** Principles and Applications of Green Chemistry/ Herbal Chemistry/ Energy for Future/ Polymer Chemistry/ MOOCs	-	2*
		23SLPEX01	**Extension(JACEP)**	-	1
			Total	**30**	**23+2***
			Total	**180**	**140+3***

*** Extra Credits**

ALLIED COURSES OFFERED BY THE DEPARTMENT

FOR I B.Sc. ZOOLOGY (R+SF) STUDENTS

Sem.	Part	Code	Title of the Paper	Hours	Credit
I	III	23CH1AC1A/ 23CH1AC1B	Allied Chemistry-I / General Concepts in Chemistry-I	3	3
	III	23CH1AP1A/ 23CH1AP1B	Allied Practical: Volumetric Estimation/ Allied Practical: Semimicro Inorganic Qualitative Analysis	2	1
II	III	23CH2AC2A/ 23CH2AC2B	Allied Chemistry-II/ General Concepts in Chemistry-II	3	3
	III	23CH2AP2A/ 23CH2AP2B	Allied Practical: Organic analysis/ Allied Practical: Quantitative estimation	2	1

FOR II B.Sc. PHYSICS (R+SF) STUDENTS

Sem.	Part	Code	Title of the Paper	Hours	Credit
III	III	23CH3AC3A/ 23CH3AC3B	Allied: General Chemistry-I / Allied: General Aspects of Chemistry-I	3	3
	III	23CH3AP3A/ 23CH3AP3B	Allied Practical: Organic Analysis/ Allied Practical: Semimicro Inorganic Qualitative Analysis	2	1
IV	III	23CH4AC4A/ 23CH4AC4B	Allied: General Chemistry-II / Allied: General Aspects of Chemistry-II	3	3
	III	23CH4AP4A/ 23CH4AP4B	Allied Practical :Volumetric Analysis/ Allied Practical :Quantitative Estimation	2	1

SKILL DEVELOPMENT PROGRAMME (SDP) (CERTIFICATE COURSE) GANDHIAN THOUGHT

Code	Title of the Course	Hours	Credit
CCHYGT01	Life of Mahatma Gandhi	60	2
CCHYGT02	Non Violence and Sarvodaya		

SKILL DEVELOPMENT PROGRAMME (SDP) CERTIFICATE COURSE (NON SEMESTER)

Code	Title of the Course	Hours	Credit
23CH1SD01	IT skills for Chemists	60	2

DIPLOMA COURSE (NON SEMESTER)

Code	Title of the Course	Hours	Credit
DCCHMC01	Chemistry of Modern Cosmetics	60	2
DCCHMCP1	Practical: Handling Cosmetics Lab-I	60	1
DCCHMCP2	Practical: Handling Cosmetics Lab-II	60	1
		180	**4**
Total number of hours = 180 Hours			

CONTINUOUS INTERNAL ASSESSMENT COMPONENT (CIA) - 2023-2026 -UG

CIA components for Practical can be decided by the respective Departments.

Passing Minimum in the Continuous Internal Assessment is Compulsory for appearing the External Semester Examination

THEORY:

Component	Marks	Marks
Internal test I	40	Converted to 25
Internal test II	40	
Quiz	10	
Assignment	5	
Attendance	5	
Total	**100**	**25**

PRACTICAL:

Continuous Internal Assessment (CIA) - 40 Marks

External Practical Exam - 60 Marks

PROJECT WORK (UG)

The ratio of marks for Internal and External Examination is 50:50. The Internal Components of project work are given below:

THE INTERNAL COMPONENTS OF PROJECT

Components	Marks
First Review	10
Second Review	10
Final Review (Internal Viva Voce)	30
Total	**50**

EXTERNAL VALUATION OF PROJECT WORK

Components	Marks
Project Report	25
External Viva Voce	25
Total	**50**

INTERNSHIP (UG)

Components	Marks
Internal	50 Marks
External	50 Marks
Total	**100 Marks**

INTERNAL COMPONENTS:

Components	Marks
Report Submission	25 Marks
Presentation and viva (internal)	25 Marks
External (Awarded by the Respective Guide / Intern site)	50 Marks

PASSING MINIMUM FOR EXTERNAL SEMESTER EXAMINATION-UG

Semester Examination		
Theory	40% out of 75 Marks (i.e. 30 Marks)	40% out of 100 Marks (i.e. 40 Marks)
Practical	40% out of 60 Marks (i.e. 24 Marks)	

INTERNAL QUESTION PATTERN - UG (2023-2026)

Max. Marks - 40 **Duration - 2 Hours**

Section	Bloom's level	Course Outcome	Questions
A MCQs (10×1=10)	K1	CO1	1.
		CO1	2.
		CO1	3.
		CO1	4.
		CO1	5.
		CO1	6.
		CO1	7.
		CO1	8.
		CO1	9.
		CO1	10.
B Answer all the Questions (2×5=10)	K2	CO2	11. a) (or) 11. b)
	K3	CO3	12. a) (or) 12. b)
C Answer all the questions (2×10=20)	K4	CO4	13. a) (or) 13. b)
	K5	CO5	14. a) (or) 14. b)

INTERNAL QUESTION PATTERN (Fully Internal Papers) - UG (2023-2026)

Max. Marks - 40 **Duration - $1\frac{1}{2}$ Hours**

Section	Bloom's level	Course Outcome	Questions
A MCQs (10×1=10)	K1	CO1	1.
		CO1	2.
		CO1	3.
		CO1	4.
		CO1	5.
		CO1	6.
		CO1	7.
		CO1	8.
		CO1	9.
		CO1	10.
B Answer all the Questions (2×5=10)	K2	CO2	11. a) (or) 11. b)
	K3	CO3	12. a) (or) 12. b)
C Answer all the questions (2×10=20)	K4	CO4	13. a) (or) 13. b)
	K5	CO5	14. a) (or) 14. b)

UG - EXTERNAL QUESTION PATTERN

For Credits 5 and above

Sections	Bloom's level	Course Outcome	Questions
A MCQs 15×1=15	K1	CO1	1
			2
			3
			4
			5
			6
			7
			8
			9
			10
			11
			12
			13
			14
			15
B Answer All the Questions 5×2=10	K2	CO2	16
			17
			18
			19
			20
C Answer ALL the Questions 5×5=25	K1	CO1	21. a)
			Or
			21. b)
	K2	CO2	22. a)
			Or
			22. b)
	K3	CO3	23. a)
			Or
			23. b)
	K4	CO4	24. a)
			Or
			24. b)
	K5	CO5	25. a)
			Or
			25. b)

D Answer All the Questions 5×10=50	K1	CO1	26. a)
			Or
			26. b)
	K2	CO2	27. a)
			Or
			27. b)
	K3	CO3	28. a)
			Or
			28. b)
	K4	CO4	29. a)
			Or
			29. b)
	K5	CO5	30. a)
			Or
			30. b)

UG - EXTERNAL QUESTION PATTERN

For Below 5Credits

Sections	Bloom's level	Course Outcome	Questions
A MCQs 15×1=15	K1	CO1	1
			2
			3
			4
			5
			6
			7
			8
			9
			10
			11
			12
			13
			14
			15
B Answer All the Questions 5×6=30	K1	CO1	16. a)
			Or
			16. b)
	K2	CO2	17. a)
			Or
			17. b)
	K3	CO3	18. a)
			Or
			18. b)
	K4	CO4	19. a)
			Or
			19. b)
	K5	CO5	20. a)
			Or
			20. b)
C Answer All the Questions 3×10=30	K2	CO2	21. a)
			Or
			21. b)
	K3	CO3	22. a)
			Or
			22. b)
	K4	CO4	23. a)
			Or
			23. b)

Note: Revised Bloom's Taxonomy Levels

Remembering - K1 **Understanding - K2** **Applying - K3**
Analysing - K4 **Evaluating - K5**

ALLIED COURSES OFFERED BY

Sem.	Part	Code	Title of the Paper	Hours	Credit
I	III	23CH1AC1A/ 23CH1AC1B	Allied Chemistry-I / General Concepts in Chemistry-I	3	3
	III	23CH1AP1A/ 23CH1AP1B	Allied Practical: Volumetric Estimation/ Allied Practical: Semimicro Inorganic Qualitative Analysis	2	1
II	III	23CH2AC2A/ 23CH2AC2B	Allied Chemistry-II/ General Concepts in Chemistry-II	3	3
	III	23CH2AP2A/ 23CH2AP2B	Allied Practical: Organic analysis/ Allied Practical: Quantitative estimation	2	1

EVALUATION PATTEREN FOR CERTIFICATE COURSE :
IT SKILLS FOR CHEMISTS
AND
DIPLOMA COURSE : CHEMISTRY OF MODERN COSMETICS
TESTING AND EVALUATION

Internal	External	Total
25	75	100

Components : 23CH1SD01

Component		Marks	
Internal Test - I	:	40	Converted to 25
Internal Test - II	:	40	
Practical Test	:	20	
Total	**:**	**100**	

CIA Components - DCCHMC01

Component		Marks	
Internal Test - I	:	40	**Converted to** 25
Internal Test - II	:	40	
Assignment	:	10	
Quiz/Seminar	:	10	
Total	**:**	**100**	

Passing Minimum for Continuous Internal Assessment (CIA)	
Theory & Practical	40% out of 25 Marks (i.e. 10 Marks)

INTERNAL QUESTION PATTEREN FOR

CERTIFICATE COURSE - IT SKILLS FOR CHEMISTS

AND

DIPLOMA COURSE -CHEMISTRY OF MODERN COSMETICS

SECTION	Types of Question	Number of Qns.	Number of Qns. to be answered	Marks for each Qn.	Total
A Q. No (1-5)	-	5	5	2	**10**
B Q. No (6-7)	Internal Choice	2	2	5	**10**
C Q. No (8-10)	Open choice	3	2	10	**20**

EXTERNAL QUESTION PATTEREN FOR

CERTIFICATE COURSE - IT SKILLS FOR CHEMISTS

AND

DIPLOMA COURSE - CHEMISTRY OF MODERN COSMETICS

Class: **Time: 2½ Hours**

Date: **Max.: 75 Marks**

Code and Ttitle of Paper:

SECTION	Types of Question	Number of Qns.	Number of Qns. to be answered	Marks for each Qn.	Total
A Q. No (1-10)	Two questions from each unit	10	10	2	**20**
B Q. No (11-15)	Internal Choice, one question from each unit	5	5	5	**25**
C Q. No (16-20)	Open choice, One question from each unit	5	3	10	**30**

PRACTICAL: HANDLING COSMETICS LAB - I (Internal Only)

Code: DCCHMCP1

CIA Components for Internal Assessment

Component		Marks
Component- I (Manicure)	:	20
Component- II (Pedicure)	:	20
Component- III (Hair cutting)	:	20
Component- IV (Hair dressing)	:	20
Component- V (Hair do)	:	20
Total	**:**	**100**

PRACTICAL: HANDLING COSMETICS LAB - II (Internal Only)

Code: DCCHMCP2

CIA Components for Internal Assessment

Component		Marks
Component- I (Mehandi)	:	20
Component- II (Nail care)	:	20
Component- III (Bleaching)	:	20
Component- IV (Saree Draping)	:	20
Component- V (Bridal Make up)	:	20
Total	**:**	**100**

Passing Minimum
40% out of 100 Marks

பொதுத்தமிழ் - 1 (பிற துறை மாணவிகளுக்கு மட்டும்)

பருவம்: ஒன்று **நேரம்: 6**

குறியீடு: 23GT1GS01 **புள்ளி: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	பாரதியார் காலந்தொட்டு தற்காலப் புதுக்கவிதைகள் வரை கவிதை இலக்கியம் அறிமுகப்படுத்தப்படுவதால் படைப்பாற்றல் திறன் அறிந்து கொள்வர்.	PSO-1	K1
CO - 2	புதுக்கவிதை வரலாற்றினை புரிந்து கொள்வார்.	PSO-5	K2
CO - 3	இக்கால இலக்கிய வகையினைக் கற்பதன் மூலம் படைப்பாக்கத் திறனைப் பெறுவர்.	PSO-2	K3
CO - 4	இக்கால இலக்கிய மொழியறிவோடு சிந்தனைத் திறன் அடையும் ஆற்றலை உணர்வர்.	PSO-3	K4
CO - 5	நவீன இலக்கிய உத்திகளைப் பயன்படுத்தி தமிழ் மொழியைப் பிழையின்றி எழுதவும், புதிய கலைச்சொற்களை உருவாக்கும் திறன் பெறுவர்.	PSO-4	K5

K1- நினைவு கூர்தல் K2-புரிதல், K3- பயன்படுத்துதல், K4 - பகுத்தல், K5 - மதிப்பீடு,

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				பொதுத்தமிழ் - 1 (பிற துறை மாணவிகளுக்கு மட்டும்)								**Hours: 6**
Code : 23GT1GS01												**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	5	2	3	3	3	5	3	2	3	3	3.18
CO - 2	4	3	3	5	3	3	3	3	3	4	5	3.55
CO - 3	3	4	3	3	5	5	4	5	3	3	3	3.73
CO- 4	3	4	5	3	3	3	4	3	5	3	3	3.55
CO - 5	5	3	3	3	3	3	3	3	3	5	3	3.36
Overall Mean Score												**3.47**

Result: The score for this course is **3.47** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

அலகு 1: மரபுக் கவிதை

1. பெ. சுந்தரனார் - தமிழ்த் தெய்வ வணக்கம்
2. பாரதிதாசன் - சிறுத்தையே வெளியில் வா
3. கவிமணி - புத்தரும் சிறுவனும்
4. முடியரசன் - மொழி உணர்ச்சி
5. கண்ணதாசன் - ஆட்டனத்தி ஆதிமந்தி (ஆதிமந்தி புலம்பல்)
6. சுரதா - துறைமுகம்
7. தமிழ் ஒளி - கடல் **18 Hours**

அலகு 2: புதுக்கவிதை

1. அப்துல் ரகுமான் - வீட்டுக்கொரு மரம் வளர்ப்போம்
2. ஈரோடு தமிழன்பன் - ஒரு வண்டி சென்றியூ கவிதைகள் - (ஐந்து மட்டும்)
3. வைரமுத்து - வேறென்ன வேண்டும்
4. மு. மேத்தா - வாழைமரத்தின் சபதம்
5. அறிவுமதி - வள்ளுவம் பத்து
6. நா. முத்துக்குமார் - ஆனந்த யாழை மீட்டுகிறாய்
7. சுகிர்தராணி - சபிக்கப்பட்ட முத்தம்
8. இளம்பிறை - நீ எழுத மறுக்கும் எனது அழகு **18 Hours**

அலகு 3: சிறுகதைகள்

1. ஜெயகாந்தன் - வாய்ச்சொற்கள்
2. புதுமைப்பித்தன் - கடிதம்
3. உமா மகேஸ்வரி - கரு
4. தி. ஜானகிராமன் - முள்முடி
5. விழி பா. இதயவேந்தன் - சிதறல்கள்
6. சு. சமுத்திரம் - காகிதஉறவு
7. அம்பை - வீட்டின் மூலையில் சமையல் அறை
8. மலையாளச் சிறுகதைகள் - செப்புமொழிபதினெட்டுடையாள் - (மொழிபெயர்ப்புக் கதை) தந்தையும் மகனும் **18 Hours**

அலகு 4: பாடம் சார்ந்த இலக்கிய வரலாறு **18 Hours**

அலகு 5: மொழித்திறன் போட்டித் தேர்வு

1. பொருள் பொதிந்த சொற்றொடர் அமைத்தல்
2. ஓர் எழுத்து ஒரு மொழி
3. வேற்றுமை - உருபுகள்
4. திணை, பால், எண், இடம்
5. கலைச்சொல்லாக்கம், மொழிபெயர்ப்பு **18 Hours**

(குறிப்பு: அலகு 4, 5 ஆகியன போட்டித் தேர்வு நோக்கில் நடத்தப்பட வேண்டும்)

பாட நூல்கள்

1. தமிழ்த்துறை வெளியீடு (தொகுப்பு) - பொதுத்தமிழ் - 1
   ஜெயராஜ் அன்னபாக்கியம் மகளிர் கல்லூரி
   (தன்னாட்சி), பெரியகுளம்.
2. முனைவர் சி. பாலசுப்பிரமணியன் - தமிழ் இலக்கிய வாலாறு,
   பாவை பப்ளிகேஷன்ஸ், சென்னை - 60
   இரண்டாம் பதிப்பு - 2016.

பார்வை நூல்கள்:

1. பெ. சுந்தரனார் - மனோன்மணீயம்
   நியூ செஞ்சுரி புக் ஹவுஸ்
   சென்னை.
2. முடியரசன் - முடியரசன் கவிதைகள்,
   பாரிநிலையம்,
   சென்னை.
3. பாரதிதாசன் - பாரதிதாசன் கவிதைகள்,
   மணிவாசகர் பதிப்பகம்,
   சென்னை
4. கவிமணி - ஆசிய ஜோதி
   பாவை பப்ளிகேஷன்ஸ்
   சென்னை.
5. கண்ணதாசன் கவிதைகள் - ஆட்டனத்தி ஆதிமந்தி
   வானதி பதிப்பகம்,
   சென்னை.
6. வைரமுத்து - வைரமுத்து கவிதைகள்
   திருமகள் நிலையம்,
   சென்னை.
7. மு. மேத்தா - மு. மேத்தா கவிதைகள்,
   கவிதா வெளியீடு,
   சென்னை.
8. கவிஞர் சிற்பி - சிற்பியின் கவிதை வானம்,
   மணிவாசகர் பதிப்பகம்,
   சென்னை.
9. நா. முத்துக்குமார் - ஆனந்த யாழை மீட்டுகிறாய்
   இணையவழி தகவல் திரட்டு
10. சுகிர்தாராணி - சபிக்கப்பட்ட முத்தம்
    இணையவழி தகவல் திரட்டு

11. ஜெயகாந்தன் - ஜெயகாந்தன் சிறுகதைகள்,
கவிதா பப்ளிகேஷன்ஸ்,
சென்னை.

12. ச. சுபாஷ் சந்திரபோஸ் (தொகுப்பாசிரியர்) - புதுமைப்பித்தன் சிறுகதைகள்,
பாவை பப்ளிகேஷன்ஸ்,
சென்னை.

13. தி. ஜானகிராமன் - தி. ஜானகிராமன் படைப்புகள்,
ஐந்திணைப் பதிப்பகம்,
சென்னை.

14. சு. சமுத்திரம் - சு. சமுத்திரம் கதைகள்,
ராஜராஜன் பதிப்பகம்,
சென்னை.

15. தமிழாக்கம் கோ. பிச்சை - செப்புமொழி பதினெட்டுடையாள்,
நியூசெஞ்சுரி புக் ஹவுஸ்,
சென்னை.

16. சி. பாலசுப்பிரமணியன், - தமிழ் இலக்கிய வரலாறு
பாவை பப்ளிகேஷன்ஸ், சென்னை - 600 014.

17. புலவர் குழந்தை - மாணவர் அடிப்படைத் தமிழ் இலக்கணம்,
சாரதா பதிப்பகம்,
சென்னை - 600 014.

18. எ.ப். பாக்கியமேரி - வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு
நியூசெஞ்சுரி புக் ஹவுஸ், சென்னை.

PART I - HINDI - COURSE PATTERN (2023 - 2026)

Part	Sem.	Code	Title of the Paper	Hours/ Week	Credit
I	I	23GH1GS01	Paper - I - Prose, Short Story and Grammar - I	5	3
	II	23GH2GS02	Novel, One act Play, and Grammar - II	5	3
	III	23GH3GS03	Poetry and History of Hindi Literature, Alankar	5	3
	IV	23GH4GS04	General Essay, Technical Hindi, Translation, and Letter Writing	5	3
		Total		**20**	**12**

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate

TESTING AND EVALUATION

Course	Continuous Internal Assessment	Semester Examination
Hindi	25%	75%

Continuous Internal Assessment Component (CIA)

Component	Marks	Marks
Internal test I	40	Converted to 25
Internal test II	40	
Quiz	10	
Assignment	5	
Attendance	5	
Total	**100**	**25**

CONTINUOUS INTERNAL ASSESSMENT COMPONENT (CIA)

CIA components for Practical can be decided by the respective Departments.

Passing Minimum in the Continuous Internal Assessment is Compulsory for appearing the External Semester Examination

Passing Minimum for CIA Examination	
Theory	40% out of 25 Marks (i.e. 10 Marks)

PASSING MINIMUM FOR EXTERNAL SEMESTER EXAMINATION -UG

Semester Examination		
Theory	40% out of 75 Marks (i.e. 30 Marks)	40% out of 100 Marks (i.e. 40 Marks)
Practical	40% out of 60 Marks (i.e. 24 Marks)	

PAPER I - PROSE, SHORT STORY AND GRAMMAR - I

Semester: I **Hours: 5**

Code : 23GH1GS01 **Credits: 3**

1. Prose : Naveen Hindi Patamala Part-3

Published by Dakshina Bharathi Hindi Prachar Sabha,

Thyagaraya Nagar, Chennai - 600 017.

The following Lessons have been prescribed

a) Shiraj Ki Gurubhakthi

b) Shri Krishn

c) Gupth Rupya

d) Karmaveer Kamaraj

2. Short Story : Kahani Manjari

Edited by: Dakshin Bharath Hindi Prachar Sabha,

Thyagaraya Nagar, Chennai - 600 017.

The following short stories have been priscribed

a) Badegar kee beti - Premchand

b) Thayee - Vishwamranava Shrama Kaushik

c) Paanch minute - Mohanlalji Mahato yogi

d) Usne Kaha tha - Chandradharshama Guleri

3. Grammar 1 : Vyakaran Pradeep Published by Ramdev, Hindi Bhaan,

63, Tagore Nagarm Allahabad -2

The following topics have been prescribed

a) Noun b) Gender and Number

c) Pronoun d) Adjectives

COMMUNICATIVE ENGLISH - I

Semester: I **Hours: 4**

Code : 23GE1GS01 **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Discover a fair degree of competence in self-expression in both writing and speaking	PSO-5	K1
CO - 2	Comprehend by reading texts	PSO-2	K2
CO - 3	Articulate academic resources	PSO-4	K3
CO - 4	Focus on independent learning	PSO-3	K4
CO - 5	Estimate critical and analytical thinking	PO-1	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				**COMMUNICATIVE ENGLISH -I**							**Hours: 4**
Code : 23GE1GS01											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	5	3	3	3	5	4	3	3	3	5	3.73
CO - 2	4	3	3	5	4	3	4	5	3	4	3	3.73
CO - 3	4	3	3	3	5	3	4	3	3	5	3	3.55
CO - 4	3	3	5	3	4	3	3	3	5	4	3	3.55
CO - 5	5	3	4	3	4	3	5	3	4	4	3	3.73
Overall Mean Score												**3.65**

Result: The score for this course is **3.65** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I **12 Hours**

1. Listening and Speaking
    a. Introducing self and others
    b. Listening for Information
    c. Pronunciation (without phonetic symbols)
    i. Essentials of pronunciation
    ii. American and British pronunciation
2. Reading and Writing
    a. Reading short articles - newspaper reports / fact based articles
    i. Skimming and scanning
    ii. Diction and tone
    iii. Identifying topic sentences
    b. Reading aloud: Reading an article/report
    c. Journal (Diary) Writing
3. Study Skills - I
    a. Using dictionaries, encyclopaedias, thesaurus

UNIT II **12 Hours**

1. Listening and Speaking
    a. Listening with a Purpose
    b. Effective Listening
    c. Tonal Variation
    d. Listening for specific information
    e. Asking for Information
    f. Giving Information
2. Reading and Writing
    a. Types of Reading: Extensive and Intensive Reading
    b. Reading a Prose Passage
    c. Reading a Poem
    d. Reading a Short Story
3. Paragraphs: Structure and types
    a. What is a Paragraph?
    b. Paragraph Structure
    c. Topic Structure
    d. Unity
    e. Coherence
    f. Connections between Ideas: Using Transitional words and expressions
    g. Types of Paragraphs

4. Study skills - II

   Using the internet as a resource

   a. Online search

   b. Know the keyword

   c. Refine your search

   d. Guidelines for using the Resources

   e. E- Learning resources of Government of India

   f. Terms to know

UNIT III **12 Hours**

1. Listening and Speaking

   a. Giving and following instructions

   b. Asking for and giving directions

   c. Continuing discussions with connecting ideas

2. Reading and writing

   a. Reading feature articles (from newspapers and magazines)

   b. Reading to identify point of view and perspective (opinion pieces, editorials etc.)

   c. Descriptive writing - writing a short descriptive essay of two to three paragraphs

UNIT IV **12 Hours**

1. Listening and Speaking

   a. Giving and responding to opinions

2. Reading and writing

   a. Note taking

   b. Narrative writing - writing narrative essays of two to three paragraphs

UNIT V **12 Hours**

1. Grammar in Context

   Naming and Describing

   a. Nouns and Pronouns

   b. Adjectives

Involving Action- I

   a. Verbs

   b. Concord

Involving Action- II

   a. Verbal- Gerund, Participle, Infinitive

   b. Modals

Tense

   a. Present

   b. Past

   c. Future

COURSE BOOKS:

- Communicative English (For Students of Arts and Science Colleges) Tamilnadu State Council for Higher Education (TANSCHE)
- Savarimuttu, Rohan J. S, and G. Petricia Alphine Nirmala, *English Grammar and Usage - An Ideal Companion for Advanced Learners*. New Century Book House (P) Ltd, 2016.

BOOKS FOR REFERENCE

1. Kumar, Manoj. *English Communication: Theory and Practice. Scholar* .Tech Press, 2018.
2. Nachmuthu, Cambridge. *Advanced Communication English.* Cambridge Publishers, 2011.

WEB SOURCES

1. https://www.youtube.com/watch?v=Y94s85-Crew
2. https://www.esolcourses.com/content/topicsmenu/listening.html
3. https://www.ox.ac.uk/students/academic/guidance/skills/plagiarism?wssl=

GENERAL CHEMISTRY - I

Semester: I **Hours: 4**

Code : 23CH1MC01 **Credit: 4**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the history of structure of atom, rules for electronic configuration, postulates of modern periodic table and basic concepts of organic chemistry	PSO-1	K1
CO - 2	Explain the wave particle nature, effective nuclear charge, long form of periodic table, nomenclature of organic compounds and cleavage of a covalent bond	PSO-2	K2
CO - 3	Apply de Broglie equation to particles, principles and rules to write electronic configuration, periodic properties to elements, homologous series and types of reagents and intermediates in organic reactions	PSO-3	K3
CO - 4	Analyse the Rutherford and Bohr's model of atom, quantum numbers, periodic variations of atomic radii, ionisation energy, electronegativity, IUPAC nomenclature and types of reactions	PSO-4	K4
CO - 5	Evaluate Sommerfeld model of atom, extra stability of orbitals, factors determining periodic properties, functional groups, the stability of reaction intermediates	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				**GENERAL CHEMISTRY-I**							**Hours: 4**
Code : 23CH1MC01											**Credit: 4**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	4	4	3	3	5	4	3	3	3	3.64
CO - 2	4	4	5	5	3	3	4	5	4	3	3	3.91
CO - 3	3	5	4	4	3	4	3	4	5	4	3	3.82
CO - 4	3	4	3	3	4	5	3	3	4	5	4	3.73
CO - 5	3	3	3	3	5	4	3	3	3	4	5	3.55
Overall Mean Score												**3.73**

Result: The score for this course is **3.73** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: STRUCTURE OF ATOM - I:

History of atom: Rutherford nuclear model of the atom - photoelectric effect and quantum theory - Bohr's model of the atom - Bohr's theory and origin of Hydrogen spectrum - Sommerfeld's extension of Bohr's theory - de Broglie concept of particle and wave character - derivation of de Broglie equation-related problems - distinction between matter waves and electromagnetic waves - experimental verification of de Brogli's relation - Davisson and Germer experiment. **(12 Hours)**

UNIT II: STRUCTURE OF ATOM - II:

Heisenberg's uncertainty principle - Compton effect - s, p, d, f orbitals and their shapes - differences between orbit and orbital - quantum numbers - Slater's rule: concept of effective nuclear charge - Aufbau principle - Pauli's exclusion principle - Hund's rule of maximum multiplicity - Rules to write electronic configuration of atoms - extra stability of half-filled and completely filled orbitals.

(12 Hours)

UNIT III: MODERN PERIODIC TABLE AND PERIODIC TRENDS:

Modern periodic law - long form of periodic table - periods - groups - cause of periodicity - division of elements into s, p, d, and f blocks - atomic properties and periodic variations: size of atoms and ions, covalent radius, van der Waals radius, ionic radius, ionization energy - factors determining ionization energy - electron affinity - electronegativity. **(12 Hours)**

UNIT IV: BASIC CONCEPTS IN ORGANIC CHEMISTRY - I:

Classification of organic compounds: acyclic and cyclic compounds - homocyclic and heterocyclic compounds - homologous series - nomenclature of organic compounds: alkanes, alkenes, alkynes, alkyl halides, alcohols, ethers, carbonyl groups, nitro compounds, amines, carboxylic acids, amides and alicyclic compounds - writing of names - IUPAC nomenclature. **(12 Hours)**

UNIT V: BASIC CONCEPTS IN ORGANIC CHEMISTRY - II:

Types of reagents: nucleophilic and electrophilic reagents - notations used in organic chemistry - homolytic and heterolytic cleavage of a covalent bond - structure and stability of free radicals - carbocations - carbanions - carbenes - aryne and nitrenes - types of organic reactions: substitution, addition, elimination and rearrangement reactions. **(12 Hours)**

COURSE BOOKS:

1. B.R.Puri, L.R.Sharma and M.S. Pathania, Principles of Physical Chemistry, Vishal publishing co, 46th edition,2013. **Unit I - II**
2. B.R. Puri, L.R. Sharma and K.C. Kalia, Principles of Inorganic Chemistry, Milestone Publishers, 31st edition, 2017 **Unit III**
3. P.L. Soni and H.M Chawla, Organic Chemistry, Sultan Chand and Sons, 29th Edition, 2007 **Unit IV**
4. M.K. Jain and S.C. Sharma, Modern Organic Chemistry, Vishal Publishing Co., 4th edition, 2023 **Unit V**
5. M.K. Jain and S.C. Sharma and Fateh Bahadur, Graduate Organic Chemistry, Vishal Publishing Co., Volume - I, 2018-19 **Unit V**
6. A. Mary Imelda Jayaseeli, M. Kalanithi, C. Mary Anbarasi, Sr. T. Johny Dathees and Sr. S. Sahaya Leenus, Allied Chemistry, New Century Book House (P)Ltd., Chennai, first edition, 2020 **Unit I - III**

GENERAL CHEMISTRY - II

Semester: I **Hours: 4**
Code : 23CH1MC02 **Credit: 4**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire basic knowledge on chemical bonding, hybridization, theories of VB, VSEPR and MO, electronic effects in organic reaction and quantum mechanics	PSO-1	K1
CO - 2	Describe the types of chemical bonding, hydrogen bonding, overlap of atomic orbitals, substituent effects in organic reaction and differences between classical and quantum mechanics	PSO-2	K2
CO - 3	Find out the bonding, hybridization, shapes, bond order of chemical compounds, relative stability of the organic compounds and postulates of quantum mechanics	PSO-3	K3
CO - 4	Analyse the polarizing power, intermolecular forces, theories of VB, VSEPR and MO, electron displacements in organic compounds and failure of classical mechanics	PSO-4	K4
CO - 5	Evaluate the properties of chemical bonding and weak chemical forces, resonance stabilization, energy of particle in 1D box	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				GENERAL CHEMISTRY - II							Hours: 4
Code : 23CH1MC02											Credit: 4
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	3	4	4	3	3	5	4	3	3	3	3.63
CO - 2	3	3	5	5	4	3	3	5	3	3	4	3.73
CO - 3	4	5	3	3	3	3	4	3	5	3	3	3.55
CO - 4	4	3	3	3	3	5	4	3	3	5	3	3.55
CO - 5	3	3	4	4	5	3	3	4	3	3	5	3.63
Overall Mean Score												3.62

Result: The score for this course is **3.62** (High Relationship)
Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: IONIC AND COVALENT BONDING:

Introduction - Octet rule - types of bonding - ionic bond: definition - formation of ionic bond, examples of ionic compounds - properties - covalent bond: Lewis concept of covalent bond - polarization of ions and Fajans' rules - properties - factors affecting the polarizing power and polarizability - difference between ionic and covalent bond. **(12 Hours)**

UNIT II: HYBRIDIZATION AND WEAK CHEMICAL FORCES:

Two electron pair: $BeCl_2$, three electron pair: BO_3^{3-}, four electron pair: NH^{4+}, five electron pair: PF_5, six electron pair: SF_6, seven electron pair: IF_7 - Nature of hydrogen bond - intermolecular hydrogen bonding - intermolecular hydrogen bonding - consequences of hydrogen bonding - importance of hydrogen bonding - intermolecular forces - dipole-dipole interaction - induced dipole-induced dipole interaction. **(12 Hours)**

UNIT III

a) VB THEORY:

Postulates of VB theory - types of overlap of atomic orbitals: s-s, s-p, and p-p - strength of covalent bond - σ bond - π bond: formation of π bond in O_2 and N_2 molecules - difference between σ and π bond - concept of resonance - resonance structures: CO_2, NO_2, CO_3^{2-}, NO_3^-

b) VSEPR THEORY:

Cause of change in bond angle - shapes of molecules: AB_2, AB_3, AB_4, AB_5, AB_6 and AB_7

c) MO THEORY:

Basic Principles of MO theory - MO diagram, bond order and magnetic properties: H_2, H_2^+, He_2, N_2, O_2, CO and NO - difference between VBT and MOT **(12 Hours)**

UNIT IV: ELECTRON DISPLACEMENTS IN ORGANIC COMPOUNDS:

Inductive effect - relative acid strengths - formic acid and acetic acid - relative acid strength of halo acids - relative basicities of amines - electeomeric effect - resonance: resonance energy - resonance theory - effect of substituents on acidity of phenol - base weakening effect of amines - free radicals - mesomeric effect - hyperconjucation: relative stability of alkyl free radicals - relative stabilities of simple alkyl cations - streric effect. **(12 Hours)**

UNIT V: INTRODUCTION TO QUANTUM MECHANICS:

Introduction - failure of classical mechanics - black body radiation - origin of quantum mechanics - comparison and relation of classical mechanics with quantum mechanics - Postulates of quantum mechanics - formulation of Schrodinger wave equation (No derivation) - energy derivation of a particle in a 1D box. **(12 Hours)**

COURSE BOOKS:

1. R.D.Madan, Modern Inorganic Chemistry, S.Chand and company Ltd., 3rd edition, 2019. **Unit I - III**
2. B.R. Puri, L.R. Sharma and K.C. Kalia, Principles of Inorganic Chemistry, Milestone Publishers, 31st edition, 2012. **Unit I - III**
3. P.L. Soni and H.M Chawla, Organic Chemistry, Sultan Chand and Sons, 29th Edition, 2007. **Unit IV**
4. M.K. Jain and S.C. Sharma, Modern Organic Chemistry, Vishal Publishing Co., 4th edition, 2013. **Unit IV**
5. B.R.Puri, L.R.Sharma and M.S. Pathania, Principles of Physical Chemistry, Vishal publishing co, 46th edition,2013. **Unit V**

PRACTICAL : SEMI-MICRO INORGANIC QUALITATIVE ANALYSIS

(Examination at the end of II Semester)

Semester:I & II **Hours :3+3**

Code : 23CH1CP01 & 23CH2CP01 **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO-1	Recall the basic principles of semimicro qualitative analysis of inorganic sample adopting systematic procedure	PSO-1	K1
CO-2	Explain the reactions of acid radicals and basic radicals in the analysis	PSO-2	K2
CO-3	Apply the theoretical principles in the analysis of inorganic mixture	PSO-3	K3
CO-4	Analyse the various interfering and non interferring acid radicals and basic radicals	PSO-4	K4
CO-5	Apprasie the procedures and skills of the semimicro inorganic qualitative analysis	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I & II							**PRACTICAL : SEMI-MICRO INORGANIC QUALITATIVE ANALYSIS**					**Hours: 3+3**
Code : 23CH1CP01 & 23CH2CP01												**Credits: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	4	4	3	3	5	4	3	3	3	3.64
CO - 2	4	4	5	5	3	3	4	5	4	3	3	3.91
CO - 3	3	5	3	3	4	4	3	3	5	4	4	3.73
CO - 4	3	4	4	4	4	5	3	4	4	5	4	4.00
CO - 5	3	3	4	4	5	4	3	4	3	4	5	3.82
Overall Mean Score												**3.82**

Result: The score for this course is **3.82** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

Analysis of a mixture following semi-micro method containing two cations and two anions of which one is interfering anion

i) **ANIONS:**

Carbonate, sulphate, nitrate, chloride, bromide, oxalate, borate, phosphate, chromate and fluoride

ii) **CATIONS:**

Lead, copper, cadmium, bismuth, antimony, iron, aluminium, zinc, manganese, cobalt, nickel, barium, strontium, calcium, magnesium and ammonium

COURSE BOOK:

1. V. Venkateswaran, R. Veerasamy and A. R. Kulandaivelu , Basic principles of Practical chemistry, Sultan Chand and sons, 2nd edition, 2012

ALLIED CHEMISTRY - I

Semester: I **Hours: 3**
Code : 23CH1AC1A **Credit: 3**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO-1	Acquire knowledge on the basic concepts of periodic table of elements, atomic structure, chemical bonding, biomolecules, empirical and molecular formula and sources of polymers	PSO-1	K1
CO-2	Describe the periodic properties of elements, different models of atom, classification of carbohydrates, deducing molecular formula and classification of polymers	PSO-2	K2
CO-3	Illustrate the periodic variations of elements, atomic structure, chemical bonding, classification of amino acids, Zwitter ion empirical and molecular formula and preparation of polymers	PSO-3	K3
CO-4	Analyse the periodic properties of elements, orbits, orbitals, MO diagram, proteins, aminoacids, empirical and molecular formula and properties of polymers	PSO-4	K4
CO-5	Evaluate the properties of periodic table elements, types of overlapping of orbitals, structure of carbohydrates, molecular formula and applications of polymers	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				ALLIED CHEMISTRY - I							Hours: 3
Code : 23CH1AC1A											Credit: 3
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	3	4	4	4	3	5	4	3	3	4	3.81
CO - 2	3	3	5	5	3	3	3	5	3	3	3	3.55
CO - 3	3	5	3	3	3	3	3	3	5	3	3	3.36
CO - 4	3	3	3	3	3	5	3	3	3	5	3	3.36
CO - 5	3	3	3	3	5	4	3	3	3	4	5	3.55
Overall Mean Score												3.53

Result: The score for this course is **3.53** (High Relationship)
Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I: PERIODIC TABLE:

Modern periodic table - groups and periods - classification of elements on the basis of electronic configuration - properties of elements - atomic radii - ionic radii - size of atoms and ions - ionization energy - electronegativity -electron affinity-trends in perodic table **(9 Hours)**

UNIT II

a) STRUCTURE OF ATOM:

Bohr model of an atom - merits and demerits - Sommerfield modification - wave nature - de Broglie's equation - difference between orbit and orbital - shapes of atomic orbitals

b) BONDING:

Valence Bond(VB) theory - s-s, s-p and p-p overlap - application to the formation of simple molecules like hydrogen and oxygen - Molecular Orbital(MO) theory - MO diagram for H_2, O_2 and F_2 - difference between VB theory and MO theory **(9 Hours)**

UNIT III

a) CARBOHYDRATES:

Definition - sources - classification-reducing and non reducing sugars Properties of glucose: addition with HCN, $NaHSO_3$ and Phenyl hydrazine-sucrose: inversion of sucrose- uses-Ring and Haworth structure of glucose and fructose- tests for carbohydrates

b) AMINO ACIDS: Classification - Properties : dipolar structure - Zwitter ion - uses

c) PROTEINS: Color reactions of proteins-structure of protein - vitamins:Classification - sources - deficiency diseases **(9 Hours)**

UNIT IV: DEDUCING MOLECULAR FORMULA:

Detection of nitrogen, halogen and sulphur in organic compounds (Lassigne's test) - definition of Empirical Formula (EF), Molecular Formula(MF) and Structural Formula (SF)- calculation of empirical and molecular formula from their percentage composition- difference between EF, MF and SF. **(9 Hours)**

UNIT V: POLYMER CHEMISTRY:

Definition - classification of polymers based on origin, mode of formation, structure and application - rubber - natural rubber - vulcanization - synthetic rubbers - preparation and uses of buna rubbers and neoprene- plastics: Thermoplastics and thermosetting plastics - distinction and uses - resins: Definition - preparation and uses of bakelite. **(9 Hours)**

COURSE BOOK

1. Mary Imelda Jayaseeli, M. Kalanithi, C. Mary Anbarasi, Sr. T. Johny Dathees and Sr. S. Sahaya Leenus, Allied Chemistry-I , New Century Book House (P)Ltd., Chennai, first edition, 2020

GENERAL CONCEPTS IN CHEMISTRY-I

Semester: I **Hours: 3**
Code : 23CH1AC1B **Credit: 3**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the properties of hydrogen, hydrogen peroxide, oxides, halogen compounds, ozone, ideal and real gases, kinetic reactions, alkaloids and terpenoids	PSO-1	K1
CO - 2	Explain the classification of hydrogen, hydrogen peroxide, oxides, ozone, alkaloids and terpenoids and describe the behaviour of ideal gases and rate of the reactions	PSO-2	K2
CO - 3	Illustrate the structure of hydrogen peroxide and ozone, enzyme catalysed reactions, alkaloids and terpenoids and deviation of real gases	PSO-3	K3
CO - 4	Analyse the strength of hydrogen peroxide, halogen compounds, behaviour of real gases, order and molecularity of reactions, isolation of alkaloids and terpenoids	PSO-4	K4
CO - 5	Evaluate the properties of hydrogen, hydrogen peroxide, oxides, halogen compounds and ozone, ideal and real gases, rate constant of reaction, alkaloids and terpenoids	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				**GENERAL CONCEPTS IN CHEMISTRY-I**							**Hours: 3**
Code : 23CH1AC1B											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	3	3	4	3	5	3	3	3	4	3.55
CO - 2	3	3	5	5	3	3	3	5	3	3	3	3.55
CO - 3	4	5	3	3	3	3	4	3	5	3	3	3.55
CO - 4	3	3	3	3	3	5	3	3	3	5	3	3.36
CO - 5	3	3	3	3	5	4	3	3	3	4	5	3.55
Overall Mean Score												**3.51**

Result: The score for this course is **3.51** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: HYDROGEN AND HYDROGEN PEROXIDE :

a) Hydrogen : isotopes of hydrogen -separation of the isotopes -properties and uses of heavy hydrogen -position of hydrogen in the periodic table - ortho and para hydrogen - separation - difference in structure and properties - hydrides - definition - classification -preparation and properties.

b) Hydrogen peroxide: manufacture, properties structure and uses of hydrogen peroxide - estimation of hydrogen peroxide by permanganimetry - strength of hydrogen peroxide in volume strength, normality and percentage - calculation of strength on these different terms. **(9 Hours)**

UNIT II: OXIDES,WATER AND OZONE:

a) Oxides : Definition -classification - properties.

b) Ozone: manufacture, composition, structure and properties.

c)Halogen compounds: Dichloromethane, chloform, carbontetrachloride, DDT and BHC - preparation, properties and uses. **(9 Hours)**

UNIT III: GASEOUS STATE:

Postulates of kinetic theory of gases - derivation of expression for pressure of gases on the basis of kinetic theory - deducing the basic gas laws - derivation of real gases from ideal behaviour - reasons for deviation - derivation of van der Waals gas equation - explanation of behaviour of real gases on the basis of van der Waals gas equation. **(9 Hours)**

UNIT IV: CHEMICAL KINETICS:

Rate of reaction - rate law and rate constant - order and molecularity of reactions - derivation of first order rate constant - half -life period - examples of second order, third order reactions - enzyme kinetics. **(9 Hours)**

UNIT V: ALKALOIDS AND TERPENOIDS:

a) **Alkaloids:** Definition -occurrence - extraction of alkaloids and general properties -classification of alkaloids - structures of cocaine, papaverine, piperine and nicotine (structural elucidation not required).

b) **Terpenoids:** Introduction - classification - occurrence - isolation - general properties - isoprene rule - structures of citral, geraniol, terpeniol, menthol and dipentene (structural elucidation not required). **(9 Hours)**

COURSE BOOKS:

1. K. Ratinamuthu, R.Victoria, Semester -I, Text book of Ancillary Chemistry, Educational publishers, Madurai. **Unit I - III**
2. A. Mary Imelda Jayaseeli, M. Kalanithi, C. Mary Anbarasi, S. Pooranalakshmi, Allied Chemistry III and IV, Shanlax publications., Madurai, first edition, 2022. **Unit IV**
3. K. Ratinamuthu, R.Victoria, Semester -IV, Text book of Ancillary Chemistry, Educational publishers, Madurai. **Unit V**

ALLIED PRACTICAL: VOLUMETRIC ESTIMATION

Semester: I **Hours: 2**
Code : 23CH1AP1A **Credit:1**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recognize the techniques of titrimetric analyses	PSO - 1	K1
CO - 2	Describe the procedures to do the volumetric titration using double burette method	PSO - 2	K2
CO - 3	Estimate the amount of substance present in the given solution	PSO - 3	K3
CO - 4	Demonstrate the different types of titrations such as acidimetry, alkalimetry and permanganometry	PSO - 4	K4
CO - 5	Develop problem solving and analytical skills	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				**ALLIED PRACTICAL: VOLUMETRIC ESTIMATION**							**Hours: 2**
Code : 23CH1AP1A											**Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	4	4	3	3	5	4	3	3	3	3.64
CO - 2	4	3	5	5	3	3	4	5	3	3	3	3.73
CO - 3	3	5	3	3	4	4	3	3	5	4	4	3.73
CO - 4	4	3	3	3	4	5	4	3	3	5	4	3.73
CO - 5	3	3	4	4	5	4	3	4	3	4	5	3.82
Overall Mean Score												**3.73**

Result: The score for this course is **3.73** (High Relationship)
Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

A double titration involving making up of the solution to be estimated following double burette method

ACIDIMETRY AND ALKALIMETRY:

1. Estimation of NaOH
2. Estimation of Na_2CO_3
3. Estimation of HCl
4. Estimation of oxalic acid

PERMANGANIMETRY:

1. Estimation of ferrous sulphate
2. Estimation of ferrous ammonium sulphate
3. Estimation of oxalic acid

IODOMETRY:

Estimation of potassium dichromate (demonstration only)

REFERENCE:

Practical guide prepared by the Chemistry Department

ALLIED PRACTICAL: SEMIMICRO INORGANIC QUALITATIVE ANALYSIS

Semester: I **Hours: 2**

Code: 23CH1AP1B **Credit:1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire skills to perform precipitation and centrifugation methods	PSO-1	K1
CO - 2	Explain the tests for cations and anions present in a given inorganic sample	PSO-2	K2
CO - 3	Apply the procedures of analysis to check the quality of an inorganic substance	PSO-3	K3
CO - 4	Analyse the characteristic reaction of cation and anion in a given sample	PSO-4	K4
CO - 5	Appraise safety measures in handling chemicals	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				**ALLIED PRACTICAL: SEMIMICRO INORGANIC QUALITATIVE ANALYSIS**							**Hours: 2**
Code : 23CH1AP1B											**Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	4	4	3	3	5	4	3	3	3	3.64
CO - 2	4	3	5	5	3	3	4	5	3	3	3	3.73
CO - 3	3	5	3	3	4	4	3	3	5	4	4	3.73
CO - 4	4	3	3	3	4	5	4	3	3	5	4	3.73
CO - 5	3	3	4	4	5	4	3	4	3	4	5	3.82
Overall Mean Score												**3.73**

Result: The score for this course is **3.73** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

Analysis of a simple salt containing one cation and one anion.

i) ANIONS:

Carbonate, sulphate, nitrate, chloride, bromide, oxalate, borate, phosphate, chromate and fluoride

ii) CATIONS:

Lead, copper, cadmium, bismuth, antimony, iron, aluminium, zinc, manganese, cobalt, nickel, barium, strontium, calcium, magnesium and ammonium

COURSE BOOK:

1. V. Venkateswaran, R. Veerasamy and A. R. Kulandaivelu , Basic principles of Practical chemistry , Sultan Chand and sons, 2nd edition, 2012

ESSENTIAL MATHEMATICS - I

Semester: I **Hours: 5**

Code : 23MA1AC1A **Credit: 4**

COURSE OUTCOMES:

CO.NO	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Find the n^{th} derivative of a given function, and know the concept of double and triple integrals and central tendencies	PSO - 1	K1
CO - 2	Understand the concept of derivatives, integrals and measures of central tendencies	PSO - 4	K2
CO - 3	Apply the knowledge of derivatives, integrals and measures of central tendencies in real life scenario	PSO - 2	K3
CO - 4	Analyse the given function, series and the data	PSO - 3	K4
CO - 5	Evaluate the integrals and interpret the given statistical data	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				**ESSENTIAL MATHEMATICS - I**							**Hours: 5**
Code : 23MA1AC1A											**Credit: 4**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	3	3	3	3	5	3	3	3	4	3.54
CO - 2	2	3	3	3	5	5	2	3	3	5	3	3.36
CO - 3	3	3	3	5	3	3	3	5	3	3	3	3.36
CO - 4	3	3	5	3	3	3	3	3	5	3	3	3.36
CO - 5	3	5	3	3	3	3	3	3	3	3	5	3.36
Overall Mean Score												**3.40**

Result: The score for this course is **3.40** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

Successive differentiation - n^{th} derivative - Standard results - Leibnitz formula for n^{th} derivative - Jacobians. **(15 Hours)**

UNIT II

Multiple integrals - Double integrals - Changing the order of integration in double integrals - Double integral in polar coordinates. **(15 Hours)**

UNIT III

Fourier series - Fourier coefficients - Cosine and Sine series. **(15 Hours)**

UNIT IV

Central Tendencies: Introduction - Arithmetic mean - Partition values (Median, Quartiles, Deciles and Percentiles) - Mode - Geometric mean and Harmonic mean - Measures of dispersion. **(15 Hours)**

UNIT V

Moments - Skewness and Kurtosis - Curve fitting: Introduction - Principle of Least Squares - Fitting a straight line - Fitting a second degree parabola.

(15 Hours)

COURSE BOOK:

- Course material compiled by the Department.

BOOKS FOR REFERENCE:

1. S. Arumugam and A. Thangapandi Isaac, Ancillary Mathematics Paper I & III, New Gamma Publishing House, 1996 & 2002.
2. D. C. Sancheti and V. K. Kapoor, Statistics (Theory, Methods & Application), Century Printers, 2011.
3. D N Elhance, Veena Elhance and B. M. Aggarwal, Fundamentals of Statistics, seventh edition, Sultan Chand & Sons, 2009

E-RESOURCE:

1. https://www.classcentral.com/course/introduction-to-ordinary-differential-equations-p-92976

CALCULUS OF FINITE DIFFERENCES

Semester: I **Hours: 5**

Code : 23MA1AC1B **Credit: 4**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge about algebraic and transcendental equations and the method of finite differences	PSO - 4	K1
CO - 2	Understand the methods of interpolation to solve the equations	PSO -2	K2
CO - 3	Apply the techniques of interpolation to solve a given problem	PSO - 3	K3
CO - 4	Analyse the given problem and identify the method to find approximate solutions	PSO - 1	K4
CO - 5	Appraise the techniques of interpolation in realistic situations	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				CALCULUS OF FINITE DIFFERENCES							Hours: 5
Code : 23MA1AC1B											Credit: 4
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	2	3	3	3	5	5	2	3	3	5	3	3.36
CO - 2	3	3	3	5	3	3	3	5	3	3	3	3.36
CO - 3	3	3	5	3	3	3	3	3	5	3	3	3.36
CO - 4	5	4	3	3	3	3	5	3	3	3	4	3.54
CO - 5	3	5	3	3	3	3	3	3	3	3	5	3.36
Overall Mean Score												3.40

Result: The score for this course is **3.40** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

Algebraic and Transcendental equations - Introduction - Errors in numerical computation -Iteration method - Bisection method (Bolzano method) - Regular Falsi method - Newton - Raphson method. **(15 Hours)**

UNIT II

Simultaneous equations - Introduction - Simultaneous Equations - Backward substitution - Gauss Elimination Method - Gauss Jordan Elimination method.

(15 Hours)

UNIT III

Interpolation - Newton's Interpolation Formulae - Central Difference Interpolation formula - Gauss forward interpolation formula - Gauss Backward interpolation formula. **(15 Hours)**

UNIT IV

Sterling's formula - Bessel's formula - Laplace Everette's formula - Lagrange's Interpolation formula - Divided differences - Newton's divided difference formula - Inverse interpolation. **(15 Hours)**

UNIT V

Introduction - Derivatives using Newton's forward difference formula - Derivatives using Newton's backward difference formula - Derivatives using central difference formula. **(15 Hours)**

COURSE BOOK:

- Course material compiled by the Department.

BOOK OF REFERENCE:

1. S. Arumugam, A. Thangapandi Isaac and A. Somasundaram, Numerical Methods, SciTech Publications (India) Pvt. Ltd., Second Edition, 2010.

E-RESOURCE:

1. https://www.classcentral.com/course/introduction-to-ordinary-differential-equations-p-92976

ALLIED ZOOLOGY - I

Semester: I **Hours: 3**
Code : 23ZO1AC1A **Credit: 3**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the general characteristics and classifications of major phyla in Invertebrates	PSO - 1	K1
CO - 2	Explain the distinctive features of key specimens in Invertebrates.	PSO - 5	K2
CO - 3	Interpret the evolutionary significance and importance of Invertebrates.	PSO - 3	K3
CO - 4	Analyze the structural and functional organizations of Invertebrates.	PSO - 4	K4
CO - 5	Evaluate the exceptional attributes of different classes of Invertebrates.	PSO - 2	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				**ALLIED ZOOLOGY - I**							**Hours:**
Code : 23ZO1AC1A											**Credit:**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	2	3	4	3	5	4	2	3	3	3.36
CO - 2	4	5	2	2	3	5	4	3	2	2	5	3.36
CO - 3	3	4	5	4	3	4	3	3	5	4	4	3.82
CO - 4	4	4	2	5	4	4	4	4	2	5	4	3.82
CO - 5	4	4	2	4	5	4	4	5	2	4	4	3.82
Overall Mean Score												**3.64**

Result: The score for this course is **3.64** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

Invertebrates: Salient features of invertebrates, Binomial Nomenclature, Outline classification of animals. Levels of organization - Grades of organization, Symmetry and Coelom. **Protozoa:** General characters with an example. Salient features of Amoeba, Euglena and Paramecium. Nutrition in protozoa. **Porifera:** General characters with an example. Salient features of ascon and sycon sponge. **(9 Hours)**

UNIT II

Coelenterata: General characters with an example. Salient features of Hydra Physalia, Aurelia and Obelia. Polymorphism in coelenterate, Types of corals and Structure of coral polyp. **Platyhelminthes:** General characters with an example. Salient features of Tape worm Planaria, Schistosoma and Liver fluke. Parasitic adaptations of liver fluke, Platyhelminth parasites of man. **(9 Hours)**

UNIT III

Aschelminthes: General characters with an example. Salient features of Ascaris, Ancylostoma, Dracunculus and Wuchereria. Parasitic adaptations of nematodes, Nematode parasites in man. **Annelida:** General characters with an example. Salient features of Earth worm, Chaetopterus and Nereis. Metamerism in annelids. **(9 Hours)**

UNIT IV

Arthropoda: General characters with an example. Salient features of prawn, spider, tick, mite and Limulus. Larval forms of crustacea, Beneficial insects, Affinities of Peripatus and appendages of prawn. **(9 Hours)**

UNIT V

Mollusca: General characters with an example. Salient features of Pila, sepia, and octopus. Oyster culture, Economic importance of Mollusca. **Echinodermata:** General characters with an example. Salient features of star fish, sea cucumber and sea urchin, Water vascular system, Larval forms of Echinodermata. **(9 Hours)**

COURSE BOOK:

- Arumugam, N., N.C. Nair, S. Leelavathy, N. Soundara Pandian. (2013). Invertebrate Zoology, 5th Edition, Saras Publication, Nagercoil.
  Unit I: Chapter 1, 2, 3.
  Unit II: Chapter 4, 5.
  Unit III: Chapter 6, 7.
  Unit IV: Chapter 8.
  Unit V: Chapter 9, 10.

BOOKS FOR REFERENCE:

1. Barnes, R.D. (2006). Invertebrate Zoology. VII Edition. Holt Saunders InternationalEdition.
2. Ekambaranatha Ayyar and Ananthakrishnan, T.N. (2019). Manual of Zoology Vol - I, Part I S.Viswanathan Pvt. Ltd. Chennai..
3. Kotpal, R. L. (2020). Modern text book of Zoology Invertebrates, 12th Edition, Rastogi Publications, Meerut.
4. Jordan and Verma (2022). Invertebrate Zoology S. Chand & Co, New Delhi.
5. Anderson D. T. (2001). Invertebrate Zoology, 2nd Edition, Oxford University Press, New Delhi.
6. Barrington, E. J. W. (2012). Invertebrate Structure and Function. English Language Book Society.
7. Hyman, L. H. (1967). The Invertebrates (6 vols). McGraw-Hill Companies Inc. New York.

GENERAL ZOOLOGY - I

Semester: I **Hours: 3**

Code : 23ZO1AC1B **Credit: 3**

COURSE OUTCOMES:

O. NO.	ON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	SO ADDRESSED	COGNITIVE LEVEL
CO - 1	Discuss the basic principles of taxonomy, nomenclature of Invertebrates.	PSO - 1	K1
CO - 2	Interpret the structural organization of chordates.	PSO - 2	K2
CO - 3	Analyse the life cycle of malarial parasite and identify poisonous and non-poisonous snakes	PSO - 3	K3
CO - 4	Discriminate the prokaryotic and eukaryotic cells	PSO - 4	K4
CO - 5	Integrate the inheritance of sex-linked diseases	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				GENERAL ZOOLOGY - I							Hours: 3
Code : 23ZO1AC1B											Credit: 3
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	3	2	3	4	3	5	4	2	3	3	3.36
CO - 2	4	3	2	2	5	3	4	5	2	2	3	3.18
CO - 3	4	3	5	4	4	3	4	4	5	4	3	3.91
CO - 4	4	4	2	5	4	4	4	4	2	5	4	3.82
CO - 5	4	5	3	4	4	5	4	4	3	4	5	4.09
Overall Mean Score												3.67

Result: The Score for this Course is **3.67** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I

Outline classification of animals, Introduction to principles of taxonomy, principles of binomial nomenclature, levels of organization - symmetry, salient features of Invertebrata. General characters of phyla of Invertebrata with an example each. Salient features of amoeba, sycon, hydra, liver fluke, ascaris, earthworm, cockroach, pila, starfish. Paramecium - conjugation. Obelia - Polymorphism.

(9 Hours)

UNIT II

Salient features of chordates. General characters of classes of Chordata with an example. Salient features of Balanoglossus, Amphioxus, Ascidian, Shark, Frog, Calotes, Pigeon and Rabbit. **(9 Hours)**

UNIT III

Life cycle of plasmodium, Economic importance of insects, Economic importance of fishes. Identification of poisonous and nonpoisonous snakes Migration in birds, Adaptations of aquatic mammals. **(9 Hours)**

UNIT IV

Prokaryotic and Eukaryotic cells, General structure of animal cell, Mitotic cell division, Structure and functions of chromosomes, Watson and Crick model of DNA, General features of cancer cells, Types of cancer. **(9 Hours)**

UNIT V

Mendelian experiments - Monohybrid and Dihybrid cross. Multiple alleles - ABO blood groups in man. Polygenes - Skin colour in man, Sex determination in man, and Sex-linked inheritance in man - X linked inheritance and Y linked inheritance. Syndromes - Down's, Klinefelter's and Turner's syndrome. **(9 Hours)**

COURSE BOOKS:

1. Arumugam, N., N.C. Nair, S. Leelavathy, N. Soundara Pandian. (2013). Invertebrate Zoology, 5th Edition, Saras Publication, Nagercoil.
   Unit I: Chapter 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.
   Unit III: Chapter 2, 8.
2. Arumugam, N., A. Thangamani, S. Prasannakumar, L. M. Narayanan, (2013). Chordate Zoology, 7th Edition, Saras Publication, Nagercoil.
   Unit II: Chapter 1, 2, 3, 4, 5, 6, 7, 8.
   Unit III: Chapter 4, 6, 7, 8.
3. Arumugam, N. (2019). Cell Biology, 10th Edition, Saras Publication, Nagercoil.
   Unit IV: Chapter 4, 13, 14, 15, 16.
4. Arumugam, N. and Meyyan, R. P. (2015). Genetics and Evolution, 6th Edition, Saras Publication, Nagercoil.
   Unit V: Chapter 2, 4, 5, 9, 10, 12

BOOKS FOR REFERENCE:

1. Nair, N.C., Leelavathy, S., Soundara Pandian, N., Murugan, T. and Arumugam, N. (2019). A Textbook of Invertebrates. Saras Publication, Nagercoil.
2. Thangamani A, Prasannakumar Narayanan LM, Arumugam N. (2019). A Text Book of Chordates, Saras Publication, Nagercoil.
3. Kotpal., (2020). Modern textbook of zoology. 4th edition. R. L. Rastogi publication, Meerut.
4. Jordan E. L., and Verma P.S., (2014). Chordate Zoology. 15th Edition. Chand and Co., New Delhi.
5. Arumugam N., Murugan S., Johnson J., and Ram Prabu R. (2005) Applied zoology, saras publications, Nagercoil.
6. C. B. Power, (2019). Cell Biology, 3rd edition. Himalaya Publishing House Pvt.Ltd., Bombay.
7. Verma P.S. & Agarwal V.K. (2014). Genetics. 9th edition. Chand and Co., New Delhi.
8. Verma P.S. and Agarwal V.K. (2016) Cell Biology (Cytology, Biomolecules, Molecular Biology), Paperback, S. Chand and Company Ltd.
9. Meyyan R.P., (2010). Genetics, Saras Publication, Nagercoil.

ALLIED ZOOLOGY - I - LAB

Semester: I **Hours: 2**

Code : 23ZO1AP1A **Credit: 1**

COURSE OUTCOMES:

CO. NO.	ON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	SO ADDRESSED	COGNITIVE LEVEL
CO - 1	Compare the general biology of few Invertebrates.	PSO - 3	K1
CO - 2	Recognize the major groups of invertebrates.	PSO - 2	K2
CO - 3	Categorize the invertebrate animals in their specific taxonomic position.	PSO - 1	K3
CO - 4	Mount the body setae of earthworm.	PSO - 4	K4
CO - 5	Prepare the mouth parts of honey bee and cockroach	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				**ALLIED ZOOLOGY - I - LAB**							**Hours: 2**
Code : 23ZO1AP1A											**Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	2	5	3	4	2	3	4	5	3	2	3.27
CO - 2	4	3	2	3	5	3	4	5	2	3	3	3.36
CO - 3	5	2	2	3	3	2	5	3	2	3	2	2.91
CO - 4	2	2	2	5	3	2	2	3	2	5	2	2.73
CO - 5	3	5	2	3	4	5	3	4	2	3	5	3.55
Overall Mean Score												**3.16**

Result: The Score for this Course is **3.16** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

DISSECTION:

Cockroach - Digestive system

Cockroach - Nervous system

MOUNTING:

Body setae of Earthworm

Mouth Parts of Honey Bee and Cockroach

Sting of Honey Bee

Survey of butterfly in the campus.

Vermicompost preparation.

SPOTTERS:

Amoeba, Paramecium, Euglena, Obelia, Liver fluke, Tapeworm, Planaria, Ascaris (Male and Female), Nereis, Peripatus, Limulus, Millipede, Centipede, Prawn, Pila, Nauplius larva, Zoea larva, Sepia, Octopus, Sea urchin, Sea Cucumber, Starfish.

GENERAL ZOOLOGY – I - LAB

Semester: I **Hours: 2**

Code : 23ZO1AP1B **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Compare the general biology of few Invertebrates.	PSO - 3	K1
CO - 2	Categorize the invertebrate animals in their specific taxonomic position.	PSO - 1	K2
CO - 3	Mount the body setae of earthworm.	PSO - 4	K3
CO - 4	Detect the different stages of mitosis.	PSO - 2	K4
CO - 5	Develop the knowledge on inheritance of Mendelian traits.	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I				**GENERAL ZOOLOGY - I - LAB**							**Hours: 2**
Code : 23ZO1AP1B											**Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	2	2	5	3	4	2	2	4	5	3	2	3.09
CO - 2	5	2	2	3	3	2	5	3	2	3	2	2.91
CO - 3	4	2	2	5	3	2	4	3	2	5	2	3.09
CO - 4	3	2	3	4	5	2	3	5	3	4	2	3.27
CO - 5	3	5	3	4	4	5	3	4	3	4	5	3.91
Overall Mean Score												**3.25**

Result: The Score for this Course is **3.25** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

DISSECTIONS:

Cockroach - Nervous System

Cockroach - Digestive system

MOUNTINGS:

Body setae of Earth worm

Sting of honey bee

Placoid scales

OBSERVATIONS:

Observation of Mitosis in onion root tip

Observation of Mendelian traits in man

Monohybrid cross

Observation of syndromes - Down's, Klinefelter's and Turner syndrome

SPOTTERS:

Amoeba, Obelia, Ascaris (Male and Female), Neries, Prawn, Octopus, Star fish, Amphioxus, Anabas, Bufo, Naja Naja, King fisher, Bat.

PROFESSIONAL ENGLISH

Semester: I **Hours: 2**

Code : 23AE1PE01 **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recognise their own ability to improve their competence in using the language	PSO-1	K1
CO - 2	Relate to the language with confidence, ensuring communication is intelligible	PSO-2	K2
CO - 3	Employ unfamiliar vocabularies in their context	PSO-3	K3
CO - 4	Correlate their professional communication skills	PSO-4	K4
CO - 5	Assess the errors while framing sentences	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I												**Hours: 2**
Code : 23AE1PE01						**PROFESSIONAL ENGLISH**						**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	3	4	3	4	5	4	3	3	4	3.82
CO - 2	3	4	3	5	3	4	3	5	3	3	4	3.64
CO - 3	4	3	5	4	4	3	4	4	5	4	3	3.91
CO - 4	4	3	3	4	5	3	4	4	3	5	3	3.73
CO - 5	3	5	3	3	3	5	3	3	3	3	5	3.55
Overall Mean Score												**3.73**

Result: The score for this course is **3.73** (High relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: THE ART OF QUESTIONING **6 Hours**

The Art of Questioning Paper-1 (Chamber 1-Orator: Units 1-5)

The Art of Questioning Paper-2 (Chamber 1-Orator: Units 1-3)

UNIT II: RECEPTIVE RESPONSE **6 Hours**

Receptive Response Paper-1 (Chamber 2 - Orator: Units 1-3)

Receptive Response Paper-2 (Chamber 2 - Orator: Units 1-4)

UNIT III: EASY EXPRESSIONS **6 Hours**

Easy Expressions Paper-1 (Chamber 2 - Orator: Units 1-4)

Easy Expressions Paper-2 (Chamber 2 - Orator: Units 1-3)

UNIT IV: EVERY DAY ENGLISH **6 Hours**

Every Day English Paper-1 (Chamber 3 - Orator: Units 1-5)

Every Day English Paper-2 (Chamber 3 - Orator: Units 1-3)

UNIT V: TELEPHONE SKILLS **6 Hours**

Buzz-Telephone skills - Basic (Chamber 6 - Kaleidoscope)

Buzz-Telephone skills - Customer support: Topics 1-5 (Chamber 6 - Kaleidoscope)

Buzz-Telephone skills - Front Office (Chamber 6 - Kaleidoscope)

COURSE SOFTWARE:

Lady Hawk Software

Component	Marks
Internal test I	40
Internal test II	40
Dialogue/ Conversation	10
Expressions Using Chart	5
Attendance	5
Total	**100**

BASICS OF CHEMISTRY

Semester: I **Hours: 2**

Code : 23CH1FC01 **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the units, constants and their conversions, equivlent mass, valency, oxidation state, functional groups and isomerism in organic chemistry	PSO-1	K1
CO - 2	Explain the calculation of molecular mass and formulate the inorganic compounds, classification of organic compounds and isomerism	PSO-2	K2
CO - 3	Apply the concepts of fundamental units in simple problems of chemistry and apply the rules to find electronic configuration and nomenclature of organic compounds	PSO-3	K3
CO - 4	Analyse different constants and their conversions, the preparation of solutions of different concentrations and isomerism in organic compounds	PSO-4	K4
CO - 5	Evaluate the basics of organic, inorganic and physical chemistry concepts and calculations used in quantitative analysis	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I											**Hours: 2**
Code : 23CH1FC01				**BASICS OF CHEMISTRY**							**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	4	4	3	3	5	4	3	3	3	3.63
CO - 2	4	2	5	5	3	3	4	5	2	3	3	3.54
CO - 3	4	5	3	3	3	3	4	3	5	3	3	3.54
CO - 4	4	3	3	3	3	5	4	3	3	5	3	3.54
CO - 5	4	3	3	3	5	3	4	3	3	3	5	3.54
Overall Mean Score												**3.56**

Result: The score for this course is **3.56** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

UNITS, CONSTANTS AND CONVERSIONS

Fundamental units in physical chemistry - SI and CGS units - conversions - natural logarithm and log - different constants and their conversions: velocity of light, gas constant, Planck constant and Boltzmann constant - Avogadro number – wave length-wave number - related simple problems **(6 Hours)**

UNIT II

FUNDAMENTALS OF INORGANIC CHEMISTRY

Definition of atom and its constituents - atomic number - atomic weight - atomic mass - molecular mass - equivalent mass - gram equivalent mass - equivalent mass of acids, bases oxidising and reducing agents and inorganic salts - empirical formula - mole concept - percentage calculation - isotopes - isobars - isosteres - valence of common elements - variable valency - oxidation state – writing chemical formulae of inorganic compounds - electronic configuration of atoms. **(6 Hours)**

UNIT III

FUNDEMENTALS OF CARBON COMPUNDS

Vital force theory - tetra valency of carbon - valency of oxygen, nitrogen - primary, secondary and tertiary carbon - classification of organic compounds - open chain and cyclic compounds: definition and example - functional groups of organic compounds- common names. **(6 Hours)**

UNIT IV

ISOMERISM IN ORGANIC COMPOUNDS

Isomerism - definition and examples - Isomerism in alkanes, alkyl and alkenyl groups - structural isomerism - chain isomerism - positional isomerism - functional isomerism - metamerism – tautomerism. **(6 Hours)**

UNIT V

CONCEPTS IN QUANTITATIVE ANALYSIS

Units of concentration - conversion of moles to molecules and vice versa - molarity, molality, normality and mole fraction - Equivalent weights of substances - preparation of standard solutions - relation between normality and equivalent weight - dilutions and concentration - simple problems. **(6 Hours)**

COURSE BOOKS:

1. P.L. Soni and H.M Chawla, Organic Chemistry, Sultan Chand and Sons, 29th Edition, 2007
2. B. R. Puri, L. R. Sharma and K. C. Kalia, Graduate Inorganic Chemistry, Vishal Publishing Co., Volume – I, 2017 – 18.
3. M.K. Jain and S.C. Sharma and Fateh Bahadur, Graduate Organic Chemistry, Vishal Publishing Co., Volume - I, 2018-19
4. Puri, Sharma, Pathania and Lark, Graduate Inorganic Chemistry, Vishal Publishing Co., Volume – I, 2018-19

STUDENT TRAINING PROGRAMME

NATIONAL SERVICE SCHEME

U. G. PROGRAMME OUTCOMES

PO. NO.	UPON COMPLETION OF THIS PROGRAM THE STUDENTS WILL BE ABLE TO
1.	Gain theoretical knowledge and apply the expertise in different fields.
2.	Acquire Industry specific skills and can emerge as entrepreneurs.
3.	Develop critical and rational thinking to solve societal issues.
4.	Explore the knowledge and acclimatize it in the ever changing work environment.
5.	Evolve theories and develop innovative discipline specific ideas.
6.	Comprehend the nuances and develop innovative, discipline-specific ideas.

U. G. PROGRAMME SPECIFIC OUTCOMES

PSO. NO.	UPON COMPLETION OF THE PROGRAM THE STUDENTS WILL BE ABLE TO	PO MAPPED
PSO-1	Get knowledge about National Service Scheme.	PO-1
PSO-2	Acquire leadership skills and readiness to serve the society.	PO -2
PSO-3	Enhance perspectives of social issues in different point of views Think and act effectively in a critical situation.	PO-3
PSO-4	Develop positive attitude towards betterment of the society through voluntary service.	PO-4
PSO-5	Preserve nature, ethos and traditions and practices of the society.	PO-1

NATIONAL SERVICE SCHEME

Semester: I -IV **Hours: 2**

Code : 23STPNS01 **Credit: 1***

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire the basic knowledge about NSS	PSO-1	K1
CO - 2	Uphold the value system based on the social, political and moral bases	PSO-1, PSO-2	K2
CO - 3	Understand and identify the needs of the society	PSO-1, PSO-2, PSO - 4	K3
CO - 4	Develop the capacity to meet emergencies and attain knowledge to concentrate on personal health and hygiene	PSO2-, PSO-4 PSO-5	K4
CO - 5	Face the challenges particularly to become women entrepreneurs	PSO-1	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I -IV				**NATIONAL SERVICE SCHEME**							**Hours: 2**
Code : 23STPNS01											**Credit: 1***
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	**1**	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	3.81
CO - 2	4	5	4	3	4	3	4	3	4	4	4	3.90
CO - 3	5	4	4	4	4	4	4	3	4	4	3	3.90
CO - 4	4	4	5	3	4	4	5	4	3	3	4	4.00
CO - 5	5	4	4	3	4	4	4	5	4	3	4	3.90
Overall Mean Score												**3.90**

Result: The score for this course is **3.90** (High relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I: BASICS OF NSS

Introduction –History and Growth – Aim and Objectives – NSS Motto – NSS Symbol - NSS Badge – NSS Day - Code of Conduct- NSS Regular Activities & Special Camp.

UNIT II: PERSONALITY DEVELOPMENT

Personality Development – Know Thyself- Body Language- Forming Values Etiquette and Manner - Team Building and Team Work – Problems of Youth – Drug abuse - Drug Dependence /Addiction –Alcoholism – Suicide - Sexual Problems – Diseases.

UNIT III: SOCIAL SERVICE

Aim of Social Service – Social Service Organizations - Social Problems - Need for Social Service - Scope of Social Services - Functions of Social Services - Principles of First Aid - Important things kept in the First Aid Box - Snake Bite - Dog Bite - Insect Bite - Heat Stroke - Drowning - Electric Shock - Artificial Respiration – Hemorrhage – Stroke - Heart Attack – Symptoms – Fainting.

UNIT IV: NUTRITIOUS FOOD AND WOMEN'S HEALTH

Nutrition - Adequacy – Balance - Calorie Management - Dietary Density – Moderation – Variety - Calculation of Calorie Permittance - Calculation of Protein Percentages - Food Sources - Vitamins the Importance of Dietary Nutrition Women's Health

UNIT V: ECOLOGY AND ROLE OF WOMEN IN SOCIETY

Environment - Environmental Elements - Environmental concerns - Changing Climate – Global warming – Women achievers - Women's Place in Society - Social Issues against Women - The Ways to Empower Women.

COURSE BOOK:

- Arul Sunila.J, Flora Pauline Mary.V, Preethi.J, Padmasree. A. D, Girija Bai. T, Arul Irudaya Jeyanthi.J, Abinaya. D, *NOT ME BUT YOU*, Acca Printing Press, 2022

Components	Marks
Attendance	20
Assessment (Involvement in activities)	50
Test	30
Total	**100**

QUESTION PATTERN

NATIONAL SERVICE SCHEME-23STPNS01

Class: II UG **Time: 2 Hours**

Date: **Max.: 30 Marks**

Course Outcome	**Bloom's K-level**	**Q. No**	SECTION – A 2x5=10 Answer All Questions Internal choice
			SECTION – B 2x10=20 Answer any TWO of the following

NATIONAL CADET CORPS

U.G. PROGRAMME OUTCOMES (2023 - 2026)

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Think critically, evaluate analytically and apply the expertise of their discipline in related scenario.
2.	Enhance the communicative skills and gain confidence to disseminate knowledge through oral/verbal communications effectively at various situations.
3.	Accomplish the basic understanding of the relationship between education and human life and enhance their perspectives on the various functions of their studies in the diverse contexts of the society.
4.	Identify the different roles in an organizational structure of the work place and carry out multiple roles in social responsibilities.
5.	Develop skills like collaboration, higher-order thinking, problem solving and self-direction through effective use of technologies and resources.
6.	Increase self-awareness, set and pursue meaningful goals, and develop positive personal qualities such as self-esteem, positive attitude, self-discipline, and self-motivation.

PROGRAM SPECIFIC OUTCOMES (PSO)

PSO NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO	PO MAPPED
1	Reinforce the aims, motto, vision and mission of the NCC through the academic curriculum.	PO-1, PO-3
2	Train the students, to be graduates with all round development, who apart from their own subject, can successfully compete in other fields such as defense/paramilitary/ police forces and civil services.	PO-1, PO-4
3	Perform in social service activities and creating awareness about social evils in society.	PO-1, PO-5, PO-6.
4	Explain the tri services organization, comprising the army, navy and air force, engaged in grooming the youth of the country into disciplined and patriotic citizens.	PO-2, PO-6
5	Demonstrate "B" and "C" certificate examination of NCC helps in getting jobs in different forces and also security related jobs.	PO-1, PO-2, PO-5,PO-5, PO-6

NATIONAL CADET CORPS

Semester: I - IV **Hours: 240**

Code : 23STPNC01 **Credits: 1***

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Describe the history, honors and awards of Indian Military.	PSO - 1,PSO - 2, PSO - 4	K1
CO - 2	Explain the map and weapon training to remove the fear of a weapon from the hearts of youth.	PSO - 1, PSO - 4	K2
CO - 3	Illustrate the different types of disasters under different circumstances.	PSO - 2,PSO - 3, PSO 4, PSO - 5	K3
CO - 4	Analyze the practical knowledge in community development and other social programs.	PSO - 4, PSO - 5	K4
CO - 5	Assess the personality development and develop technical skill of first Aid.	PSO - 1, PSO - 2	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I - IV											**Hours: 240**
Code : 23STPNC01				**NATIONAL CADET CORPS**							**Credits: 1***
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	3	3	3	4	3	4	4	3	3	3	3.4
CO - 2	3	4	3	3	4	3	4	4	3	4	4	3.54
CO - 3	3	3	4	4	4	4	3	4	4	3	5	3.72
CO - 4	3	3	4	5	4	4	3	3	4	5	4	3.81
CO - 5	3	3	5	4	3	4	3	3	4	5	4	3.72
Overall Mean Score												**3.64**

Result: The score for this course is **3.64** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I: ARMED FORCES AND MILITARY HISTORY

Army, Police and Central Armed Police Forces, Modes of Entry into Army, Police and CAPF, Aims and Objectives of NCC , Organisation, Training and NCC Song , Incentives , Honors and Awards, Biographies of Renowned Generals, War Heroes : Param Veer Chakra Awardees, Study of Battles of Indo-Pak Wars 1965, 1971, & Kargil, War Movies, "B" and "C" certificate examinations.

UNIT II: MAP READING, FCBC AND WEAPON TRAINING

Introduction to Map Reading, Conduct of Map Reading, Introduction to Field Craft and Battle Craft, Indication of landmark, Observation, Camouflage & Concealment, Fire and Move Capsule, Knots, Lashing and Strecthers, Organisation of Infantry Battalion & its weapons. Characterstics of a Rifle and its Ammunition, Stripping, Assembling, Care, and Cleaning of 7.62 SLR, Loading, Cocking and Unloading, Lying Position, Holding and Aiming, Trigger Control and Firing a Shot, Theory of Group and Snap Shooting, Obstacle Training

UNIT III: DISASTER MANAGEMENT AND CIVIL AFFAIRS

Civil Defence Organisation and NDMA, Types of Emergencies / Natural Disasters, Fire Services & Fire Fighting, Traffic Control During Disaster Under Police Supervision, Collection & Distribution of Aid Material, Essential Services and their Maintenance. Aim of aid to civil authority - Role of NCC Cadets during natural calamities - Types of disaster- Essential services during natural calamities

UNIT IV: NATIONAL INTEGRATION AND SOCIAL AWARENESS

Basics of Social Service and Its Need, NGOs Role & Contribution, Drug Abuse and Trafficking, Causes & Prevention of HIV / AIDS and Role of Youth, Counter Terrorism, Traffic Control Organisation and Anti Drunken Driving, Religions, Culture, Traditions and Customs of India. National Interests, Objectives, Threats and Opportunities. Unity in Diversity. National Integration Council. Contribution of Youth in Nation Building. Leaders of Political / Regional Parties, Media Persons, Women Representatives, Eminent Public Representatives, Representatives of Business

UNIT V: PERSONALITY DEVELOPMENT, LEADERSHIP AND FIRST AID

Factors Influencing and Shaping Personality : Physical, Social, Psycological and Philosophical Types of Leadership, Time Management, Stress Management Skills, Interview Skills, Sociability : Social Skills Ettiquettes And Mannerism, Injuries to Internal Organs, Burns and Scalds, Snake Bite, Scorpion Bite & Rabid Dog Bite, Foreign Bodies in Eye, Ear and Nose, Insensibility or Unconsciousness, Artificial Respiration.

BOOK FOR REERENCE:

- Mishra R.C., A Handbook of NCC, Kanti Prakashan, Etawah, 2000.

Scheme of Evaluation	
Summative Examination (2 hours)	25 Marks
Continuous Internal Assessment	75 Marks
Total	**100 Marks**

Scheme of Evaluation of Continuous Internal Assessment		
1.	Attendance - 240 hours	10 Marks
2.	Special Camp	40 Marks
3.	"B" and "C" certificate examination	25 Marks
Total		**75 Marks**

Question Pattern for Summative Examination

Total Marks: 25

Time: 2 hours

Section - A

Answer All Questions

5× 1= 5Marks

(Multiple Choice Questions)

Section - B

Answer All Questions

2 × 5=10 Marks

(Either or Questions)

Section - C

Answer any one Questions

1 × 10=10 Marks

(One Question Out of Two)

PHYSICAL EDUCATION (2023-2026)

Code	Year	Paper Title	Hours	Credit
23STPPE01	I & II	Yoga and Physical Wellness	120	1*

YOGA AND PHYSICAL WELLNESS

Semester: I to IV **Hours: 120**

Code : 23STPPE01

COURSE OUTCOMES

- To develop Physical and mental fitness.
- To motivate and encourage students to involve themselves in physical skills through the Sports and Games and Yoga.
- To promote harmonious all-round development of the students

UNIT I: ASANAS **(24 hours)**

Meaning - Benefits - Postures: Sitting - Standing - Prone - Supine.

UNIT II: PRANAYAMA **(24 hours)**

Meaning - Benefits - Steps in Pranayama: Puraka, Khumbaka, Rechaka - Mudras: Chin mudra, Chinmaya mudra, Brahma mudra.

UNIT III: SURYANAMASKAR **(24 hours)**

Meaning - Benefits - Steps - Poses (12 posture)

UNIT IV: NUTRITION **(24 hours)**

Meaning - Balanced Diet - Daily Energy Requirement - Nutrient Balance - Nutrition Intake - Body Mass Index

UNIT V: FIRST AID **(24 hours)**

Meaning - Injuries to bones and Muscles, Sprain, Strain, Muscle Cramp and joints Dislocation and Fractures - Snake-bite, Dog bite

BOOKS FOR REFERENCE:

1. Elangovan.R, (2002), 'Utarkalvi Oru Arimugam', Ashwin Publication, Triunelveli.
2. Chandrasekaran.K, (1999), 'Sound Health through Yoga, Prem Kalyan Publication, Sedapatti.
3. John Ambulance Association, 'First Aid to the Injured' New Delhi
4. Prabhakar Eric, (1995), 'The way to Atheletic Gold', Affliated East West Pvt. Ltd., New Delhi.
5. Sathyanesan, R.C., 'Hand Broken Physical Education', Gheena Publishers, Madurai

SCHEME OF EVALUATION

1.	Summative Examination (2 hours)	:	25 marks
2.	Continuous Internal Assessment	:	75 marks
	Total	**:**	**100 marks**

SCHEME OF EVALUATION FOR COTINUOUS INTERNAL ASSESSMENT

1.	Attendance (240 hrs)			:	20 marks
	❖ Theory Class	:	120 hrs		
	❖ Games	:	60 hrs		
	❖ Field Work	:	60 hrs		
2.	Performance in any one Game			:	10 marks
3.	Performance in any one of Athletic event			:	10 marks
4.	Performance in Yoga / Rhythmic activities			:	10 marks
5.	Rhythmic activities				10 marks
6.	Field Work			:	15 marks
	Total			**:**	**75 marks**

QUESTION PATTERN FOR SUMMATIVE EXAMINATION

Total marks: 25 **Time: 1 $^{1/2}$ hours**

SECTION - A

Answer All Questions (5x1=5)

(Choose the best Answer)

SECTION - B

Answer any two questions (2x2=4)

(Four question out of four)

SECTION - C

Answer any Two out of Four questions (2x5=10)

(Four question out of Four)

SECTION - D

Answer any one question (1x6=6)

(One question out of two)

CONSUMER CLUB

PROGRAMME OUTCOMES:

PO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO
1.	Think critically, evaluate analytically and apply the acquired knowledge of their discipline in related scenario
2.	Enhance the communicative skills and gain confidence to disseminate knowledge through oral/verbal communications effectively at various situations.
3.	Express the cultural and environmental diversity that they have been exposed in various studies
4.	Identify the different roles in an organizational structure of the work place and carry out multiple roles in social responsibilities
5.	Develop higher-order thinking, problem solving and self-direction skills through effective use of technologies and other resources
6.	Increase self-awarness, set and pursue meaningful goals, and develop positive personal qualities

PROGRAMME SPECIFIC OUTCOMES:

PSO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PO MAPPED
PSO-1	Aware of consumer's rights, responsibilities and consumer production Act,1986	PO-1
PSO-2	Instill right-consciousness, confidence to question violations of citizen and consumer rights and fight for justice	PO-1, PO-4, PO-6
PSO-3	Work with other voluntary consumer organizations to enhance consumer movement in the society	PO-3, PO-6
PSO-4	Make informed purchase decision as individual and inculcating the behavior in others also	PO-3, PO-4, PO-6
PSO-5	Gain practical knowledge and become good consumer as well as entrepreneur	PO-4, PO-5, PO-6

CONSUMER CLUB

Semester: I-IV **Hours: 120**

Code : 23STPCC01 **Credit: 1***

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire the knowledge of aware of the nature, rights and responsibilities of consumer	PSO - 1	K1
CO - 2	Understand the concepts of food trade and certification	PSO - 4	K2
CO - 3	Identify misleading advertisement, consumer court and consumer redressal	PSO - 3,5	K3
CO - 4	Analyze the concept of food adulteration and ecofriendly products	PSO - 2	K4
CO - 5	Evaluate practical experience through field visit and interact with experts	PSO - 2	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I-IV				**CONSUMER CLUB**							**Hours: 120**
Code : 23STPCC01											**Credit: 1***
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	4	3	4	3	3	3	3	4	3	4	3.45
CO - 2	3	3	4	3	4	3	4	4	3	4	3	3.45
CO - 3	4	4	3	4	3	4	3	3	4	3	4	3.54
CO - 4	3	3	4	3	4	3	4	4	3	4	3	3.45
CO - 5	4	3	4	3	4	3	4	3	4	3	4	3.54
Overall Mean Score												**3.48**

Result: The score for this course is **3.48** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

Basics of Consumer: Consumer - Meaning - Difference between Consumer and Buyer - Consumerism - Nature of Consumerism - Roots of Consumerism - Rights and Responsibilities of Consumer- Consumer Protection - Rights of Consumer under Consumer Protection Act 1986- Do's and Don'ts of consumer.

UNIT II

Trade Mark & Certification: Definition - Objectives - Types of Trademark - Categories of Trademark-Registrar of Trademark - Powers and functions of Registrar of Trademark - Certification: Certification Marks issued for different products in India - Types of certifications.

UNIT III

Advertisement & Food Adulteration: Definition - Features of Advertisement - Misleading Advertisement - Online Consumer - Rights of online consumer - Food Adulteration**: Introduction - Types of Food Adulteration - Causes of Food Adulteration - Methods of Food Adulteration - Food Adulteration in Developing Countries - Health Hazards of Food Adulteration - Mitigation Measures for Addressing Food Adulteration** - How can Adulteration to be prevented - Food Contamination.

UNIT IV

Eco-Friendly Consumer, Consumer Redressal & Grievance: Eco-Friendly consumer Products - Eco-friendly products for daily life - Innovative and Eco-friendly Business ideas - Green Consumerism - Important steps of Green Consumerism - Green marketing strategies- Consumer Court - Objectives - Consumer Disputes Redressal Agencies - Model Form of Complaints - How to file a Complaint in Consumer Court - Grievance -Features of Grievance - Causes of Grievance - Where to file a Complaint-Redressal settlement machinery.

UNIT V

Field Visit.

COURSE BOOKS:

- Material prepared by the Consumer Club

BOOK FOR REFERENCE:

1. Dr. L. Natarajan, Business Legislation, Merit India Publication, 2017.
2. Consumer Movement, Robert N. Mayer, Twayne Publishers Inc., U.S.,1989
3. Consumer Education and Economics, Charles A. Malouf, 2002

E-RESOURCES:

1. https://www.Consumer-Awareness-Protection-Empirical-Evidence/dp/1723301108
2. https://www.himpub.com/documents/Chapter1482.pdf
3. https://www.Consumer-Education-Veena-Gandotra/dp/9382007008

SCHEME OF EVALUATION

1.	Summative Examination (1 hour)	:	25 marks
2.	Continuous Internal Assessment	:	75 marks
	Total	**:**	**100 marks**

Scheme of Evaluation of Continuous Internal Assessment		
1.	Field Visit	25 Marks
2.	Report	25 Marks
3.	Involvement	10 Marks
4.	Case Study	10 Marks
5.	Attendance	5 Marks
Total		**75 Marks**

Total the marks of I, II, III & IV will be converted to 75 marks

INTERNAL TEST (THEORY)

Total Marks: 25 **Time: 1 Hour**

Section - A

Answer All Questions 5 x 1= 5 Marks
(Multiple Choice Questions)

Section - B

Answer All Questions 2 x 5= 10 Marks
(Either Or Questions)

Section - C

Answer Any One Question 1 x 10 =10 Marks
(One Question Out of Three)

RED RIBBON CLUB

PROGRAMME OUTCOMES

PO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO
1.	Think critically, evaluate analytically and apply the acquired knowledge of their discipline in related scenario
2.	Enhance the communicative skills and gain confidence to disseminate knowledge through oral/verbal communications effectively at various situations.
3.	Demonstrate the precise understanding of the principles and theories of their discipline through experiments.
4.	Identify the different roles in an organizational structure of the work place and carry out multiple roles in social responsibilities
5.	Develop higher-order thinking, problem solving and self-direction skills through effective use of technologies and other resources
6.	Increase self-awareness, set and pursue meaningful goals, and develop positive personal qualities

PROGRAMME SPECIFIC OUTCOMES:

PSO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PO MAPPED
PSO-1	Tell the importance of Red Ribbon Club for the Society.	PO-1, PO-6
PSO-2	Explain the structure of Blood and its Uses.	PO-3, PO-4
PSO-3	Demonstrate the microscopic examination of Blood Identification and Donation process.	PO-3, PO-5
PSO-4	Classify the Blood types, Donation process and HIV Awareness.	PO-2, PO-4
PSO-5	Estimate the vision of Red Ribbon Club and its role in the society.	PO-5, PO-6

RED RIBBON CLUB

Semester: I, II, III & IV **Hours: 120**

Code : 23STPRR01 **Credit: 1***

COURSE OUTCOMES

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Define the meaning and basic concepts of Red Ribbon Club	PSO -1, PSO-5	K1
CO - 2	Classify the services rendered by Red Ribbon Club	PSO -1, PSO -4	K2
CO - 3	Relate the vision and objectives of Red Ribbon Club with its services	PSO- 1, PSO-3	K3
CO - 4	Categorize the objectives, Blood identification and HIV Testing process	PSO -4, PSO-5	K4
CO - 5	Evaluate the awareness programmes against the communicable diseases	PSO -2, PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I, II, III & IV						**RED RIBBON CLUB**					**Hours: 120**
Code : 23STPRR01											**Credit: 1***
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	2	3	4	5	5	3	4	2	5	3.27
CO - 2	4	5	3	5	2	4	5	4	2	5	3	3.54
CO - 3	5	3	4	3	4	5	5	3	5	4	2	3.72
CO - 4	2	5	5	3	4	4	4	2	3	5	5	3.36
CO - 5	3	4	2	5	5	4	3	5	2	3	5	3.27
Overall Mean Score												**3.43**

Result: The score for this course is **3.43** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

Red Ribbon Club-Basic Concepts - Meaning -Vision - Objectives - Popular Colour - Symbol - Significance

UNIT II

Blood Identification - Blood composition - Blood types -Functions of Blood - Components of Blood Plasma -Blood Vessels - Microscopic examination -DNA analysis

UNIT III

Blood Donation - Procedure -Importance of Donating Blood -Steps taken to ensure the safety of transfused blood - Benefits - Donors - Blood Banks - Outdoor camps - Storage, Supply & Demand

UNIT IV

HIV Awareness**:** Definition -Signs &Symptoms - HIV Transmission-Risk factors-Diagnosis & Tests-Treatment methods - Prevention -Tamil Nadu AIDS Control Society (TANSACS) - Components

UNIT V

Blood Donation Camp - Practical and Field Work : Blood Identification Camp - HIV AIDS Awareness Programmes - Field visit to JeevanJothi - Aundipatti Government Hospital

COURSE BOOK:

- Book offered by Red Ribbon Club Committee Members

BOOKS FOR REFERENCE

1. Conor S, Kingman S. *The search for the virus, the scientific discovery of AIDS and the quest for a cure,*Penguin Books, 1988.
2. S. Kartikeyan, R.N. Bharmal, R.P. Tiwari and P.S. Bisen.*HIV and AIDS: Basic Elements and Priorities*. Springer Publications. 2007.
3. Narain, Jai P; AIDS in Asia: The Challenge Ahead, Sage Publications, New Delhi, 2004
4. Nath, LM; The Epidemic in India: An Overview, Mosaic Books, New Delhi, 2003.
5. Srivastava V.P., HIV/AIDS and Human Rights, Indian Publishers, Delhi, 2006.
6. Shalini Bharat, HIV/AIDS related Stigma, Discrimination and Denial, Best Practices, Key Material. UNAIDS Publications, 2001

SCHEME OF EVALUATION

1.	Summative Examination (1 hour)	:	25 marks
2.	Continuous Internal Assessment	:	75 marks
	Total	**:**	**100 marks**

Scheme of Evaluation of Continuous Internal Assessment		
1.	Field Visit	25 Marks
2.	Report	25 Marks
3.	Involvement	10 Marks
4.	Case Study	10 Marks
5.	Attendance	5 Marks
Total		***75 Marks***

Total the marks of I, II, III & IV will be converted to 75 marks

Question Pattern for Internal Examination

Total Marks:25 **Time : 1hour**

Section - A

Answer All Questions 5 x 1= 5 Marks

(Multiple Choice Questions)

Section - B

Answer All Questions 2 x 5= 10 Marks

(Either or Questions)

Section - C

Answer Any One Question 1 x 10 =10 Marks

(One Question Out of Three)

YOUTH RED CROSS

Semester: I-IV **Hours: 120**

Code : 23STPRC01 **Credit: 1***

PROGRAMME OUTCOMES:

PO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO
1.	Think critically, evaluate analytically and apply the acquired knowledge of their discipline in related scenario.
2.	Formulate hypothesis, design experiments use appropriate tools and interpret the results.
3.	Demonstrate the precise understanding of the principles and theories of their discipline through experiments.
4.	Enhance the communicative skills and gain confidence to disseminate knowledge through oral/verbal communications effectively at various situations.
5.	Identify the different roles in an organizational structure of the work place and carry out multiple roles in social responsibilities
6.	Increase self-awarness, set and pursue meaningful goals, and develop positive personal qualities.

PROGRAMME SPECIFIC OUTCOMES

PSO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PO MAPPED
PSO1	Get a basic understanding of the origin, growth and development of humanity.	PO1
PSO2	Acquire basic knowledge about social subjects	PO1, PO2
PSO3	Identify various social issues and problems	PO3, PO4
PSO4	Help build up a good career	PO1, PO4
PSO5	Gain awareness of social responsibilities	PO1, PO5

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Understand themselves in relation to their community	PSO- 1	K1
CO - 2	Identify the needs and problems of the community and involve them in problem solving.	PSO-2	K2
CO - 3	Gain skills in mobilizing community participation. Develop capacity to meet emergencies and social harmony	PSO-3	K3
CO - 4	Educate and empower children and youth in the spirit of the Red Cross through constructive trainings and effective leadership	PSO-4	K4
CO - 5	Provide opportunities for directing and harnessing their energies and idealism into worthwhile humanitarian activities	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: I-IV							**YOUTH RED CROSS**					**Hours: 120**
Code : 23STPRC01												**Credit: 1***
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	5	4	3	2	2	5	5	3	2	2	3.45
CO - 2	5	5	4	3	2	2	5	5	4	2	2	3.55
CO - 3	5	4	4	3	4	2	5	5	5	2	3	3.91
CO - 4	5	4	5	4	3	3	5	5	5	2	3	4.09
CO - 5	5	4	5	3	3	3	5	5	5	2	3	4.09
Overall Mean Score												**3.82**

Result: The score for this course is **3.82** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

BASICS OF YOUTH RED CROSS

Semester: I & II **Hours: 60**

Code: 23STPRC01 **Credit: 1***

UNIT I

History Of Red Cross - Henri Dunant's Early Life - The Battle of Solferino - The Man in White - The Birth of Red Cross - Charity in the Midst of Battle - Clara Barton: Pioneer of Disaster Relief - Death of Dunant.

UNIT II

Idea of the Red Cross Movement - Foundation of the Red Cross Movement - A Global Movement - The Emblems- History of the Emblems - Who can use the emblem in India? Misuse of the Emblem - Why respect the Emblem?

UNIT III

The Seven Fundamental Principles - International Humanitarian Law - Re Establishing Family Links

UNIT IV

Birth of the Indian Red Cross Society- Introduction to the programmes of the IRCS - Humanitarian Values - Disaster Management - Health and Care in the Community

UNIT V

Volunteering - Trainings

COURSE BOOK:

1. Rev. Sr. Dr. JesuRani, Dr. J. Arul Irudaya Jeyanthi, Dr. B. Amala Jasmine, Mrs. P. Selvarani, Mrs. K. Rani, Youth Red Cross (YRC), PCF Publications, Pandiyanadu Cultural Foundation, Madurai, 2021.

BOOKS FOR REFERENCE:

1. ''The Story of the Red Cross'', Krishna Satyanand, Reprint 2002, Published by the Director, National Book Trust, India.
2. ''Basic about YRC'', Indian Red Cross Society, National Headquarters.

YOUTH RED CROSS

Semester: III & IV **Hours: 60**

Code: 23STPRC01 **Credit: 1***

UNIT I

The International Committee of the Red Cross (ICRC) -Origin And History - International Status - ICRC - Legal Status - ICRC's Humanitarian Activities - Administration and Structure of ICRC - National Red Cross and Red Crescent Societies.

UNIT II

Interntional Federation of Red Cross and Red Crescent Societies - Mission - Strength - Global Network - International Red Cross and Red Crescent Movement - Geneva Conventions and their Additional Protocols - Protection and care - protection of persons - Protection of Civilian medical and religious personnel - Methods and means of warfare - Improper use of emblems - fundamental guarantees.

UNIT III

Indian Red Cross Society - Headquarters - Resources - Partnerships – Strategic Development plan - Indian Red Cross Society - Tamil Nadu Branch - Indian Red Cross Society, District Red Cross Branch and Sub Branch

UNIT IV

Youth Red Cross - Junior Red Cross

UNIT V

Field Visit

COURSE BOOK:

1. Rev. Sr. Dr. JesuRani, Dr. J. Arul Irudaya Jeyanthi, Dr. B. Amala Jasmine, Mrs. P. Selvarani, Mrs. K. Rani, Youth Red Cross (YRC), PCF Publications, Pandiyanadu Cultural Foundation, Madurai, 2021.

BOOKS FOR REFERENCE:

1. ''History of Red Cross'', Youth Red Cross, Indian Red Cross Society Tamil Nadu Branch.

SCHEME OF EVALUATION

1.	Summative Examination (1 hour)	:	25 marks
2.	Continuous Internal Assessment	:	75 marks
	Total	**:**	**100 marks**

Scheme of Evaluation of Continuous Internal Assessment		
1.	Field Visit	25 Marks
2.	Report	25 Marks
3.	Involvement	10 Marks
4.	Case Study	10 Marks
5.	Attendance	5 Marks
Total		***75 Marks***

Total the marks of I, II, III & IV will be converted to 75 marks

Question Pattern for Internal Examination

Total Marks:25 **Time : 1hour**

Section - A

Answer All Questions 5 x 1= 5 Marks

(Multiple Choice Questions)

Section - B

Answer All Questions 2 x 5= 10 Marks

(Either or Questions)

Section - C

Answer Any One Question 1 x 10 =10 Marks

(One Question Out of Three)

பொதுத்தமிழ் - 2
(பிறதுறை மாணவிகளுக்கு மட்டும்)

பருவம்: இரண்டு **நேரம்: 6**

குறியீடு: 23GT2GS02
புள்ளி: 3

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	பக்தி இலக்கியங்கள், சிற்றிலக்கியங்கள் கற்பதன் மூலம் பக்தி நெறியினையும், இலக்கியச் சுவையினையும் அறிவர்.	PSO-4	K1
CO - 2	தமிழ்ச் சமூகப் பண்பாட்டு வரலாற்றினை இலக்கியங்கள் வாயிலாகப் புரிந்து கொள்வர்.	PSO-3	K2
CO - 3	பக்தி, சிற்றிலக்கியங்களின் வழி சமய நல்லிணக்கத்தையும் பண்பாட்டு நெறிகளையும் தெரிந்து அவற்றைப் பின்பற்றப்படவேண்டிய அறிவினையும் பெறுவர்.	PSO-5	K3
CO - 4	பட்டப் படிப்பினைப் படிக்கும் போதே பெரும்பான்மையான தமிழ் இலக்கியங்கள், இலக்கணங்கள் குறித்த அறிவினைப் பெறும் திறன் பெறுவர்.	PSO-2	K4
CO - 5	போட்டித் தேர்வுகளில் வெற்றி பெறுவதற்குத் தமிழ்ப் பாடத்தின் முக்கியத்துவத்தை உணர்ந்து பயன்கொள்ளும் வகையில் ஏற்ற மொழித்திறன் பயிற்சி பெறுவர்.	PSO-1	K5

K1-நினைவு கூர்தல் K2-புரிதல், K3- பயன்படுத்துதல், K4 -பகுத்தல், K5 -மதிப்பீடு

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				**பொதுத்தமிழ் - 2**								**Hours: 6**
Code : 23GT2GS02				**(பிற துறை மாணவிகளுக்கு மட்டும்)**								**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	2	4	3	3	4	3	2	5	4	3.55
CO - 2	4	4	5	4	4	4	4	4	5	4	4	4.18
CO - 3	3	3	3	5	4	4	3	4	3	3	5	3.64
CO- 4	3	4	3	4	5	5	4	5	3	3	4	3.91
CO - 5	3	5	3	3	2	2	5	2	3	3	3	3.09
Overall Mean Score												**3.68**

Result: The score for this course is **3.68** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

அலகு 1

திருநாவுக்கரசர் தேவாரம் - நாமார்க்கும் குடியல்லோம் எனத் தொடங்கும் பதிகம் (10 பாடல்கள்) ஆண்டாள் திருப்பாவை - (முதல் 10 பாசுரங்கள்) **18 Hours**

அலகு 2

வள்ளலார்-அருள் விளக்கமாலை (முதல் 10பாடல்கள்)

எச்.ஏ.கிருட்டிணப்பிள்ளை - இரட்சணியமனோகரம் - பால்ய பிராத்தனை

குணங்குடி மஸ்தான் சாகிபு-பராபரக்கண்ணி (முதல்10 கண்ணி) **18 Hours**

அலகு 3

தமிழ்விடு தூது - (முதல் 20 கண்ணி)

திருக்குற்றாலக் குறவஞ்சி-குறத்தி மலைவளம் கூறுதல்

முக்கூடற்பள்ளு-நாட்டுவளம் **18 Hours**

அலகு 4

பக்தி இலக்கியம் சிற்றிலக்கியம் தொடர்பான இலக்கியவரலாறு (பல்லவர்காலம், நாயக்கர் காலம்) **18 Hours**

அலகு 5: மொழித்திறன் / போட்டித் தேர்வுத் திறன்

1. தொடர் வகைகள்,
2. மரபுத்தொடர்,
3. பழமொழிகள்,
4. பிறமொழிச் சொற்களைக் களைதல்,
5. வழுச் சொற்கள் நீக்குதல்,
6. இலக்கணக் குறிப்பு அறிதல். **18 Hours**

(குறிப்பு: அலகு4, 5ஆகியனபோட்டித் தேர்வுநோக்கில் நடத்தப்படவேண்டும்)

பாடநூல்கள்

1. தமிழ்த்துறைவெளியீடு (தொகுப்பு) - பொதுத்தமிழ் - 2
   ஜெயராஜ் அன்னபாக்கியம் மகளிர் கல்லூரி (தன்னாட்சி),பெரியகுளம்.
2. முனைவர்சி. பாலசுப்பிரமணியன் - தமிழ் இலக்கியவாலாறு,
   பாவைபப்ளிகேஷன்ஸ்,சென்னை- 60
   இரண்டாம் பதிப்பு-2016.

பார்வை நூல்கள்

1. புலவர் பி.ரா.நடராசன் (உ.ஆ) - திருநாவுக்கரசு சுவாமிகள் தேவாரம், உமா பதிப்பகம்,சென்னை - 600001, முதல் பதிப்பு - ஏப்ரல் 2003.

2. எம்.நாராயணவேலுப் பிள்ளை (உ.ஆ) - நாலாயிர திவ்யப் பிரபந்தம், முல்லை நிலையம்,சென்னை - 600017, முதல் பதிப்பு - செப்டம்பர்2000.

3. திருவருட்பிரகாசவள்ளலார் - திருவருட்பா,கலைஞன் பதிப்பகம், சென்னை - 600017, இரண்டாம் பதிப்பு - 1885.

4. சுந்தரராசன் (உ.ஆ) - இரட்சணியமனோகரம், முல்லை நிலையம், சென்னை-600017,முதல் பதிப்பு - 2001.

5. கவிக்கோ அப்துல் ரகுமான் - குணங்குடியார் பாடற்கோவை, நேஷனல் பப்ளிஷர்ஸ்,சென்னை-600017, முதல் பதிப்பு - டிசம்பர்2008.

6. பேரா. சே.இராதாகிருஷ்ணன் - தமிழ்விடு தூது,முல்லை நிலையம், சென்னை-600017, இரண்டாம் பதிப்பு - 2008.

7. புலியூர்க் கேசிகன் - திருக்குற்றாலக் குறவஞ்சி, பாவை பப்ளிகேஷன்ஸ், சென்னை-600 014, இரண்டாம் பதிப்பு - ஜூலை2014.

8. புலியூர்க் கேசிகன் - முக்கூடற் பள்ளு, பாரி நிலையம், சென்னை-16, ஐந்தாம் பதிப்பு - செப்டம்பர்1993.

9. முனைவர்கோ. பெரியண்ணன் - அடிப்படைஎளியதமிழ் இலக்கணம், வனிதா பதிப்பகம்,சென்னை - 600 017, முதல் பதிப்பு - 2003.

10. தமிழ் வேந்தன் - பிழையின்றி தமிழ் எழுத பேச, அருவி வெளியீடு, சென்னை - 600 078, முதல் பதிப்பு ஏப்ரல், 2003.

NOVEL, ONE ACT PLAY AND GRAMMAR

Semester: II **Hours:5**

Code : 23GH2GS02 **Credit:3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Reproduce words both in speaking and writing Hindi.	PSO-1	K1
CO - 2	Acquire a comprehensive knowledge of vocabulary, syntax and grammar in Hindi	PSO-4	K2
CO - 3	Identify the competence in self-expression	PSO-2	K3
CO - 4	Focus on independent learning	PSO-3	K4
CO - 5	Develop proficiency in speaking, listening, reading, and writing Hindi.	PSO-5	K5

UNIT I **(15 Hours)**

Nirmala Summary - Bahu kee Vidha (Send - Off) - Grammar-Verb - Dowry is Cruel and Taking Dowry is a Big Sin.

UNIT II **(15 Hours)**

Nirmala-Thothaaraam, Kalyaani , Mansaraam , Udhayabhanulal - Rajpoothani ka Badla (Rajputani's Revrnge) - Grammar - Tense and Voice - Identify the Sentences in Hindi using Basic Grammar.

UNIT III **(15 Hours)**

Nirmala-Sudha, Balachandrasimha, Rangeelaa Bhayee, Siyaram - Andher Nagaree (Dark City) – Grammar- Preposition - Coming out of Darkness with the Wisdom of Knowledge.

UNIT IV **(15 Hours)**

Nirmala- Pandith Motaram, Jiyaram, Bhuvana Mohan Chimhaa - Reed Kee Haddi (Back Bone) - Grammar- Conjunction - Jagdishchandra Mathur Shows the Representative of the Entire Female Race.

UNIT V **(15 Hours)**

Nirmala - Rukmani, Nirmala, Krishnaa - Grammar - Interjection, Adverb - Nirmala- a critical analysis.

COURSE BOOKS:

1. Nirmala – Novel written by Munshi Premchand, published by Hamsa Prakashan Allahabad.
2. Aadarsh Ekanki, Published by Dakshina Bharath Hindi Prachar Sabha, Thyagaraya Nagar, Chennai – 600 017.

   The following Ekankies have been prescribed

   a) Rajpoothri Ka badla – Divjendralal Rai

   b) Andher Nagaree - Bharathendu Harichandra

   c) Reed Kee Haddi – Jagadeeshachandra Maathur

   d) Bahu kee Vidha – Shri vinodh Rasthogi

BOOK FOR REFERENCE:

1. Vyakaran Hindi – written by Ramdev, Published by Hindi Bhavan, 63 Tagore Nagar, Allahabad -2.

   The following topics have been prescribed

   a) Verb
   b) Tense and Voice
   c) Adverb
   d) Prepositions
   e) Conjunctions
   f) Interjunctions

COMMUNICATIVE ENGLISH – II

Semester: II **Hours: 4**

Code : 23GE2GS02 **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Identify skills in both writing and speaking	PSO-1	K1
CO - 2	Explain the main idea of a text	PSO-3	K2
CO - 3	Utilize website resources to enhance their language skills	PSO-2	K3
CO - 4	Categorize the rhetorical strategies and techniques used in writing and speaking	PSO-5	K4
CO - 5	Criticize the texts after comprehending	PSO-4	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				**COMMUNICATIVE ENGLISH – II**							**Hours: 4**
Code : 23GE2GS02											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	3	3	3	4	5	3	3	3	4	3.64
CO - 2	3	3	5	4	3	3	3	4	5	3	3	3.55
CO - 3	4	2	3	5	2	2	4	5	3	2	2	3.09
CO - 4	3	5	2	3	4	5	3	3	2	4	5	3.55
CO - 5	4	4	2	4	5	4	4	4	2	5	4	3.82
Overall Mean Score												**3.53**

Result: The score for this course is **3.53** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I **12 Hours**

1. Listening and Speaking
    a. Listening and responding to complaints (Formal situation)
    b. Listening to problems and offering solutions (Informal)
2. Reading and writing
    a. Reading aloud (Brief motivational anecdotes)
    b. Writing a paragraph on a proverbial expression/motivational idea.
3. Word Power/Vocabulary
    Synonyms & Antonyms

UNIT II **12 Hours**

1. Listening and Speaking
    a. Listening to famous speeches and poems
    b. Making short speeches- Formal: welcome speech and vote of thanks.
        Informal occasions- Farewell party, graduation speech
2. Reading and Writing
    a. Writing opinion pieces (On travel, food, film /book reviews or on any contemporary topic)
    b. Reading poetry
        i. Reading aloud: (Intonation and Voice Modulation)
        ii. Identifying and using figures of speech -simile, metaphor, personification etc.
3. Word Power
    a. Idioms & Phrases

UNIT III **12 Hours**

1. Listening and Speaking
    a. Listening to Ted talks
    b. Making short presentations – Formal presentation with PPT, analytical presentation of graphs and reports of multiple kinds
    c. Interactions during and after the presentations
2. Reading and writing
    a. Writing emails of complaint
    b. Reading aloud famous speeches
3. Word Power
    a. One Word Substitution

UNIT IV **12 Hours**

1. Listening and Speaking
   a. Informal interview for feature writing
   b. Listening and responding to questions at a formal interview
2. Reading and Writing
   a. Writing letters of application
   b. Readers' Theatre (Script Reading)
   c. Dramatizing everyday situations/social issues through skits.
   (writing scripts and performing)
3. Word Power
   Collocation

UNIT V **12 Hours**

Grammar in Context

1. Adverbs & Prepositions
2. Conjunctions & Interjections
3. Sentence Patterns
4. Working with Clauses

COURSE BOOKS:

- Communicative English (For Students of Arts and Science Colleges) Tamilnadu State Council for Higher Education (TANSCHE)

- Savarimuttu, Rohan J. S, and G. Petricia Alphine Nirmala, *English Grammar and Usage - An Ideal Companion for Advanced Learners*. New Century Book House (P) Ltd, 2016.

BOOKS FOR REFERENCE

1. Kumar, Manoj.*English Communication: Theory and Practice. Scholar*. Tech Press, 2018.
2. Nachmuthu, Cambridge. *Advanced Communication English.* Cambridge Publishers, 2011.

WEB RESOURCES

https://www.youtube.com/watch?v=xZbKHDPPrrc

https://www.youtube.com/watch?v=TRcIEMgppK8

https://youtube.com/playlist?list=PLZ-F4pjbka7EIKKAwh83RDqi7Vp0q_DQp

https://www.scripts.com/script/the_chronicles_of_narnia:_the_lion,_the_witch_and_the_wardrobe_5540

GENERAL CHEMISTRY - III

Semester: II **Hours: 4**
Code : 23CH2MC03 **Credit: 4**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the acid base concepts, chemistry of s and p block elements, preparation and properties of alkanes, alkenes, alkadienes and alkynes	PSO-1	K1
CO - 2	Describe the theory of indicators, properties of s and p block elements, reactions of alkanes, alkenes, alkadienes and alkynes	PSO-2	K2
CO - 3	Apply the pH scale to solve problems and the characteristics of s,p-block elements and properties of alkanes, alkenes and alkadienes to explain the chemical reactions	PSO-3	K3
CO - 4	Analyze the acid base indicators, anomalous behaviour of oxygen, preparation and properties of alkanes, alkenes and alkadienes	PSO-4	K4
CO- 5	Summerize titration curves, properties of s- and p-block elements, diagonal relationship, allotropy of carbon and the reactions of alkadienes and alkynes	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				GENERAL CHEMISTRY - III							Hours: 4
Code : 23CH2MC03											Credit: 4
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO -1	5	3	3	3	4	4	5	3	3	4	4	3.73
CO - 2	3	4	5	5	3	3	3	5	4	3	3	3.73
CO - 3	3	5	4	4	4	3	3	4	5	3	4	3.82
CO - 4	3	4	4	4	4	5	3	4	4	5	4	4.00
CO - 5	3	4	4	4	5	3	3	4	4	3	5	3.82
Overall Mean Score												**3.82**

Result: The score for this course is **3.82** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: ACIDS AND BASES:

Concepts of acids and bases - Arrhenius concept, Bronsted - Lowry concept - Lewis concept - relative strengths of weak acids and weak bases - dissociation constant - dissociation of poly basic acids - ionic product of water - pH scale - pH of solutions (related problems) - common ion effect - degree of dissociation - factors affecting degree of dissociation - theory of acid base indicators - action of phenolphthalein and methyl orange - titration curves - use of acid base indicators. **(12 Hours)**

UNIT II: CHEMISTRY OF s - BLOCK ELEMENTS:

Position of the hydrogen in periodic table: resemblance with alkali metals - resemblance with halogens - alkali metals: physical and chemical properties - diagonal relationship of Li with Mg - preparation and uses of NaOH, Na_2CO_3, KBr, $KClO_3$ - alkaline earth metals: physical and chemical properties - anomalous behavior of beryllium - comparison of Be and Mg with other alkaline earth metals - diagonal relationship between Be and Al. **(12 Hours)**

UNIT III: CHEMISTRY OF p- BLOCK ELEMENTS:

Characteristics of p-block elements: metallic character - melting and boiling points - oxidising and reducing properties - electrode potentials and electropositive character - oxidation states - Electronic configuration of group 13, 14, 15 and 16 elements - structure of diborane and borazine - properties and uses of borax - diagonal relationship between boron and silicon - allotropy of carbon: structure of diamond and graphite - comparison of carbon with silicon - preparation, properties, structure and uses of $NH_2.NH_2$ and PH_3 - difference between nitrogen and the rest of the family members - anomalous behavior of oxygen - preparation and structure of H_2SO_4, Caro's and Marshall's acids.

(12 Hours)

UNIT IV: HYDROCARBON CHEMISTRY-I:

a) ALKANES:

Petroproducts - fractional distillation of petroleum - cracking - alkanes: classification of carbon atoms in alkanes - isomerism in alkanes - methods of preparation: Kolbe's electrolytic method and Corey House synthesis - physical properties - chemical properties: oxidation, halogenation, nitration, aromatization and isomerization .

b) ALKENES:

Nomenclature - general methods of preparation - E_1 and E_2 mechanism - Hofmann and Saytzeff rules - chemical properties of alkenes: addition reactions, Markownikoff's rule, Anti-Markownikoff's rule (Kharasch effect), oxidation reactions, hydroxylation, epoxidation,ozonolysis and polymerization. **(12 Hours)**

UNIT V: HYDROCARBON CHEMISTRY -II:

a) ALKADIENES:

Alkadienes - nomenclature - classification - stability - mechanism of electrophilic addition to conjugated dienes - 1, 2 and 1, 4 additions - free radical addition to conjugated dienes - polymerization - polychloroprene - polybutadiene - polyisoprene - Diels-Alder reactions

b) ALKYNES:

Nomenclature - general methods of preparation: from calcium carbide, dehydrohalogenation of dihalides - physical properties - chemical properties: acidity of acetylene, polymerisation and isomerization. **(12 Hours)**

COURSE BOOKS:

1. B.R. Puri, L.R. Sharma and S.Pathania, Principles of Physical Chemistry, Vishal Publishing Co, 46th edition, 2012. **Unit I**
2. R. D.Madan Modern Inorganic Chemistry, S.Chand and company Ltd., 3rd edition, 2012. **Unit II - III**
3. B.R. Puri, L.R. Sharma and K.C. Kalia, Principles of Inorganic Chemistry, Milestone Publishers, 31st edition, 2012. **Unit II - III**
4. B.R. Puri, L.R. Sharma and K.C. Kalia, Geetanjli Kaushal, Graduate Inorganic Chemistry, Vol-I, Vishal Publishing Co. **Unit III**
5. M.K. Jain and S.C. Sharma, Modern Organic Chemistry, Vishal Publishing Co., 4th edition, 2013 **Unit IV - V**
6. P.L. Soni and H.M Chawla, Organic Chemistry, Sultan Chand and Sons, 29th Edition, 2007 **Unit IV - V**

GENERAL CHEMISTRY - IV

Semester: II **Hours: 4**

Code : 23CH2MC04 **Credit: 4**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge on ionic equilibria, gaseous state, nuclear chemistry and benzene chemistry	PSO-1	K1
CO - 2	Explain the concepts of ionic equilibria, gaseous state, nuclear chemistry and benzene chemistry	PSO-2	K2
CO - 3	Recognise the importance of ionic equilibria, gaseous state, nuclear chemistry and benzene chemistry	PSO-3	K3
CO - 4	Analyse the applications of ionic equilibria, gaseous state, nuclear chemistry and benzene chemistry	PSO-4	K4
CO - 5	Solve the problems in ionic equilibria, gaseous state, nuclear chemistry and benzene chemistry	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II			**GENERAL CHEMISTRY - IV**						**Hours: 4**			
Code : 23CH2MC04												**Credit: 4**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	3	3	3	3	5	3	4	3	3	3.55
CO - 2	4	3	5	5	3	3	4	5	3	3	3	3.73
CO - 3	3	5	3	3	3	4	3	3	5	4	3	3.55
CO - 4	3	3	3	3	3	5	3	3	3	5	3	3.36
CO - 5	4	3	3	3	5	3	4	3	3	3	5	3.55
Overall Mean Score												**3.55**

Result: The score for this course is **3.55** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: IONIC EQUILIBRIA:

Buffer solutions - types - buffer mixture of weak acid and it is salt - Henderson-Hasselbalch equation -related problems - hydrolysis of salt - salts of strong acids and strong bases - salts of weak acids and strong bases - salts of weak bases and strong acids - salts of weak acids and weak bases - hydrolysis constant - relationship between K_h, K_a and K_w - degree of hydrolysis - solubility product - applications of solubility product. **(12 Hours)**

UNIT II: GASEOUS STATE - I

Kinetic molecular theory of gases - derivation of gas laws: Boyl's law, Charl's law, Avagadro's law, ideal gas equation, Graham's law of diffusion and Dalton's law of partial pressures - kinetic theory and temperature - Maxwel's law of distribution of molecular velocities (no derivation), effect of temperature on distribution of molecular velocities - types of molecular velocities-related problems - collision parameters: collision diameter - collision cross-section - collision number - collision frequency - mean free path. **(12 Hours)**

UNIT III: GASEOUS STATE - II

Real gases: deviation of real gases from ideal behavior - effect of temperature on deviations from ideal behavior - explanation for the deviations - van der Waals equation of state - derivation - critical constants of a gas -P-V isotherms of carbon dioxide - liquefaction of gases: Inversion temperature -Joule - Thomson effect-coefficient - Linde's process - Claude's process-applications of liquefied gases

(12 Hours)

UNIT IV: NUCLEAR CHEMISTRY AND RADIOACTIVITY:

Nuclear chemistry - nuclear particles - packing fraction - mass defect - binding energy of the nucleus - related problems - binding energy and stability - nuclear fission: atom bomb - nuclear fusion: hydrogen bomb, energy of the sun atmosphere - Radioactivity -rate of radioactive disintegration - units of radioactivity - half-life period - nature of radiations from radioactive elements - detection and measurement of radio activity: Geiger Muller counter - applications of radio activity: tracers-rock dating -carbon dating - artificial transmutation of elements - cyclotron. **(12 Hours)**

UNIT V: BENZENE CHEMISTRY

Benzene - source - structure of benzene - stability of benzene ring molecular orbital picture of benzene - aromaticity - Huckel's (4n +2) rule - applications of Huckel's rule - electrophilic aromatic substitution reactions and mechanism: halogenation, nitration, sulphonation, Friedel Craft's alkylation and acylation - mono substituted and disubstituted benzene - effect of substituent - orientation and reactivity. **(12 Hours)**

COURSE BOOKS:

1. B.R. Puri, L.R. Sharma and S.Pathania, Principles of Physical Chemistry, Vishal Publishing Co, 46th edition, 2012. **Unit I - III**
2. B.R. Puri, L.R. Sharma and K.C. Kalia, Principles of Inorganic Chemistry, Milestone Publishers, 31st edition, 2012 **Unit IV**
3. M.K. Jain and S.C. Sharma, Modern Organic Chemistry, Vishal Publishing Co., 4th edition, 2013 **Unit V**
4. P.L. Soni and H.M Chawla, Organic Chemistry, Sultan Chand and Sons, 29th Edition, 2007 **Unit V**

ALLIED CHEMISTRY - II

Semester: II **Hours: 3**
Code : 23CH2AC2A **Credit: 3**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Gain knowledge about chemistry of chemotherapeutic drugs, catalysis, chromatographic techniques, fertilizers and electrochemistry	PSO-2	K1
CO - 2	Describe the concepts of chemotherapy, surface chemistry, chromatography, fertilizers and corrosion	PSO-1	K2
CO - 3	Apply the preparation methods of drugs, adsorption, catalysis, chromatographic techniques, pesticides and electrochemical reactions	PSO-3	K3
CO - 4	Classify the types of chemotherapeutic drugs, adsorption, chromatographic techniques, fertilizers and electrochemical cells	PSO-4	K4
CO - 5	Summarize the uses of drugs, catalyst, chromatographic techniques, fertilizers and electrochemistry	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				**ALLIED CHEMISTRY - II**							**Hours: 3**
Code : 23CH2AC2A											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	3	5	5	3	3	3	5	3	3	3	3.54
CO - 2	5	3	4	4	3	4	5	4	3	4	3	3.81
CO - 3	3	5	4	4	3	4	3	4	5	4	3	3.81
CO - 4	3	4	4	4	3	5	3	4	4	5	3	3.81
CO - 5	4	3	4	4	5	4	4	4	3	4	5	4.0
Overall Mean Score												**3.79**

Result: The score for this course is **3.79** (High Relationship)
Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: CHEMISTRY IN THE SERVICE OF MANKIND:

Antibiotics: definition - classification based on specificity and their gram staining methods-uses of penicillins, chloramphenicol, tetracyclines and streptomycin- **antipyretics:** definition - preparation and uses of aspirin and paracetamol - **analgesics:** definition, types and examples - **antiseptics and disinfectants:** definition, uses and examples-artificial sweeteners: structure and uses of saccharin and aspartame- organic halogen compounds: structure and uses of freon and teflon **(9 Hours)**

UNIT II

a) SURFACE CHEMISTRY:

Adsorption - definition - difference between adsorption and absorption - types of adsorption - difference between physisorption and chemisorption - Freundlich adsorption isotherm - applications of adsorption

b) CATALYSIS:

General characteristics of a catalyst - types of catalysis - homogeneous catalysis, heterogeneous catalysis, acid-base catalysis, enzyme catalysis, auto catalysis - definitions and examples - catalytic poisoning - promoters - industrial applications of catalyst. **(9 Hours)**

UNIT III: CHROMATOGRAPHY:

Definition - classification - applications of chromatography- thin layer chromatography (TLC): principle, choice of adsorbent and solvents, developing of chromatoplates, applications- Column chromatography(CG): Principle, choice of adsorbent and solvents, packing and developing of column, applications-paper chromatography: Principle, choice of adsorbent and solvents, application of sample, development of chromatogram:ascending, decending, radial techniques-R_f value-Applications. **(9 Hours)**

UNIT IV

a) FERTILIZERS:

Definition - nutrients for plants - role of various elements in plant growth - natural and chemical fertilizers - classification of chemical fertilizers - manufacture of urea- mixed fertilizers - organic farming.

b) INSECTICIDES AND PESTICIDES:

Definition- preparation, structure and uses of DDT and BHC **(9 Hours)**

UNIT V: ELECTROCHEMISTRY AND CORROSION:

Electrolytes, electrochemical cells- lead storage cell - pH scale-definition - simple calculation - buffer solution: definition, types, example - corrosion-definition - disadvantages-Types-methods of prevention : galvanizing, tinning, cathodic protection, lacquers- and paints - inhibitors:Anodic and cathodic inhibitors.

(9 Hours)

COURSE BOOK:

1. Mary Imelda Jayaseeli, M. Kalanithi, C. Mary Anbarasi, Sr. T. Johny Dathees and Sr. S. Sahaya Leenus, Allied Chemistry-II , New Century Book House (P)Ltd., Chennai, first edition, 2021

GENERAL CONCEPTS IN CHEMISTRY-II

Semester: II **Hours: 3**

Code : 23CH2AC2B **Credit:3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the concept of distribution law, phase rule, photochemistry,coordination chemistry,carbon compounds, dyes and heterocyclic chemistry	PSO-1	K1
CO - 2	Discuss the distribution law, phase rule, photochemistry, coordination compunds, dyes and heterocyclic compounds	PSO-2	K2
CO - 3	Apply the concept of distribution law, phase rule, photochemistry, coordination compunds, carbon based industrial products, dyes and heterocyclic compounds	PSO-3	K3
CO - 4	Analysis the applications of distribution law, phase rule, photochemistry, coordination compunds, carbon based industrial products, polynuclear hydrocarbons, dyes and heterocyclic compounds	PSO-4	K4
CO - 5	Summarize the significance of distribution coefficient, phase rule, photochemical reactions, coordination compunds, carbon compounds, dyes and heterocyclic compounds	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				**GENERAL CONCEPTS IN CHEMISTRY-II**							**Hours: 3**
Code : 23CH2AC2B											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	4	4	3	3	5	4	3	3	3	3.63
CO - 2	4	3	5	5	3	4	4	5	3	4	3	3.90
CO - 3	3	5	4	4	3	3	3	4	5	3	3	3.63
CO - 4	3	3	4	4	3	5	3	4	3	5	3	3.63
CO - 5	4	3	4	4	5	3	4	4	3	3	5	3.81
Overall Mean Score												**3.72**

Result: The score for this course is **3.72** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

a) DISTRIBUTION LAW: Statement and mathematical formulation-experimental verification- conditions under which the law is obeyed-derivations from the law (Statement only and no derivation of the respective relations)- applications of distribution law.

b) PHASE RULE: (only qualitative treatment)

LIQUIDS IN LIQUIDS: Distillation of homogeneous binary liquid mixtures- theory of fractional distillation and azeotropic distillation - partially miscible liquids: variation of solubility with temperature - critical solution (consolute) temperature- lower and upper- influence of impurity on C.S.T and applications - Immiscible liquid systems: Theory of steam distillation and its applications.

(9 Hours)

UNIT II: PHOTOCHEMISTRY:

Definition of photochemical reaction - laws of photochemistry - Grotthus -Draper law -Einstein law - quantum efficiency - consequence of light adsorption by atoms and molecules - Jablonsky diagram - fluorescence - phosphorescence - comparison between thermal and photochemical reactions - photosensitization - chemiluminescence. **(9 Hours)**

UNIT III

a) COORDINATION COMPOUNDS: Definition - nomenclature - definition of various terms involved in coordination chemistry - Werner's theory - EAN rule - VB theory (outline only) - nickel carbonyl - chelates.

b) INDUSTRIAL CARBON: Manufacture of graphite, carbon black, calcium carbide - silicon carbide. **(9 Hours)**

UNIT IV

a) CONDENSED SYSTEM: Naphthalene and anthracene. Isolation from coal tar, synthesis, properties and uses. Structures of the above(No elucidation).

b) DYES: Definition- theory of colour and constitution- classification according to the structure and application- preparation of methyl orange- bismark brown and malachite green. **(9 Hours)**

UNIT V

a) HETEROCYCLIC COMPOUNDS I: Preparation, properties and structures of pyrrole, furan, thiophene, indole, pyridine, quinoline and isoquinoline (structural elucidation not necessary)

b) HETEROCYCLIC COMPOUNDS II :

Preparation, properties and structures of oxazole, pyrazole and imidazole (structural elucidation not required). **(9 Hours)**

COURSE BOOKS:

1. K. Ratinamuthu, R.Victoria, Semester -II, Text book of Ancillary Chemistry, Educational publishers, Madurai. **Unit I**
2. A. Mary Imelda Jayaseeli, M. Kalanithi, C. Mary Anbarasi, S. Pooranalakshmi, Allied Chemistry III and IV, Shanlax publications., Madurai, first edition, 2022. **Unit II**
3. K. Ratinamuthu, R.Victoria, Semester -III, Text book of Ancillary Chemistry, Educational publishers, Madurai. **Unit III**
4. K. Ratinamuthu, R.Victoria, Semester -II, Text book of Ancillary Chemistry, Educational publishers, Madurai. **Unit IV**
5. K. Ratinamuthu, R.Victoria, Semester -IV, Text book of Ancillary Chemistry, Educational publishers, Madurai. **Unit V**

ALLIED PRACTICAL III: ORGANIC ANALYSIS

Semester: II **Hours: 2**

Code : 23CH2AP2A **Credit:1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge about the chemistry of fundamental organic reactions	PSO-1	K1
CO - 2	Find the aromatic/non aromatic and saturated/unsaturated nature of the organic substance, special element nitrogen and functional groups	PSO-2	K2
CO - 3	Apply the procedures for finding special element nitrogen and functional groups	PSO-3	K3
CO - 4	Analyze the functional group of organic substances	PSO-4	K4
CO - 5	Adopt safety measures in handling chemicals	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				**ALLIED PRACTICAL III: ORGANIC ANALYSIS**							**Hours: 2**
Code : 23CH2AP2A											**Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	3	3	3	4	5	3	4	4	3	3.73
CO - 2	3	3	5	5	3	4	3	5	3	4	3	3.73
CO - 3	3	5	3	3	4	4	3	3	5	4	4	3.73
CO - 4	3	3	3	3	4	5	3	3	3	5	4	3.55
CO - 5	3	3	4	4	5	4	3	4	3	4	5	3.82
Overall Mean Score												**3.71**

Result: The score for this course is **3.71** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

ANALYSIS OF THE ORGANIC SUBSATANCES CONTAINING THE FOLLOWING FUNCTIONAL GROUPS

Primary amines, Amides, Aldehydes, Ketones, Carbohydrates, Esters, Acids and Phenols (Preparation of solid derivative not required)

Report should contain the following

1. Aliphatic / Aromatic
2. Saturated / unsaturated
3. Presence / absence of special element nitrogen
4. Functional group

REFERENCE:

Practical guide prepared by the Chemistry Department

ALLIED PRACTICAL IV: QUANTITATIVE ESTIMATION

Semester: II **Hours: 2**

Code : 23CH2AP2B **Credit:1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Gain analytical skills in volumetric estimation	PSO-1	K1
CO - 2	Explain the methods of EDTA, colorimetric titrations	PSO-2	K2
CO - 3	Apply the procedure for colorimetric estimation of metal ions	PSO-3	K3
CO - 4	Analyse the estimation of metals using EDTA, colorimetric titrations	PSO-4	K4
CO - 5	Adopt safety measures in handling chemicals	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				ALLIED PRACTICAL IV: QUANTITATIVE ESTIMATION							Hours: 2
Code : 23CH2AP2B											Credit: 1
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	4	3	3	3	4	5	3	4	4	3	3.73
CO - 2	4	3	5	5	3	4	4	5	3	4	3	3.91
CO - 3	3	5	3	3	4	4	3	3	5	4	4	3.73
CO - 4	3	3	3	3	4	5	3	3	3	5	4	3.55
CO - 5	4	3	3	3	5	4	4	3	3	4	5	3.73
Overall Mean Score												3.73

Result: The score for this course is **3.73** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

EDTA TITRATIONS:

1. Estimation of Magnesium
2. Estimation of Zinc
3. Estimation of Hardness of water

COLORIMETRY:

1. Estimation of Iron
2. Estimation of Copper

REFERENCE BOOK:

1. V.Venkateswaran, R. Veeraswamy and A. R. Kulandaivelu , Basic principles of Practical chemistry Sultan Chand and sons, 2nd edition, 2012

ESSENTIAL MATHEMATICS - II

Semester: II **Hours: 5**

Code : 23MA2AC2A **Credit: 4**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge of differential equations and operators	PSO - 1	K1
CO - 2	Understand the calculus of vector functions	PSO - 2	K2
CO - 3	Articulate expansions of trigonometric functions	PSO - 3	K3
CO - 4	Connect vector differentiation with the concepts of gradient, divergence, and curl concepts	PSO - 5	K4
CO - 5	Evaluate line and surface integrals	PSO - 4	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				ESSENTIAL MATHEMATICS - II								Hours: 5
Code : 23MA2AC2A												Credit: 4
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	4	3	3	3	3	5	3	3	3	4	3.55
CO - 2	3	3	3	5	3	3	3	5	3	3	3	3.36
CO - 3	3	3	5	3	3	3	3	3	5	3	3	3.36
CO - 4	3	5	3	3	2	3	3	3	3	3	5	3.36
CO - 5	2	3	3	3	5	5	2	3	3	5	3	3.36
Overall Mean Score												3.40

Result: The score for this course is **3.40** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I

Homogeneous linear equations of the second order - Linear equations with variable coefficients - Variation of parameters. **(15 Hours)**

UNIT II

Vector differentiation - Vector differential operator - Gradient - Directional derivative -Divergence and curl - Solenoidal and irrotational vectors.

(15 Hours)

UNIT III

Vector integration - Line integrals - Surface integrals - Theorems of Green, Gauss and Stokes (problems only). **(15 Hours)**

UNIT IV

Expansion of sin nθ, cos nθ, and tan nθ - Formation of Equations. **(15 Hours)**

UNIT V

Powers of sines and cosines of θ in terms of functions of multiples of θ - Expansions of sin θ, cos θ, tan θ in a series of ascending powers of θ.

(15 Hours)

COURSE BOOK:

- Course material compiled by the Department.

BOOKS FOR REFERENCE:

1. S. Arumugam and A. Thangapandi Issac , Ancillary Mathematics Paper II & III, New Gamma Publishing House, 1996 & 1997.
2. S. Narayanan & T. K. Manicavachagom Pillay, Trigonometry, S. Viswanathan (Printers & Publishers) Pvt. Ltd., 2008.
3. A. Abdul Rasheed, Allied Mathematics I, Vol. I, Vijay Nicole Imprints Pvt. Ltd.,2005.

E-RESOURCES:

1. https://www.khanacademy.org/math/trigonometry
2. https://youtu.be/94UNkDQ-aUM
3. https://youtu.be/AKN2AMcptO0

CLASSICAL ALGEBRA

Semester: II **Hours: 5**

Code : 23MA2AC2B **Credit: 4**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge on the theory of equations	PSO - 4	K1
CO - 2	Understand the concepts theory of equations and the methods of interpolation to solve the equations	PSO -2	K2
CO - 3	Apply the techniques of summation of series and interpolation to solve a given problem	PSO - 3	K3
CO - 4	Analyse the given problem and identify the method to find solutions	PSO - 1	K4
CO - 5	Appraise the techniques of interpolation and series expansion in realistic situations	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				**CLASSICAL ALGEBRA**							**Hours: 5**
Code : 23MA2AC2B											**Credit: 4**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	2	3	2	3	5	5	2	3	3	5	3	3.36
CO - 2	3	3	3	5	3	3	3	5	3	3	3	3.36
CO - 3	3	3	5	3	3	3	3	3	5	3	3	3.36
CO - 4	5	4	3	3	3	3	5	3	3	3	4	3.55
CO - 5	3	5	3	3	3	3	3	3	3	3	5	3.36
Overall Mean Score												**3.40**

Result: The score for this course is **3.40** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

Theory of Equations: Remainder theorem - Fundamental theorem of Algebra - Relation between roots and coefficients - Symmetric function of the roots - Sum of the powers of the roots of an equation - Newton's Theorem on a sum of powers of roots. **(15 Hours)**

UNIT II

Transformation of Equations: Reciprocal roots - Reciprocal equations - To increase or decrease the roots of a given equation by a given quantity.

(15 Hours)

UNIT III

Integral roots: Numerical solution by Horner's method and Newton's Method **(15 Hours)**

UNIT IV

Binomial theorem for a rational index - particular cases of Binomial expansion - Greatest term - application of the binomial theorem to the summation of series. **(15 Hours)**

UNIT V

Logarithmic and Exponential series: Exponential limit - Summation of series - Logarithmic series. **(15 Hours)**

COURSE BOOK:

- Course material compiled by the Department.

BOOKS FOR REFERENCE:

1. A. Abdul Rasheed, Allied Mathematics I, Vol. I, Vijay Nicole Imprints Pvt. Ltd.,2005.
2. T. K. Manicavachagom Pillay, T. Natarajan, and K. S. Ganapathy, Algebra , Volume I, Ananda Book Depot, 2016.

E-RESOURCES:

1. https://youtu.be/5nNPf_EB7Es
2. https://youtu.be/zCVtqFy33Kw

ALLIED ZOOLOGY - II

Semester: II **Hours: 3**

Code : 23ZO2AC2A **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the distinct features of different classes of chordates.	PSO - 1	K1
CO - 2	Describe the structural and functional organizations of chordates.	PSO - 2	K2
CO - 3	Illustrate the adaptive features of chordates to various habitats.	PSO - 3	K3
CO - 4	Explain the general characters of different classes of chordates and features of key specimens.	PSO - 2, PSO - 5	K4
CO - 5	Evaluate the exceptional attributes of different classes of chordates.	PSO - 4	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				**ALLIED ZOOLOGY - II**							**Hours: 3**
Code : 23ZO2AC2A											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	3	2	4	3	5	4	3	2	3	3.36
CO - 2	4	3	3	3	5	3	4	5	3	3	3	3.55
CO - 3	4	3	5	3	4	3	4	4	5	3	3	3.73
CO - 4	4	5	3	2	5	5	4	5	3	2	5	3.91
CO - 5	3	4	3	5	4	4	3	4	3	5	4	3.82
Overall Mean Score												**3.67**

Result: The score for this course is **3.67** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I

PROTOCHORDATA AND PISCES: General characters and classification of chordates up to classes with an example. Salient features of Ascidian, Amphioxus, Balanoglossus and Petromyzon. Affinities of Hemichordates. General characters of class Pisces. Salient features of Narcine, Eel and Scoliodon, Economic importance of fishes, Migration of fishes. **(9 Hours)**

UNIT II

AMPHIBIA: General characters with an example. Salient features of Frog, Bufo, Rhacophorus and Salamander. Metamorphosis of Amphibian, Limbless Amphibians, Parental care in Amphibia. **(9 Hours)**

UNIT-III

REPTILIA: General characters with an example. Salient features of Chelone, Draco, Chamaeleon and Crocodilus. Identification of Poisonous and non - poisonous snakes, Poison apparatus, Snake venom, Biting mechanism, First aid. **(9 Hours)**

UNIT IV

AVES: General characters with an example. Salient features of Parrot, Duck, Woodpecker, Kingfisher and Pelican. Flightless birds, Flight adaptations in birds, Migration of birds. **(9 Hours)**

UNIT V

MAMMALS: General characters with an example. Salient features of Echidna, Bat, Kangaroo and Scaly anteater. Egg laying mammals, Dentition in mammals, Aquatic mammals, Adaptations of aquatic mammals. **(9 Hours)**

. COURSE BOOK:

- Thangamani A, Prasannakumar, Narayanan LM, Arumugam N, A. (2019). Text Book of Chordates, Saras Publication, Nagercoil.

  Unit I: Chapter 2, 4.

  Unit II: Chapter 5.

  Unit III: Chapter 6.

  Unit IV: Chapter 7.

  Unit V: Chapter 8.

BOOKS FOR REFERENCE:

1. Arumugam, N. (2019). Animal Diversity - volume 2 - Chordata, Saras Publication, Nagercoil.
2. Ekambaranatha Ayyar and T.N. Anandakrishnan. (2019). Manual of Zoology vol - II, Viswanathan Pvt. Ltd, Chennai.
3. Kotpal R. L. (2019). Modern Text Book of Zoology Vertebrates, 5th edition, Rastogi Publications, Meerut.
4. Young, J. Z. (2004). Life of vertebrates, Clarendon Press, Oxford UK.
5. Pouch Harvey F, Christine M. Janis and John B, Heiser. (2002). Vertebrate Life, Pearson Education Inc, New Delhi.
6. Verma P. S. and Jordan, E. L. (2013). Chordate Zoology, S Chand Publishers, New Delhi.

GENERAL ZOOLOGY - II

Semester: II **Hours: 3**

Code : 23ZO2AC2B **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Describe the process of digestion and working mechanism of heart.	PSO - 2	K1
CO - 2	Illustrate the transport of respiratory gases and urine formation.	PSO - 3	K2
CO - 3	Appraise the origin of life.	PSO - 1	K3
CO - 4	Assess the abiotic and biotic factors.	PSO - 5	K4
CO - 5	Formulate the events of gametogenesis.	PSO - 4	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				**GENERAL ZOOLOGY - II**							**Hours: 3**
Code : 23ZO2AC2B											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	2	3	4	5	2	3	5	3	4	2	3.27
CO - 2	4	3	5	2	3	3	4	3	5	2	3	3.36
CO - 3	5	3	3	3	4	3	5	4	3	3	3	3.55
CO - 4	3	5	3	2	4	5	3	4	3	2	5	3.55
CO - 5	3	3	4	5	3	3	3	3	4	5	3	3.55
Overall Mean Score												**3.46**

Result: The Score for this Course is **3.46** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I

Food - Physiological role of carbohydrate, proteins and lipids- balanced diet. Malnutrition. Vitamins-sources and deficiency diseases. Human digestive tract, Functional anatomy of human heart, ECG. **(9 Hours)**

UNIT II

Respiratory pigments, Transport of respiratory gases, Structure of kidney and nephron, formation of urine, structure of neuron, Ultra structure of skeletal muscle.

(9 Hours)

UNIT III

Biochemical origin of life - Abiogenesis, Biogenesis, mimicry and coloration, Lamarckism-Principles, examples for use and disuse theory. Darwinism, Neo Lamarckism and Neo Darwinism - Experimental evidences, Speciation- sympatric and allopatric. **(9 Hours)**

UNIT IV

Abiotic and Biotic factors, Pond ecosystem, food chain and food web, nitrogen cycle, animal association-symbiotic commensalism, mutualism and parasitism. Pollution - types, causes, effects and prevention of air and water pollution. Wild life conservation.

(9 Hours)

UNIT V

Gametogenesis - Spermatogenesis and oogenesis, Structure of sperm and ovum, Types and functions of placenta in animals, Menstrual cycle, Pregnancy, Twin study - Identical twins, Fraternal twins, Siamese twins, Test tube baby, Invitro fertilization.

(9 Hours)

COURSE BOOK:

1. N. Arumugam, A. Mariakuttikan, (2019). Animal Physiology, 12th Edition, Saras publications Nagercoil.
   Unit I: Chapter 4, 5, 6, 9 - 30, 31, 40, 74, 173, 183.
   Unit II: Chapter 152, 153, 154, 197, 198, 206, 260, 278.
   Unit V: Chapter 324, 325.
2. Arumugam, N. and Meyyan, R. P. (2011). Genetics and Evolution, 5th Edition, Saras Publication, Nagercoil.
   Unit III: Chapter 1, 2, 3, 4, 5, 12, 17.
3. Arumugam, N. (2018). Concepts of Ecology Environmental Biology, 8th Edition, Saras Publication, Nagercoil.
   Unit IV: Chapter 2, 3, 11, 12, 13, 20, 37, 38, 39.
4. Arumugam, N. (2015). Developmental Zoology, 2nd Edition, Saras publications Nagercoil.
   Unit V: Chapter 2, 4, 5, 15, 34, 27, 28.

BOOKS FOR REFERENCE:

1. Mariakuttikan A. and Arumugam N., (2017). Animal Physiology. Saras Publication, Nagercoil.
2. Arumugam N., (1993) Embryology, Ecology and physiology. Saras publications, Nagercoil
3. Arumugam N., A Text book of Evolution. Saras publications Nagercoil.
4. Verma P. S. and Agarwal V. K. (2000). Environmental Biology: Principles of Ecology. S. Chand and Company Pvt. Ltd., New Delhi.
5. Verma P. S., Tyagi S. and Agarwal V. K. (2002). Animal Physiology. S. Chand and Company Pvt. Ltd., New Delhi.

ALLIED ZOOLOGY - II - LAB

Semester: II **Hours: 2**

Code : 23ZO2AP2A **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Identify and compare the general biology of few chordates.	PSO - 1	K1
CO - 2	Examine the structure of placoid scales in shark.	PSO - 4	K2
CO - 3	Differentiate the beak and feet adaptation of birds.	PSO - 2	K3
CO - 4	Evaluate the feathers of any five birds.	PSO - 3	K4
CO - 5	Prepare a report on birds in campus.	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				**ALLIED ZOOLOGY - II - LAB**							**Hours: 2**
Code : 23ZO2AP2A											**Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	2	2	3	3	5	3	2	2	3	3.00
CO - 2	3	3	2	5	3	3	3	3	2	5	3	3.18
CO - 3	3	3	2	2	5	3	3	5	2	2	3	3.00
CO - 4	3	3	5	3	4	3	3	4	5	3	3	3.55
CO - 5	4	5	3	3	3	5	4	3	3	3	5	3.73
Overall Mean Score												**3.29**

Result: The Score for this Course is **3.29** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

1. Mounting of placoid scales in shark.
2. Identification of any three local edible fishes.
3. Study of any three venomous and non-venomous snakes.
4. Feet and Beak adaptations of any three birds.
5. Collection and submission of feathers of any five birds.

SPOTTERS:

Balanoglossus, Amphioxus, Ascidian, Scoliodon, Echenies (Sucker fish), Anguilia (Eel), Narcine, Hippocampus, Rana, Bufo, Salamander, Chameleon, Draco, Calotes, Parrot, Duck, Woodpecker, Kingfisher, Echidna, Macropus, Bat and Sperm whale.

GENERAL ZOOLOGY - II - LAB

Semester: II **Hours: 2**

Code : 23ZO2AP2B **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Estimate the oxygen content in the water samples.	PSO - 4	K1
CO - 2	Calculate the consumption of oxygen in a fish.	PSO - 2	K2
CO - 3	Analyze blood groups and estimate hemoglobin content in blood.	PSO - 3	K3
CO - 4	Compare the variations in fingerprints.	PSO - 5	K4
CO - 5	Infer superficial resemblance of two or more organisms.	PSO - 1	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				**GENERAL ZOOLOGY - II - LAB**							**Hours: 2**
Code : 23ZO2AP2B											**Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	3	2	5	4	3	3	4	2	5	3	3.36
CO - 2	3	3	2	4	5	3	3	5	2	4	3	3.36
CO - 3	2	3	5	4	3	3	2	3	5	4	3	3.36
CO - 4	2	5	4	4	3	5	2	3	4	4	5	3.73
CO - 5	5	2	3	2	4	2	5	4	3	2	2	3.09
Overall Mean Score												**3.38**

Result: The Score for this Course is **3.38** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

1. Estimation of oxygen content in various water samples.
2. Oxygen consumption in fish.
3. Estimation of Hemoglobin in human blood.
4. Blood grouping in man.
5. Preparation of human blood smear.
6. Qualitative analysis of carbohydrates, protein and lipids.
7. Analysis of variation using fingerprints.

SPOTTERS

Haemometer

Cleavage - 2 cell stage, 4 cell stage

Blastula of frog

Gastrula of frog

Cotyledonary placenta

Shark and sucker fish

EVOLUTIONARY SIGNIFICANCE

Peripatus

Limulus

Leaf insect

Stick insect

Chamaeleon

ABILITY ENHANCEMENT COURSE (AEC -2)

SUSTAINABILITY LIFE SKILLS

PROGRAMME OUTCOMES

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Gain theoretical knowledge and apply the expertise in different fields.
2.	Acquire Industry specific skills and can emerge as entrepreneurs.
3.	Develop critical and rational thinking to solve societal issues.
4.	Explore the knowledge and acclimatize it in the ever changing work environment.
5.	Evolve theories and develop innovative discipline specific ideas.
6.	Comprehend the nuances and develop innovative, discipline-specific ideas.

PROGRAMME SPECIFIC OUTCOMES

PSO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO	PO MAPPED
1.	Develop positive thinking that helps them to set and pursue for meaningful goals.	PO-1, 6
2.	Inculcate leadership qualities that lead them to inspire and guide people among peer groups and in workplaces.	PO-1, 2, 3, 6
3.	Assess the advantages and disadvantages of social media.	PO-2, 6
4.	Acquiring trade skills by developing social relationships effectively with trade experts.	PO-2,5,6
5.	Create a consciousness about Sustainable Development goals which is aimed to ensure dignity, peace and prosperity for people and the planet, now and in the future.	PO-3,6
4.	Acquiring trade skills by developing social relationships effectively with trade experts.	PO-2,5,6
5.	Create a consciousness about Sustainable Development goals which is aimed to ensure dignity, peace and prosperity for people and the planet, now and in the future.	PO-3,6

SUSTAINABILITY LIFE SKILLS

Semester: II **Hours: 2**

Code : 23AE2VE02 **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	To make them realise the importance of physical health, emotional well-being, and stress management.	PSO-1	K1
CO - 2	Apply the features of team work and strive to become good leaders.	PSO-2,4	K2
CO - 3	Enhance their awareness on social media and e- learning.	PSO-3	K3
CO - 4	Develop interactive skills in online trade, and become value based professionals.	PSO-4	K4
CO - 5	Imbibe awareness about Sustainable Development Goals and become better citizen of the world.	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				SUSTAINABILITY LIFE SKILLS							Hours: 2
Code : 23AE2VE02											Credit: 2
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	4	4	4	4	4	3	4	4	3	4	4	3.88
CO - 2	4	4	3	4	4	3	4	4	4	4	4	3.81
CO - 3	4	3	4	4	4	3	4	4	4	4	4	3.81
CO - 4	4	4	4	4	4	3	4	4	3	4	3	3.72
CO - 5	4	4	3	4	4	3	3	4	4	4	4	3.72
Overall Mean Score												3.78

Result: The score for this course is **3.78** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I **6 Hours**

Self - Awareness - Empathy - Sympathy - Self-management - Stress Management- Interpersonal Relationship-Accepting Criticism- Problem Solving.

UNIT II **6 Hours**

Lateral thinking-Reasoning-motivation and goal setting- Critical thinking- leadership qualities- Social Etiquettes- Positive attitude- Creativity and components of creativity.

UNIT III **6 Hours**

Entrepreneurial Skills- Money Management-Time Management-Communication- Digital Marketing, Questioning, Observing, Networking

UNIT IV **6 Hours**

Safe Usage of social media- Gender Sensitivity-Inclusiveness-Morphing - Cyber Bulling- some useful apps- mPassport Seva- mParivahan- epathshala -epariksh- Aarogya sethu- Indian Police at your call- mAadhaar- GST Rate Finder-Umang- Sarkari Naukri-SWAYAM.

UNIT V **6 Hours**

Sustainable Development Goals.

1.No Poverty, 2.Zero Hunger 3.Good Health and Well-being 4.Quality Education 5.Gender Equality 6.Clean Water and Sanitation 7.Affordable and Clean Energy 8.Decent Work and Economic Growth 9.Industry, Innovation and Infrastructure 10.Reduced Inequality 11.Sustainable Cities and Communities 12. Responsible Consumption and Production 13. Climate Action 14. Life Below Water 15. Life on Land 16. Peace, Justice and Strong Institutions 17. Partnerships for the Goal.

COURSE TEXT:

- Prepared by the members of Foundation Course.

BOOKS FOR REFERENCE:

1. Pearson, Mark. *Emotional Healing & Self-Esteem*, Australian Educational Research, 1998.
2. Kemp. Sid. *Project Management for Small Business Made Easy*, Entrepreneur Press, 2006.
3. Oxley, Alan. *Security Risks in Social Media Technologies. Safe Practices in Public Service Applications*, Chandos Publishing, 2013.
4. Bigg, Tom & Mohammed Valli Moosa, editors. *Survival for a Small Planet: The Sustainable Development Agenda,* Earthscan Publications Ltd, 2004.

WEB-SOURCES

https://www.skillsyouneed.com/rhubarb/core-life-skills.html

http://www.linkedin.com/pulse/what-makes-positive-attitude-10-components-gary

http://ifflab.org/how-to-prevent-cyber-bullying-anti-cyber-bullying-law- in- india/

http://www.sciencedaily .com/terms/morphing.htm#:text=Morphing%20is%special %effect,little%20 instruction%20 from%20the %20 user.

https://apps.gov.in/apps

https://sdgs.un.org/goals

https://www.indeed.com/career-advice/career-development/entrepreneurial-skills

EFFECTIVE ENGLISH

Semester: II **Hours: 2**

Code : 23SE2CE02 **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Identify their abilities to become better speakers and communicators	PSO-1	K1
CO - 2	Relate their speaking ability in English both in terms of fluency and comprehensibility.	PSO-2	K2
CO - 3	Modify their vocabulary in the context for communication	PSO-4	K3
CO - 4	Analyze their formal and informal communications with better use of words in appropriate contexts	PSO-5	K4
CO - 5	Assess conversations and present their viewpoints and opinions	PSO-3	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: II				**EFFECTIVE ENGLISH**							**Hours: 2**
Code : 23SE2CE02											**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	3	3	3	3	5	3	3	3	3	3.36
CO - 2	4	3	3	5	3	3	4	5	3	3	3	3.55
CO - 3	4	2	2	2	5	2	4	2	2	5	2	2.91
CO - 4	4	5	3	3	3	5	4	3	3	3	5	3.73
CO - 5	4	3	5	3	3	3	4	3	5	3	3	3.55
Overall Mean Score												**3.42**

Result: The score for this course is **3.42** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: Easy Enacting **6 Hours**

Orator - Chamber 4 (Paper 1)

Introducing oneself (Unit 4, Lesson 2)

Student and Teacher (Unit 3 Lesson 3)

In a College Campus (Unit 4, Lesson 1)

Orator- Chamber 4 (Paper 2)

Introducing a Person (Unit 1, Lesson 3)

Inviting for a Birthday Party Unit 2, Lesson 1 & 2)

Ordering for Food (Unit 1, Lesson 4)

UNIT II: Perfecting Phrasal Verbs **6 Hours**

Orator- Chamber 3

Phrasal Verbs in Conversation

Phrasal Verbs for Situations (Describing Place, Time, Daily Routines, Feelings, Health and Socializing)

UNIT III: Captivating Collocation **6 Hours**

Orator- Chamber 4

Types of Collocation

Collocation for Situations

UNIT IV: Idiomatic Expression **6 Hours**

Orator- Chamber 5

Idioms for Conversation

Idioms for Situations

UNIT V: Grammar for Life **6 Hours**

Orator- Chamber 7

Articles, Prepositions, Pronouns, Tenses, Modals (Unit 1 to 5)

INTERNAL COMPONENTS

Test 1	40
Test 2	40
Situational Conversation	10
Designing Brochure/Invitation	5
Attendance	5
Total	**100**

பொதுத்தமிழ் - 3 (பிற துறை மாணவிகளுக்கு மட்டும்)

பருவம்: மூன்று **நேரம்: 6**

குறியீடு: 23GT3GS03 **புள்ளி: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	காப்பியங்களின் வழி வாழ்வியல் சிந்தனையை அறிவர்.	PSO-5	K1
CO - 2	காப்பியங்களில் தமிழ்மொழியின் உயர்வை உணர்வர்.	PSO-2	K2
CO - 3	சமகாலப் படைப்புகளின் சிறப்புக்கூறுகளைப் பயன்படுத்தும் ஆற்றலை அறிந்து கொள்வர்.	PSO-3	K3
CO - 4	காப்பியங்கள் மூலம் இலக்கியங்களின் முக்கியத்துவத்தைப் பகுத்தாராயும் திறனை அறிவர்.	PSO-4	K4
CO - 5	மாணவர்கள் படைப்புத்திறனை மதிப்பீடு செய்ய அறிந்து கொள்வர்.	PSO-1	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III			பொதுத்தமிழ் - 3 (பிற துறை மாணவிகளுக்கு மட்டும்)								**Hours: 6**
Code : 23GT3GS03											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	3	4	5	4	4	3	4	4	3	5	3.82
CO - 2	3	3	4	4	5	5	3	5	4	3	4	3.91
CO - 3	3	4	5	4	4	4	4	4	5	3	4	4.00
CO- 4	5	3	3	4	4	4	3	4	3	5	4	3.82
CO - 5	3	5	4	3	3	3	5	3	4	3	3	3.55
Overall Mean Score												**3.82**

Result: The score for this course is **3.82** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

அலகு 1: பெருங்காப்பியங்கள்

சிலப்பதிகாரம் - வழக்குரை காதை

மணிமேகலை - ஆதிரை பிச்சையிட்ட காதை

சீவகசிந்தாமணி - பூமகள் இலம்பகம் (பாடல் எண் 2327 - 2336)
"கண்ணாடி யன்ன.... " முதல் "தேம்பெய் கற்பகத்.. வரை

வளையாபதி - கற்பில் மகளிர் (பாடல் எண் -8, 9, 10, 11)
"பள்ள முதுநீர்ப் ....."
"உண்டியுட் காப்புண் ....."
" எத்துணை யாற்று ...."
"தனிப்பெயற் றண்டுளி ....." **18 Hours**

அலகு 2: சமயக் காப்பியங்கள்

பெரியபுராணம் - பூசலார் நாயனார் புராணம்

கம்பராமாயணம் - மந்தரை சூழ்ச்சிப்படலம் (பாடல் எண் 1399 - 1428)
"ஆண்டை அந்நிலை ....." முதல் "ஏனைநீதி இணையன ...." வரை

வில்லிபாரதம் - மற்போர் சருக்கம்

சீறாப்புராணம் - புலிவசனித்த படலம் **18 Hours**

அலகு 3: புதினம்

வஞ்சிமாநகரம் (வரலாற்றுப் புதினம்) **18 Hours**

அலகு 4

பாடம் தழுவிய இலக்கிய வரலாறு **18 Hours**

அலகு 5

மொழித்திறன்

1. நூல் மதிப்புரை 2. கடிதம் வரைதல் **18 Hours**

பாடநூல்கள்

தமிழ்த்துறை வெளியீடு (தொகுப்பு) - பொதுத்தமிழ் - 3
ஜெயராஜ் அன்னபாக்கியம் மகளிர் கல்லூரி
(தன்னாட்சி), பெரியகுளம்.

முனைவர் சி. பாலசுப்பிரமணியன் - தமிழ் இலக்கிய வரலாறு
பாவை பப்ளிகேஷன்ஸ்,
சென்னை - 60. இரண்டாம் பதிப்பு - 2016.

நா. பார்த்தசாரதி - வஞ்சி மாநகரம் (வரலாற்றுப் புதினம்)
பாவை பப்ளிகேஷன்ஸ், சென்னை - 600 014
முதற்பதிப்பு ஏப்ரல் 2012

பார்வை நூல்கள்

ந.மு. வேங்கட சாமி நாட்டார் (உ.ஆ) - சிலப்பதிகாரம் மூலமும் உரையும், ராமையா பதிப்பகம், சென்னை - 14, 10 ஆம் பதிப்பு 2019.

ந.மு. வேங்கடசாமி நாட்டார், ஔவை சு.துரைசாமிப்பிள்ளை (உ.ஆ) - மணிமேகலை மூலமும் உரையும் சாரதா பதிப்பகம், சென்னை - 600014 ஏழாம் பதிப்பு 2019

உரை ஆசிரியர் குழு - சீவக சிந்தாமணி மூலமும் உரையும், சாரதா பதிப்பகம், சென்னை - 14 2 ஆம் பதிப்பு - 2020

புலமை வேங்கடாசலம் - வளையாபதி, பாவை பப்ளிகேஷன்ஸ் சென்னை - 14 முதல் பதிப்பு மே 2006

கவிஞர் வ.த.இராமசுப்பிரமணியம் எம்.ஏ (உ.ஆ) - பெரியபுராணம் மூலமும் தெளிவுரையும் இரண்டாம் காண்டம், வெங்கட் நாராயணா ரோடு, டி. நகர், சென்னை -17. முதற்பதிப்பு மார்ச்சு 2004

பேராசிரியர் அ.ச. ஞானசம்பந்தன் முதன்மைப் பதிப்பாசிரியர் - கம்பராமாயணம் அயோத்தியா காண்டம் 2 நியூ செஞ்சுரி புக்ஹவுஸ் (பி.லிட்) சென்னை - 98. முதல் பதிப்பு டிசம்பர் 2012.

எஸ்.விசுவநாதன் (பதிப்பாசிரியர்) - வில்லிபாரதம் இரண்டாம் பாகம் தம்பி செட்டி தெரு சென்னை -1 முதல் பதிப்பு 1959

Poetry and History of Hindi Literature, Technical Hindi

Semester: III **Hours: 5**

Code : 23GH3GS03 **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Learn the reform work done by Saint Kabirdas and Saint Tulasidas	PSO-1	K1
CO - 2	Develop Official and General Knowledge.	PSO-4	K2
CO - 3	Know the Origin of Bhakthi Movement.	PSO-2	K3
CO - 4	Develop Analysis Skills .	PSO-3	K4
CO - 5	Creative Writing will be Developed.	PSO-5	K5

UNIT I **(15 Hours)**

- Sachche Devtha
- Kabir Ke Dohe - 5 numbers
- "Gyan Margi Shakha - Prominent Poets and their Poems" - Kabirdas in detailed.

UNIT II **(15 Hours)**

- Murjhaphool
- Tulasi Ke Dohe - 5 numbers
- "Ram Bhakthi Shakha - Prominent Poets and their Poems" -Tulasidas in detailed.

UNIT III **(15 Hours)**

- Vivashtha
- Deep Koyee Jal Raha Hai
- "Krishna Bhakthi Shakha - Prominent Poets and their Poems" - Surdas in detailed.

UNIT IV **(15 Hours)**

- Badhal
- "Prem Margi Shakha - Prominent Poets and their Poems" - Jayasi in detailed.
- Technical Hindi:

  Banking Terms : 50 only

  Name of the Ministries: 50 only

UNIT V **(15 Hours)**

- Vashand Aayaa
- Short Notes from Reethikal and Adunikkal: Chayavad , Mythili Sharan, Meera Bhaayi, Ameer Khusro.
- Technical Hindi: E-mail kaa Upayog

COURSE BOOKS:

1. Kavya Saurab Published by Dakshina Bhaaratha Hindi Prachar Sabha, T. Nagar, Chennai-600 017.

The following poems have been prescribed

- ❖ Sachche Devtha - Ayodhya Singh Upadhyay Harioudh
- ❖ Murjhaphool - Mahadevi Varma
- ❖ Vivashtha - Shivamangala Simh Suman
- ❖ Deep Koyee Jal Raha Hai - Ramnaresh Thiripati
- ❖ Badhal - Sumithranandhan panth
- ❖ Vashand Aayaa - Suryakanth Thripati Niraalaa
- ❖ Kabir ke Dohe
- ❖ Tulasi ke Dohe

2. Hindi Sahithiya kaa Sanchiptha Ithihaas - Published by Dakshina Bharath Hindi Prachar Sabha, Thyagaraya Nagar, Chennai - 600 017.

The following Bakthi kaal have been prescribed

- ❖ Gyan marg, Prem maarg, Rambakthi, Krishnabakthi
- ❖ Adunikkal & Reethikkal Notes: Chayavad , Mythili Sharan, Meera Bhaayi, Ameer Khusro.

BOOKS FOR REFERENCE:

1. Technical Hindi - Karyalaya Sahayika, Kendriya Sachivalaya Hindi Parishad New Delhi, Hindi Vathayan Dr.K.Chandra Mohan, Viswa Vidhyalaya Prakashan Varanashi.

The following topics have been prescribed

- ❖ Banking Terms - 50 only
- ❖ Name of the Ministries - 50 only
- ❖ E-mail kaa Upayog

COMMUNICATIVE ENGLISH - III

Semester: III **Hours: 4**

Code : 23GE3GS03 **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Identify cultural diversity and divergence in perspectives.	PSO-3	K1
CO - 2	Interpret their skills and attitudes relevant to the emerging society.	PSO-2	K2
CO - 3	Produce grammatically and idiomatically correct language.	PSO-1	K3
CO - 4	Categorize the writing techniques to meet academic and professional needs.	PSO-4	K4
CO - 5	Plan for career oriented tests with sufficient practice in Grammar and Comprehension.	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III												**Hours: 4**
Code : 23GE3GS03							**COMMUNICATIVE ENGLISH - III**					**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	3	5	2	2	3	3	2	5	2	3	3.0
CO - 2	3	2	2	5	2	2	3	5	2	2	2	2.73
CO - 3	5	3	3	2	2	3	5	2	3	2	3	3.0
CO - 4	3	3	2	3	5	3	3	3	2	5	3	3.18
CO - 5	2	5	2	2	4	5	2	2	2	4	5	3.18
Overall Mean Score												**3.02**

Result: The score for this course is **3.02** (High relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: POETRY **12 Hours**

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

UNIT II: SCENES FROM SHAKESPEARE **12 Hours**

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

UNIT III: SPEECHES OF FAMOUS PERSONALITIES **12 Hours**

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

UNIT IV: GRAMMAR IN CONTEXT **12 Hours**

Articles, Determiners and Quantifiers

Linking Words/ Connectives

Compound Words

Direct and Reported Speech

UNIT V: LANGUAGE COMPETENCY **12 Hours**

Writing letters and emails

Writing in Social media platforms

[Blogs, X, Instagram, Facebook]

Learning etiquette and Email Etiquette

COURSE BOOKS:

- Course Materials will be provided by the Department of English.
- Savarimuttu, Rohan J. S, and G. Petricia Alphine Nirmala, *English Grammar and Usage - An Ideal Companion for Advanced Learners*. New Century Book House (P) Ltd, 2016.

BOOKS FOR REFERENCE

1. Stanley Wells, *The Shakespeare Book: Big Ideas Simply Explained*, DK Publishing, 2015.
2. Jeane Kelly Bernish, *Build a Professional Digital Profile.* Kindle Edition, Bernish Communications Associates, LLC; 1st edition, 2012.
3. Krysia M Yardley- Matwiejczuk, *Role Play-Theory and Practice.* SAGE publications ltd, 1997.

WEB SOURCES

https://www.scribd.com/document/558838656/The-Voice-of-the-Mountain-By-Mamang-Dai-Adivasi-Resurgence

http://www.wordslikethis.com.au/a-song-of-hope/

https://www.poetryfoundation.org/poems/146804/in-an-artist39s-studio

https://www.poetrynook.com/poem/s%E2%94%9C%C2%ABta

https://www.cam.ac.uk/files/a-tryst-with-destiny/index.html#:~:text=Jawaharlal%20Nehru%2C%20delivering%20his%20Tryst%20with%20Destiny%20speech.&text=%22Long%20years%20ago%20we%20made,awake%20to%20life%20and%20freedom.

GENERAL CHEMISTRY-V

Semester: III **Hours: 6**

Code : 23CH3MC05 **Credit: 6**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge about liquid state, liquid crystals, solid state, chemistry of halogens and halogen derivatives, noble gases, alcohols and phenols	PSO-1	K1
CO - 2	Explain the various properties of liquid state, liquid crystals, noble gases, halogen derivatives, alcohols and phenols	PSO-2	K2
CO - 3	Interpret the parameters involved in liquid crystals, geometry of solid state, aromatic and aliphatic halogens, noble gases, alcohols and phenols	PSO-3	K3
CO - 4	Analyse different types of liquid crystals, relationships between properties and structure of solids, reactions of halogens, noble gases, alcohols and phenols	PSO-4	K4
CO - 5	Validate the various aspects in liquid state, liquid crystals, solid state, noble gases, halogen derivatives, alcohols and phenols	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				**GENERAL CHEMISTRY-V**								**Hours: 6**
Code : 23CH3MC05												**Credit: 6**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	2	2	4	4	5	2	3	4	4	3.45
CO - 2	3	2	5	5	3	3	3	5	2	3	3	3.36
CO - 3	3	5	3	3	4	3	3	3	5	3	4	3.55
CO - 4	3	2	4	4	4	5	3	4	2	5	4	3.64
CO - 5	3	4	3	3	5	3	3	3	4	3	5	3.55
Overall Mean Score												**3.51**

Result: The score for this course is **3.51** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: a) LIQUID STATE:

Gaseous, liquid and solid state - vacancy theory of liquids - free volume in a liquid - properties of liquids: vapour pressure, heat of vapourisation and Trouton's rule - surface tension: definition, surface energy, effect of temperature, interfacial tension - surface active agents - viscosity: coefficient of viscosity and units, effect of temperature: the Hole theory - effect of pressure: Reynolds number - refraction: refractive index, specific refraction, molar refraction - optical activity

b) LIQUID CRYSTALS:

Mesomorphic state - classification of thermotropic liquid crystals: smectic, nematic and cholesteric liquid crystals - disc-shaped and polymer liquid crystals - polymorphism - melting of nematic crystals - pressure induced metamorphism - molecular arrangements in liquid crystals **(18 Hours)**

UNIT II: SOLID STATE:

Crystalline and amorphous solids - differences - size and shape of crystals - interfacial angles - symmetry in crystals - definition of plane, axis and centre of symmetry - elements of symmetry - basic crystal systems - space lattice and unit cell - Bravais lattices - seven crystal systems - Miller indices - types of crystals: ionic, covalent, metallic and molecular crystals - close packing of identical solid spheres - hexagonal cubic and body centered close packing - volume occupied in ccp and bcc arrangement - interstitial sites: trigonal, tetrahedral, octahedral sites - radius ratio rule - shape of ionic crystals - structures of ionic crystals - NaCl, ZnS, CsCl, TiO_2 - defects in stoichiometric crystals: Schottky and Frenkel defect, defects in non-stoichiometric crystals: metal excess and metal deficiency defects **(18 Hours)**

UNIT III: a) THE ELEMENTS OF GROUP 17:

Electronic configuration - general characteristics: oxidation states of halogen and oxidizing power, combination with metals and non-metals, reaction with water and hydrocarbons - peculiarities of fluorine - properties - Hydrogen halides: preparation and properties - oxides: structures - oxoacids: preparation, properties and structures - interhalogens of XY, XY_3, XY_5 and XY_7: structure - characteristic reactions of pseudo halogens ($(CN)_2$ and $(SCN)_2$) - basic nature of iodine

b) THE ELEMENTS OF GROUP 18:

Introduction - properties and uses - structure of XeF_2, XeF_4, XeF_6, $XeOF_2$ and $XeOF_4$ **(18 Hours)**

UNIT IV: HALOGEN DERIVATIVES:

Aliphatic halogen derivatives: nomenclature, classification - preparation of alkyl halides from alcohols, alkanes, alkenes, alkynes and Hunsdiecker reaction - chemical properties - mechanism of nucleophilic substitution reactions: S_N1, S_N2 and S_Ni factors influencing rate of nucleophilic substitution, difference between S_N1 and S_N2 - preparation and uses of fluorocarbons, freons - polyhalogenated alkanes: chloroform, iodoform, westrosol - tetra haloalkanes: carbon tetrachloride and westron, impact of fluorocarbons on environment

Aromatic halogen compounds: isomerism - preparation: from nuclear halogenation, diazonium salts and Hunsdiecker reaction - properties of aryl halides - benzyl chloride: preparation, properties and uses - comparison between aryl and aralkyl halides **(18 Hours)**

UNIT V: a) ALCOHOLS:

Classification - nomenclature - preparation - properties: reaction with metals, Grignard reagents, carboxylic acids, acid halides, sulphonyl chloride, oxidation, dehydrogenation and iodoform test - distinction among primary, secondary and tertiary alcohols - interconversions of methanol and ethanol

b) PHENOLS:

Classification - nomenclature - preparation from diazonium salts, cumene, Dow's process, Raching process - properties - acidic character and effect of substitution on acidity - preparation, properties and uses of picric acid, resorcinol and quinol **(18 Hours)**

COURSE BOOKS:

7. B.R.Puri, L.R.Sharma and M.S. Pathania, Principles of Physical Chemistry, Vishal Publishing Co., 48th Edition, 2022-2023. **Unit I**
8. B.R. Puri, L.R. Sharma and K.C. Kalia, Principles of Inorganic Chemistry, Vishal Publishing Co., 33rd Edition, 2022-2023. **Unit II-III**
9. P.L. Soni and H.M Chawla, Organic Chemistry, Sultan Chand and Sons, 29th Edition, 2022. **Unit IV-V**
10. M.K. Jain and S.C. Sharma, Modern Organic Chemistry, Vishal Publishing Co., 4th Edition, 2023. **Unit IV-V**

BOOK FOR REFERENCE:

M.K. Jain and S.C. Sharma and Fateh Bahadur, Graduate Organic Chemistry, Vishal Publishing Co., Volume - I, 2018-19.

PRACTICAL: VOLUMETRIC ESTIMATION

Semester: III **Hours: 4**

Code : 23CH3CP02 **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Gain analytical knowledge in weighing of the substance by both chemical balance and electric balance	PSO - 1	K1
CO - 2	Illustrate the procedure for volumetric titration following double burette method	PSO - 2	K2
CO - 3	Estimate the amount of substance present in the given solution	PSO - 3	K3
CO - 4	Develop problem solving skills	PSO - 4	K4
CO - 5	Demonstrate the different types of titrations such as acidimetry, alkalimetry, permanganometry and iodometry	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				**PRACTICAL: VOLUMETRIC ESTIMATION**							**Hours: 4**
Code : 23CH3CP02											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	4	4	3	4	5	4	3	4	3	3.82
CO - 2	3	2	5	5	3	4	3	5	2	4	3	3.55
CO - 3	3	5	3	3	4	4	3	3	5	4	4	3.73
CO - 4	3	3	4	4	3	5	3	4	3	5	3	3.64
CO - 5	4	3	4	4	5	3	4	4	3	3	5	3.82
Overall Mean Score												**3.71**

Result: The score for this course is **3.71** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

DOUBLE TITRATION FOLLOWING MICROSCALE METHOD:

Preparation of a standard solution - making up of the solution to be estimated - double burette method

I 1. ACIDIMETRY AND ALKALIMETRY

1. Estimation of sodium carbonate
2. Estimation of hydrochloric acid
3. Estimation of oxalic acid

2. PERMANGANIMETRY

1. Estimation of ferrous sulphate
2. Estimation of ferrous ammonium sulphate
3. Estimation of oxalic acid

3. IODOMETRY

1. Estimation of potassium dichromate
2. Estimation of copper sulphate

4. DICHROMETRY

1. Estimation of ferrous sulphate using external indicator

II ESTIMATION OF IRON

1. Estimation of iron from iron tablets

BOOK FOR REFERENCE:

- Practical manual prepared by the PG and Research Center of Chemistry, Reprint, 2023

ALLIED: GENERAL CHEMISTRY-I

Semester: III **Hours: 3**
Code : 23CH3AC3A **Credit: 3**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the elements in periodic table and electronic configuration, types of bonding and reactions, chromatographic techniques, thermal analysis and fundamentals of chemical kinetics	PSO - 1	K1
CO - 2	Describe periodic variation, bonding and reactions, separation techniques, thermal analysis and the terms in chemical kinetics	PSO - 2	K2
CO - 3	Illustrate the periodic properties of elements, VB and MO concepts, chromatographic methodology and kinetics of reactions	PSO - 3	K3
CO - 4	Analyse the characteristics of s,p,d,f block elements, types of chemical bonding, VB and MO theories, chromatographic techniques, thermal analysis and kinetics of chemical reactions	PSO - 4	K4
CO - 5	Deduce the features of periodic table, MO diagram, applications of Grignard reagents, chromatographic seperation, application of TGA, DTA, DSC and chemical kinetics	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				**ALLIED: GENERAL CHEMISTRY-I**					**Hours: 3**			
Code : 23CH3AC3A												**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	4	4	3	3	5	4	3	3	3	3.63
CO - 2	2	3	5	5	4	3	2	5	3	3	4	3.55
CO - 3	4	5	3	3	4	3	4	3	5	3	4	3.72
CO - 4	3	3	4	4	3	5	3	4	3	5	3	3.63
CO - 5	4	3	3	3	5	3	4	3	3	3	5	3.55
Overall Mean Score												**3.62**

Result: The score for this course is **3.62** (High Relationship)
Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: PERIODIC TABLE:

Modern periodic table - groups and periods - rules to write electronic configuration - classification of elements on the basis of electronic configuration - characteristics of s, p, d and f block elements - causes and consequences of lanthanide contraction - periodic variation: atomic radii, ionic radii, ionization energy, electron affinity and electronegativity **(9 Hours)**

UNIT II: CHEMICAL BONDING:

Definition and general properties of electrovalent and covalent compounds - differences between electrovalent and covalent compounds - structure of NaCl, diamond and graphite - hydrogen bonding: definition, classification and applications - shapes of atomic orbitals - difference between orbit and orbital - s-s, s-p and p-p overlap - difference between sigma and pi bonds - Valence Bond theory (VB) - postulates of VB theory - application for the formation of simple molecules: H_2, HF, Cl_2 - Molecular Orbital theory (MO) - MO diagram of H_2, He_2, N_2, O_2 and F_2 molecules **(9 Hours)**

UNIT III: a) DETECTION OF ELEMENTS AND TYPES OF REACTIONS:

Detection of nitrogen, sulphur and halogens in organic compounds - homolytic and heterolytic bond breaking - types of reagents: electrophilic reagents and nucleophilic reagents - definition - examples - types of organic reactions: substitution, addition, rearrangements and elimination reactions - definition and examples

b) ORGANOMETALLIC COMPOUNDS:

Definition - preparation and synthetic applications of Grignard reagent - preparation and uses of tetra ethyl lead (TEL) **(9 Hours)**

UNIT IV: a) CHROMATOGRAPHY:

Definition - classification - techniques and applications: column chromatography, paper chromatography and Thin Layer Chromatography (TLC) - demonstration: separation of a mixture containing polar and non-polar compounds - applications of chromatography - High Performance Liquid Chromatography (HPLC): principle and instrumentation

b) THERMAL ANALYSIS:

Thermo Gravimetric Analysis (TGA) - introduction - thermogravimetric curve of $CuSO_4.5H_2O$ - applications of thermogravimetry - Differential Thermal Analysis (DTA) - Differential Scanning Calorimetry (DSC): introduction - instrumentation - applications **(9 Hours)**

UNIT V: CHEMICAL KINETICS:

Rate of a chemical reaction - rate law - rate constant - order of a reaction - molecularity of a reaction - difference between order and molecularity - derivation of the first order rate constant (k) - characteristics of first order reactions - kinetics of ester hydrolysis - half-life period - enzyme kinetics (elementary idea) - characteristics of enzyme catalyzed reactions **(9 Hours)**

COURSE BOOK:

- A. Mary Imelda Jayaseeli, M. Kalanithi, C. Mary Anbarasi, S. Pooranalakshmi, Allied Chemistry III and IV, Shanlax publications., Madurai, 1st Edition, 2022.
  Unit I-V

BOOKS FOR REFERENCE:

1. P.L. Soni and H.M Chawla, Text book of Organic Chemistry, Sultan Chand and Sons, Educational Publishers, Reprint, 2014.
2. B.R. Puri, L.R. Sharma and K.C. Kalia, Principles of Inorganic Chemistry, Vishal Publishing Co., 33rd Edition, 2022-2023.
3. P.L. Soni and M. Katyal, Test book of Inorganic Chemistry, Sultan Chand and Sons, Reprint, 2013.

ALLIED: GENERAL ASPECTS OF CHEMISTRY-I

Semester: III **Hours: 3**
Code : 23CH3AC3B **Credit: 3**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the properties of hydrogen, hydrogen peroxide, oxides and ozone, ideal and real gases, amino acids, alkaloids and terpenoids	PSO-1	K1
CO - 2	Explain the properties of hydrogen, hydrogen peroxide, oxides and ozone, ideal and real gases, carbohydrate, alkaloids and terpenoids	PSO-2	K2
CO - 3	Estimate the structure of hydrogen peroxide, ozone, carbohydrates, alkaloids and terpenoids and deviation of real gases	PSO-3	K3
CO - 4	Analyse the strength of hydrogen peroxide, behaviour of real gases, reducing and non reducing sugars, alkaloids and terpenoids	PSO-4	K4
CO - 5	Evaluate the properties of hydrogen, hydrogen peroxide, oxides and ozone, ideal and real gases, amino acids, alkaloids and terpenoids	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				**GENERAL ASPECTS OF CHEMISTRY-I**								**Hours: 3**
Code : 23CH3AC3B												**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	4	4	3	3	5	4	3	3	3	3.63
CO - 2	2	3	5	5	4	3	2	5	3	3	4	3.55
CO - 3	4	5	3	3	4	3	4	3	5	3	4	3.72
CO - 4	3	3	4	4	3	5	3	4	3	5	3	3.63
CO - 5	4	3	3	3	5	3	4	3	3	3	5	3.55
Overall Mean Score												**3.62**

Result: The score for this course is **3.62** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: a) HYDROGEN:

Isotopes of hydrogen - separation of the isotopes - properties and uses of heavy hydrogen - position of hydrogen in the periodic table - ortho and para hydrogen - separation - difference in structure and properties - hydrides - definition - classification - preparation and properties

b) HYDROGEN PEROXIDE:

Manufacture, properties, structure and uses of hydrogen peroxide - estimation of hydrogen peroxide by permanganimetry - strength of hydrogen peroxide: volume strength, normality and percentage - calculation of strength on these different terms **(9 Hours)**

UNIT II: OXIDES,WATER AND OZONE:

Oxides: classification based on their chemical behaviour - acidic, basic, neutral and amphoteric oxides - based on their oxygen content - normal, sub, poly and mixed oxides - thermal stability of oxides

Water: water quality parameters: pH, hardness - types of hardness and degree of hardness, dissolved oxygen, biological oxygen demand and total dissolved oxygen

Ozone: preparation - manufacture - properties - composition - structure and uses **(9 Hours)**

UNIT III: GASEOUS STATE:

Postulates of kinetic theory of gases - expression for pressure of gases based on kinetic theory - deducing the basic gas laws - deviation of real gases from ideal behaviour - reasons for deviation - derivation of van der Waals gas equation - explanation of behaviour of real gases based on van der Waals gas equation **(9 Hours)**

UNIT IV: a) CARBOHYDRATES:

Definition - sources - classification - reducing and non-reducing sugars - properties of glucose: addition with HCN, $NaHSO_3$ and phenyl hydrazine-sucrose: inversion of sucrose - uses - ring and Haworth structure of glucose and fructose - tests for carbohydrates

b) AMINO ACIDS:

Classification - properties: dipolar structure - Zwitter ion - uses

c) PROTEINS:

Color reactions of proteins - structure of protein - vitamins: classification - sources - deficiency diseases **(9 Hours)**

UNIT V: a) ALKALOIDS:

Definition - occurrence - extraction of alkaloids and general properties - classification of alkaloids - structures of coniine, piperine and nicotine (structural elucidation not required)

b) TERPENOIDS:

Introduction - classification - occurrence - isolation - general properties - isoprene rule - structures of citral, geraniol, terpeniol, menthol and dipentene (structural elucidation not required) **(9 Hours)**

COURSE BOOKS:

1. K. Ratinamuthu, R.Victoria, Semester - I, Text book of Ancillary Chemistry, Educational Publishers, Madurai. **Unit I-III**
2. Mary Imelda Jayaseeli, M. Kalanithi, C. Mary Anbarasi, Sr. T. Johny Dathees, and Sr. S. Sahaya Lenus, Allied Chemistry III and IV, New Century Book House (P) Ltd., Chennai, 1st Edition, 2020. **Unit IV**
3. K. Ratinamuthu, R.Victoria, Semester - IV, Text book of Ancillary Chemistry, Educational Publishers, Madurai. **Unit V**

ALLIED PRACTICAL: ORGANIC ANALYSIS

Semester: III **Hours: 2**

Code : 23CH3AP3A **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the procedure of micro qualitative analysis of organic substances	PSO - 1	K1
CO - 2	Explain the procedures to detect the presence of a special element, nitrogen and functional group	PSO - 2	K2
CO - 3	Apply skills in systematic microscale analysis	PSO - 3	K3
CO - 4	Analyse the functional groups in organic substance	PSO - 4	K4
CO - 5	Adopt safety measures in handling chemicals	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				**ALLIED PRACTICAL: ORGANIC ANALYSIS**							**Hours: 2**
Code : 23CH3AP3A											**Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	4	4	3	4	5	4	4	4	3	4.00
CO - 2	4	3	5	5	3	3	4	5	3	3	3	3.73
CO - 3	3	5	4	4	4	4	3	4	5	4	4	4.00
CO - 4	3	3	4	4	4	5	3	4	3	5	4	3.82
CO - 5	3	3	4	4	5	4	3	4	3	4	5	3.82
Overall Mean Score												**3.87**

Result: The score for this course is **3.87** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

Microscale Analysis of the Organic Substance containing one functional group:

Primary amine, amides (mono and di), carbonyl compounds (aldehydes and ketones), carbohydrates, esters, carboxylic acids (mono and di) and phenols. The organic substance is identified as

i) Aliphatic or aromatic

ii) Saturated or unsaturated

iii) Special elements present /absent

iv) Nature of functional group (Preparation of solid derivative is not required).

BOOK FOR REFERENCE:

Practical manual prepared by the PG and Research Center of Chemistry, Reprint, 2023

ALLIED PRACTICAL: SEMIMICRO INORGANIC QUALITATIVE ANALYSIS

Semester: III **Hours: 2**

Code : 23CH3AP3B **Credit:1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire skills to perform precipitation and centrifugation methods	PSO-1	K1
CO - 2	Explain cations and anions present in a given inorganic sample adopting the systematic procedure	PSO-2	K2
CO - 3	Apply the procedures of analysis to check the quality of an inorganic substance	PSO-3	K3
CO - 4	Analyse the characteristics reaction of cation and anion in a given sample	PSO-4	K4
CO - 5	Adopt safety measures in handling chemicals	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				ALLIED PRACTICAL: SEMIMICRO INORGANIC QUALITATIVE ANALYSIS							Hours: 2
Code : 23CH3AP3B											Credit: 1
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	3	4	4	3	3	5	4	3	3	3	4.00
CO - 2	4	3	5	5	3	3	4	5	3	3	3	3.73
CO - 3	4	5	4	4	3	3	4	4	5	3	3	4.00
CO - 4	3	4	3	3	4	5	3	3	4	5	4	3.82
CO - 5	3	3	3	3	5	4	3	3	3	4	5	3.82
Overall Mean Score												3.87

Result: The score for this course is **3.87** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

Analysis of a simple salt containing one cation and one anion

iii)ANIONS:

Carbonate, sulphate, nitrate, chloride, bromide, oxalate, borate, phosphate, chromate and fluoride

iv) CATIONS:

Lead, copper, cadmium, bismuth, antimony, iron, aluminium, zinc, manganese, cobalt, nickel, barium, strontium, calcium, magnesium and ammonium

COURSE BOOK:

2. V. Venkateswaran, R. Veerasamy and A. R. Kulandaivelu, Basic Principles of Practical Chemistry, Sultan Chand and sons, Reprint 2023.

ALLIED PHYSICS - I

MECHANICS, PROPERTIES OF MATTER AND THERMAL PHYSICS

Semester: III **Hours: 3**

Code : 23PH3AC3A **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Define the fundamental laws of Mechanics, Properties of Matter and heat transfer.	PSO - 1	K1
CO - 2	Explain the concepts of friction, bending of beams, Greenhouse effect, and Carnot's cycle.	PSO - 2	K2
CO - 3	Apply the principles of mechanics, fluid motion and thermodynamics to solve the problems	PSO - 3	K3
CO - 4	Examine the acquired knowledge through various experiments on elasticity, viscosity and heat	PSO - 3, PSO - 4	K4
CO - 5	Assess the importance of mechanics, properties of matter and thermal physics in real life situation.	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				**ALLIED PHYSICS - I: MECHANICS, PROPERTIES OF MATTER AND THERMAL PHYSICS**							**Hours: 3**
Code : 23PH3AC3A											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	2	3	3	2	3	5	3	3	3	2	3.09
CO - 2	4	2	3	3	2	5	4	5	3	3	2	3.27
CO - 3	4	2	3	5	2	3	4	3	5	3	2	3.27
CO - 4	3	2	5	5	2	3	3	3	5	5	2	3.45
CO - 5	4	5	2	2	5	3	4	3	2	2	5	3.36
Overall Mean Score												**3.29**

Result: The score for this course is **3.29** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I: FORCE, WORK, POWER AND ENERGY

Newton's law of gravitation - Coulomb's law - Central Forces - Conservative Forces - Non-Conservative Forces - Friction - Limiting friction - Coefficient of Friction and Angle of Friction - Laws of Friction - Motion of bodies along an inclined plane - Work - Work done by a varying force - Energy - Kinetic Energy - Potential Energy - Power. **(9 Hours)**

UNIT II: ELASTICITY

Young's modulus - Rigidity modulus - Bulk modulus - Poisson's ratio (definition alone) - Bending of beams - Expression for bending moment - Determination of young's modulus - uniform and non-uniform bending - Torsional oscillation of a body - Rigidity modulus by torsion Pendulum. **(9 Hours)**

UNIT III: VISCOSITY

Viscosity - Derivation of Poiseuille's Formula - Poiseuille's method for determining coefficient of viscosity of a liquid - Equation of continuity - Bernoulli's Theorem - Applications of Bernoulli's Theorem - Venturimeter - Pitot Tube. **(9 Hours)**

UNIT IV: CONDUCTION, CONVECTION AND RADIATION

Thermal conductivity - Lee's disc method of determining the thermal conductivity of a bad conductor - Analogy between heat flow and electric current - Convection in the atmosphere - Lapse rate - Greenhouse effect - Atmospheric pollution - Radiation - Stefan's Law - Solar constant - Temperature of the Sun - Statement of Planck's law of radiation - Wien's Law - Rayleigh-Jeans law. **(9 Hours)**

UNIT V: THERMODYNAMICS

Heat engine - Expression for the efficiency of a Carnot's engine - Carnot's theorem - Second law of thermodynamics - Entropy - Change of entropy in a Carnot's cycle - Change of entropy in conversion of ice into steam. **(9 Hours)**

COURSE BOOKS:

1. R. Murugeshan, Mechanics, Properties of Matter and Sound, I Edition, Annai Print Park, Madurai, July 2016.

   UNIT I: Chapter 1: All sections

   UNIT II: Chapter 4: 4.2 - 4.5, 4.7, 4.8, 4.12, 4.13

   UNIT III: Chapter 5: All sections

2. R. Murugeshan, Thermal Physics, I Edition, Annai Print Park, Madurai, June 2012.

   UNIT IV: Chapter 3: 3.1- 3.3
   Chapter 4: 4.1- 4.3, 4.5, 4.6
   Chapter 5: 5.1, 5.2, 5.4, 5.6, 5.7, 5.10 - 5.12

   UNIT V: Chapter 7: 7.1- 7.7

BOOKS FOR REFERENCE:

1. Brijlal and Subramanyam, Properties of Matter, III Edition, Eurasia Publishing Co., New Delhi, 1983.
2. D.S. Mathur, Elements of Properties of Matter, 10thEdition, S. Chand & Company Ltd., New Delhi, 1976.
3. Brijlal & Subramanyam, Heat and Thermodynamics, 16thEdition, S. Chand & Co, 2005.

ALLIED PHYSICS - I
GRAVITATION, HEAT AND SOUND

Semester: III **Hours: 3**
Code : 23PH3AC3B **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Describe the fundamentals of gravitation, heat and sound.	PSO-1	K1
CO - 2	Explain the concepts of artificial satellites, thermal expansion of matter, thermodynamic processes, and various phenomena of fluid and simple oscillation.	PSO-2	K2
CO - 3	Apply the principles of compound pendulum, thermostat, superconductivity and stationary waves to solve the problems.	PSO-3	K3
CO - 4	Examine the acquired knowledge through various experiments on Boy's method, Regnault's method, porous plug and Lissajous figures.	PSO-4	K4
CO - 5	Assess the importance of gravitation, heat and sound in real life situation.	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				**ALLIED PHYSICS - I GRAVITATION, HEAT AND SOUND**							**Hours: 3**
Code : 23PH3AC3B											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	2	3	3	2	3	5	3	3	3	2	3.09
CO - 2	4	2	3	3	2	5	4	5	3	3	2	3.27
CO - 3	3	2	3	5	2	3	3	3	5	3	2	3.09
CO - 4	3	2	5	3	2	3	3	3	3	5	2	3.09
CO - 5	4	5	2	2	5	3	4	3	2	2	5	3.36
Overall Mean Score												**3.18**

Result: The score for this course is **3.18** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: GRAVITATION

Kepler's law of planetary motion - Newton's Law of gravitation - Mass and density of the earth - Boy's method -Compound Pendulum-Expression for period - Experiment to find g -Variation of g with latitude, altitude and depth-Artificial satellites. **(9 Hours)**

UNIT II: THERMAL EXPANSION

Expansion of solids - Determination of the coefficient of linear expansion of a crystal -Expansion of anisotropic solids - Solids of low expansivity and their uses - Anomalous expansion of water - Thermostat. **(9 Hours)**

UNIT III: ISOTHERMAL AND ADIABATIC CHANGES

Isothermal change - Adiabatic change - Equation for the adiabatic change of a perfect gas - Two specific heat capacities of a gas - Difference between the two specific heat capacities - Joly's differential steam calorimeter for finding C_v - Regnault's method to find C_p **(9 Hours)**

UNIT IV: LOW TEMPERATURE PHYSICS

Joule - Kelvin effect - Porous plug experiment - Theory of Porous plug experiment - Definition of temperature of inversion - Relation between temperature of inversion and critical temperature - Adiabatic demagnetization - Principle - Curie's law - Giauque's method - Superconductivity. **(9 Hours)**

UNIT V: SOUND

Simple harmonic oscillation - Composition of two simple harmonic motions in a straight line - Composition of two simple harmonic motions of equal time periods at right angles - Experimental method for obtaining Lissajous figures - Progressive waves - Stationary waves - Acoustic of buildings - Ultrasonics - Applications of ultrasonic waves. **(9 Hours)**

COURSE BOOKS:

1. R. Murugeshan, Mechanics, Properties of Matter and Sound, I Edition, Annai Print Park, Madurai, July 2016.

   UNIT I: Chapter 3: All sections

   UNIT V: Chapter 6: All sections

2. R. Murugeshan, Thermal Physics, I Edition, Annai Print Park, Madurai, June 2012.

   UNIT II: Chapter 1: All sections

   UNIT III: Chapter 2: All sections

   UNIT IV: Chapter 8: All sections

BOOKS FOR REFERENCE:

1. D.S. Mathur, Mechanics, 1st Edition, S. Chand & Company Ltd., New Delhi, 1981.
2. R. Murugeshan and Er. Kiruthika Sivaprasath, Properties of Matter and Acoustics, Revised Edition, S. Chand & Company Ltd., New Delhi, 2012.
3. D.S. Mathur, Heat and Thermodynamics, 5th Edition, Sultan Chand & Sons, New Delhi, 2014.

ALLIED PHYSICS PRACTICAL - I: PROPERTIES OF MATTER PRACTICAL

Semester: III **Hours: 2**
Code : 23PH3AP3A **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Identify the required equipment and its purpose	PSO - 1	K1
CO - 2	Explain the concepts of elasticity moduli, viscosity and sound	PSO - 2	K2
CO - 3	Demonstrate the experiment through acquired knowledge	PSO - 3	K3
CO - 4	Deduce the results from appropriate formula	PSO - 3, PSO - 4	K4
CO - 5	Assess the results with the standard values	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				ALLIED PHYSICS PRACTICAL - I: PROPERTIES OF MATTER PRACTICAL						Hours: 2	
Code : 23PH3AP3A										Credit:1	
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	2	3	3	2	3	5	3	3	3	2	3.09
CO - 2	4	2	3	3	2	5	4	5	3	3	2	3.27
CO - 3	3	3	3	5	3	3	3	3	5	3	3	3.36
CO - 4	3	2	5	5	2	3	3	3	5	5	2	3.45
CO - 5	4	5	2	2	5	3	4	3	2	2	5	3.36
Overall Mean Score												3.30

Result: The score for this course is **3.30** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

LIST OF PRACTICALS (Any 6)

1. Determination of Young's Modulus by Uniform Bending using Pin and Microscope method.
2. Determination of thermal conductivity of a bad conductor using Lee's disc method.
3. Verification of Newton's law of cooling.
4. Determination of Young's Modulus by Non - Uniform Bending using optic lever-Telescope and Scale method.
5. Determination of rigidity modulus using Torsion Pendulum.
6. Determination of g using Compound Pendulum.
7. Determination of co-efficient of Viscosity by Stoke's Method.
8. Determination of frequency of AC mains using Sonometer.

ALLIED PHYSICS PRACTICAL – I:
PROPERTIES OF MATTER, HEAT AND SOUND PRACTICAL

Semester: III **Hours: 2**
Code : 23PH3AP3B **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Identify the required equipment and its purpose	PSO - 1	K1
CO - 2	Explain the concepts of gravitation, heat and sound	PSO - 1, PSO - 2	K2
CO - 3	Demonstrate the experiment through acquired knowledge	PSO - 3	K3
CO - 4	Deduce the result from appropriate formula	PSO - 3, PSO - 4	K4
CO - 5	Assess the results with the standard values	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				**ALLIED PHYSICS PRACTICAL - I:PROPERTIES OF MATTER, HEAT AND SOUND PRACTICAL**							**Hours: 2**
Code : 23PH3AP3B											**Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	2	3	3	2	3	5	3	3	3	2	3.09
CO - 2	5	2	3	3	2	5	5	5	3	3	2	3.45
CO - 3	3	3	3	5	3	3	3	3	5	3	3	3.36
CO - 4	3	2	5	5	2	3	3	3	5	5	2	3.45
CO - 5	4	5	2	2	5	3	4	3	2	2	5	3.36
Overall Mean Score												**3.34**

Result: The score for this course is **3.34** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

LIST OF PRACTICALS (Any 6)

1. Determination of rigidity modulus using Torsion Pendulum with mass.
2. Determination of rigidity modulus using Static torsion method.
3. Determination of Young's Modulus by Non-Uniform Bending using Pin and Microscope method.
4. Determination of Young's Modulus by Uniform Bending using optic lever - Telescope and Scale method.
5. Determination of the temperature coefficient of resistance of the material of the coil using Carey Foster's bridge.
6. Determination of the frequency of an electrically maintained tuning fork by Melde's string.
7. Verification of laws of transverse vibrations of stretched string by Sonometer.
8. Determination of solar constant and temperature of Sun using Lee's disc method.

ENTREPRENEURSHIP SKILLS IN CHEMISTRY

Semester: III **Hours: 1**

Code : 23SE3CH03 **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Identify the ingredients needed for the preparation of candles, phenyl, washing powder, face powder, cleaning powder, shampoo pain balm and hand sanitiser	PSO-1	K1
CO - 2	Explain the preparation of candles, phenyl,washing powder, face powder, cleaning powder, shampoo pain balm and hand sanitiser	PSO-4	K2
CO - 3	Develop skills in entrepreneurship	PSO-2	K3
CO - 4	Focus the skills of self employment scheme	PSO-3	K4
CO - 5	Set a start - up programme to generate income	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				**ENTREPRENEURSHIP SKILLS IN CHEMISTRY**							**Hours: 1**
Code : 23SE3CH03											**Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	3	3	3	4	5	3	3	4	3	3.55
CO - 2	3	3	3	3	4	5	3	3	3	5	4	3.55
CO - 3	4	4	5	5	3	4	4	5	4	4	3	4.09
CO - 4	3	5	3	3	3	4	3	3	5	4	3	3.55
CO - 5	3	3	3	3	5	4	3	3	3	4	5	3.55
Overall Mean Score												**3.66**

Result: The score for this course is **3.66** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: THE MEANING AND CHARACTERISTICS OF AN ENTREPRENEUR:

Meaning-origin of the term - definition - need - role and importance of entrepreneurship - scope of entrepreneurial development in chemistry - characteristics of an entrepreneur - relationship between the terms entrepreneur, an entrepreneurial and entrepreneurship **(3 Hours)**

UNIT II: CANDLES:

Raw materials - different types of wax - occurrence - different types of candle moulds - colour and creative designs of candles - laboratory preparation and hands on training **(3 Hours)**

UNIT III: PHENYL:

Definition of antiseptics and disinfectants- its action: raw materials - laboratory preparation and hands on training **(3 Hours)**

UNIT IV:

Ingredients, laboratory preparation and packaging of washing powder, face powder and cleaning powder **(3 Hours)**

UNIT V:

Ingredients and laboratory preparation of shampoo, hand sanitiser and pain balm **(3 Hours)**

COURSE BOOK

6. C. Mary Anbarasi and S. Sahaya Leenus, Entrepreneurship Skills in Chemistry, Shanlax Publications, Madurai, 1st Edition, 2023. **Unit I-V**

APPLIED CHEMISTRY

Semester: III **Hours: 2**

Code : 23CH3GE01 **Credit: 2**

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire the knowledge on food chemistry pest management and fertilizer, polymer, sugar manufacturing process, consumer products of cottage goods and the intellectual property rights	PSO-1	K1
CO - 2	Explain the manufacturing techniques of food products, pest, fertilizer, sugar and consumer products	PSO-3	K2
CO - 3	Apply the skills on identifying food adulteration techniques, pest management and cottage goods manufacturing process	PSO-2	K3
CO - 4	Analyse the significant role of chemistry in food materials and consumer products	PSO-4	K4
CO - 5	Assess the various techniques involved in applied chemistry	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				APPLIED CHEMISTRY							Hours: 2
Code :23CH3GE01											Credit: 2
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	2	4	4	3	4	5	4	2	4	3	3.64
CO - 2	2	5	4	4	3	4	2	4	5	4	3	3.64
CO - 3	3	3	5	5	3	4	3	5	3	4	3	3.73
CO - 4	3	3	2	2	4	5	3	2	3	5	4	3.27
CO - 5	3	3	4	4	5	4	3	4	3	4	5	3.82
Overall Mean Score												3.62

Result: The score for this course is **3.62** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: a) FOOD PROCESSING:

Introduction - cooking - advantages of cooking - food spoilage - food preservation - refrigeration and freezing - canning - dehydration: freeze-drying, salting, pickling, fermenting - chemical preservatives: citric acid - EDTA - heptyl paraben - lecithin

b) FOOD ADULTERATION AND TESTING:

Introduction - legal aspects of food adulteration and prevention in WHO - common food adulterants - analysis of various food adulterants: edible oils, ghee, coffee powder, chilly powder, turmeric powder, meat and milk - harmful effect of the adulterants **(6 Hours)**

UNIT II: FERTILIZERS AND PEST MANAGEMENT:

Plant nutrients - definition - nutrient for plant growth - natural and chemical fertilizers - classification - pest management - insecticides - pesticides - fungicides - definition - classification and mode of action **(6 Hours)**

UNIT III: SUGAR INDUSTRY:

Introduction - extraction of juice - purification - defecation - carbonation and sulphitation - concentration - crystallization - separation of crystals - refining - recovery of sugar from molasses - manufacture of ethanol from molasses by fermentation **(6 Hours)**

UNIT IV: POLYMERS:

Fibers - natural fibers: cotton, wool, silk, artificial fibers: rayon, nylon - rubber: natural rubber - vulcanization - synthetic rubbers: preparation and uses of buna rubbers and neoprene - commercial plastics: preparation, uses of polyethylene, PET, PVC, Polypropylene, Bakelite and Teflon **(6 Hours)**

UNIT V: a) COTTAGE INDUSTRIAL GOODS:

Preparation and uses: cleaning powder - shampoo - ink - phenyl - washing powder - candle - rose water - pain balm and hand sanitizer

b) INTELLECTUAL PROPERTY RIGHTS:

Introduction - definitions - importance of intellectual property - types of intellectual property: definition of copyright, patent, trademark and industrial designs **(6 Hours)**

COURSE BOOK

Study material prepared by the PG and Research Center of Chemistry

BOOKS FOR REFERENCE:

1. B.K. Sharma, Industrial Chemistry, Goel Publishing House, 13th Edition, 2002.
2. Alex V Ramani, Food Chemistry, MJP Publishers, 2021.
3. P. L. Soni and H.M. Chawla, Textbook of Organic chemistry, 2022, 29th Edition, Sultan Chand and Sons Educational Publishers.
4. P. L. Soni and Mohan Katyal, Textbook of Inorganic Chemistry, 2007, 20th Edition, Sultan Chand and Sons Educational Publishers.
5. Neeraj Pandey, Khushdeep Dharni, Intellectual Property Rights, PHI Learning, 2014.

PART IV - NATIONAL CADET CORPS

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Think critically, evaluate analytically and apply the acquired knowledge of their discipline in related scenario.
2.	Formulate hypothesis, design experiments, use appropriate tools and interpret the results.
3.	Demonstrate the precise understanding of the principles and theories of their discipline through experiments.
4.	Enhance the communicative skills and gain confidence to disseminate knowledge through oral/verbal communications effectively at various situations.
5.	Identify the different roles in an organizational structure of the work place and carry out multiple roles in social responsibilities.
6.	Increase self-awareness, set and pursue meaningful goals, and develop positive personal qualities.

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO. NO.	UPON COMPLETION OF THE COURSE THE STUDENTS WILL BE ABLE TO	PO MAPPED
1	Reinforce the aims, motto, vision and mission of the NCC through the academic curriculum.	PO-1, PO-3
2	Train the students, to be graduates with all round development, who apart from their own subject, can successfully compete in other fields such as defense/paramilitary/ police forces and civil services.	PO-1, PO-4
3	Perform in social service activities and creating awareness about social evils in society.	PO-1, PO-5, PO-6.
4	Explain the tri services organization, comprising the army, navy and air force, engaged in grooming the youth of the country into disciplined and patriotic citizens.	PO-2, PO-6
5	Demonstrate "B" and "C" certificate examination of NCC helps in getting jobs in different forces and also security related jobs.	PO-2, PO-5, PO-6

GE - 1: NATIONAL INTEGRATION AND PERSONALITY DEVELOPMENT

Semester: III **Hours: 2**
Code : 23GE3NC01 **Credit: 2**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Develop technical skill in Civil defense and self-defense in order to safeguard the society in case of need arises	PSO - 1,PSO - 2, PSO - 4	K1
CO - 2	Perceive the importance of Weapon training is to remove the fear of a weapon from the hearts of youth.	PSO - 1, PSO - 4	K2
CO - 3	Comprehend the motivation for positive attitude, character building and personality development.	PSO - 2,PSO - 3, PSO 4, PSO - 5	K3
CO - 4	Analyze the different types of disasters under different circumstances.	PSO - 4, PSO - 5	K4
CO - 5	Achieve practical knowledge in community development and other social programmes.	PSO - 1, PSO - 2	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				**GE-1: NATIONAL INTEGRATION AND PERSONALITY DEVELOPMENT**							**Hours: 2**
Code : 23GE3NC01											**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	3	2	2	4	5	4	3	3	5	3.55
CO - 2	5	4	4	2	3	4	5	4	4	4	5	4.00
CO - 3	5	5	4	2	2	3	3	5	3	3	4	4.00
CO - 4	5	4	3	2	2	4	4	5	4	4	5	3.82
CO - 5	5	4	4	2	3	3	5	4	2	5	4	3.73
Overall Mean Score												**3.82**

Result: The Score for this Course is **3.82** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for Cos = $\frac{\text{Total of Mean Scores}}{\text{Total No. of Cos}}$

GE-1: NATIONAL INTEGRATION AND PERSONALITY DEVELOPMENT

2hrs/Week

UNIT I

National Integration **6 Hours**

Motto of National Integration - Importance of National Integration Culture and heritage of Tamil Nadu.

UNIT II

Civil Affairs **6 Hours**

Aim of aid to civil authority - Role of NCC Cadets during natural calamities - Types of disaster - Essential services during natural calamities

UNIT III

Civil Defence and Self Defence **6 Hours**

Civil Defence - Organization - Aims and services- Aid to Civil authorities in emergency- Self Defence -Aims of Self Defence - Women and Self Defence

UNI IV

Leadership And Personality Development **6 Hours**

Leadership - Types and traits - Man Management in NCC - Duties of a Good Citizen - Role of Youth in Nation Building - Morale - Factors which affect morale - Factors which develop high morale Personality Development - Factor influencing Personality-Time Management .

UNIT V

Soft Skills **6 Hours**

Soft skills - interview skill - influencing skill - social skill - communication skill - self motivation - self-esteem - body language.

INTERNAL QUESTION PATTERN (Fully Internal Papers) - UG (2023-2026)

Max. Marks - 40 **Duration - $1\frac{1}{2}$ Hours**

Section	Bloom's level	Course Outcome	Questions
A MCQs (10×1=10)	K1	CO1	1.
		CO1	2.
		CO1	3.
		CO1	4.
		CO1	5.
		CO1	6.
		CO1	7.
		CO1	8.
		CO1	9.
		CO1	10.
B Answer all the Questions (2×5=10)	K2	CO2	11. a) (or) 11. b)
	K3	CO3	12. a) (or) 12. b)
C Answer all the questions (2×10=20)	K4	CO4	13. a) (or) 13. b)
	K5	CO5	14. a) (or) 14. b)

CONTINUOUS INTERNAL ASSESSMENT COMPONENT (CIA) - 2023-2026

Component	Marks
Internal test I	40
Internal test II	40
Seminar/Assignment	10
Quiz	5
Attendance	5
Total	**100**

AEC-3 ENVIRONMENTAL STUDIES

Semester: III **Hours: 2**

Code : 23AE3ES03 **Credit: 2**

PROGRAMME OUTCOMES

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Endow with in-depth knowledge, analyze and apply the understanding of their discipline for the betterment of self and society
2.	Synthesize ideas from various disciplines, enhance the interdisciplinary knowledge and extend it for research
3.	Gain confidence and skills to communicate orally/ verbally in research platforms and state a clear research finding
4.	Develop problem-solving and computational skills and gain confidence to appear for the competitive examinations
5.	Enhance knowledge regarding research by accumulating practical knowledge in specific areas of research
6.	Achieve idealistic goals and enrich the values to tackle the societal challenges

PROGRAMME SPECIFIC OUTCOMES

PSO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PO MAPPED
1.	Assess the scope and importance of environmental studies and the need for public awareness	PO-1
2.	Develop a deeper understanding in the classification of resources	PO - 2
3.	Analyze the concept of the ecosystem	PO-3
4.	Comprehend the definitions, causes and control measures of environmental pollutions	PO-4
5.	Participate in the environmental issues programmes from the unsustainable to sustainable development	PO - 5, PO-6

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Understand natural resources, ecosystems, environmental pollution and social issues	PSO-1	K1
CO - 2	Explain different types of natural resources, pollution, ecosystem and social issues	PSO-2	K2
CO - 3	Demonstrate the identification, utilization, ecosystems and the impact of environmental pollution on both the natural world and human communities and the conservation of natural resources	PSO-3	K3
CO - 4	Analyse social issues related to environmental sustainability	PSO-4	K4
CO - 5	Examine societal concerns within and surrounding the Theni District	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: III				**AEC-3ENVIRONMENTAL STUDIES**							**Hours: 2**
Code : 23AE3ES03											**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	3	3	3	3	5	3	3	3	3	3.36
CO - 2	3	5	4	4	3	3	3	5	4	4	3	3.73
CO - 3	3	3	5	3	4	4	3	3	5	3	4	3.64
CO - 4	3	3	3	5	4	4	3	3	3	5	4	3.64
CO - 5	3	3	3	4	5	5	3	3	3	4	5	3.73
Overall Mean Score												**3.62**

Result: The score for this course is **3.62** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: NATURAL RESOURCES

Multidisciplinary nature of environmental studies: Definition, scope and importance - need for public awareness - classification of resources: renewable and non - renewable resources - forest resources, water resources, mineral resources, food resources, energy resources, land resources - associated problems; role of an individual in conservation of natural resources - equitable use of sources for sustainable lifestyles.

(6 Hours)

UNIT II: ECOSYSTEMS

Concept, structure and function of an ecosystem - energy flow in the ecosystem - food chains, food webs and ecological pyramids - Types, characteristic features, structure and function of Forest, grassland, desert and aquatic ecosystems. **(6 Hours)**

UNIT III: ENVIRONMENTAL POLLUTION

Definition - causes - effects and control measures of air pollution, water pollution, soil pollution, marine pollution, noise pollution, thermal pollution, nuclear hazards, solid waste management, the role of an individual in prevention of pollution. **(6 Hours)**

UNIT IV: SOCIAL ISSUES AND THE ENVIRONMENTS

From unsustainable to sustainable development - urban problems related to energy water conservation, rainwater harvesting, watershed management, resettlement and rehabilitation of people, its problem and concerns, case studies, environmental ethics, climate change, global warming, acid rain and ozone layer depletion, nuclear accidents and holocaust, case studies. wasteland reclamation. environmental protection act, air act, water act and wildlife protection. **(6 Hours)**

UNIT V: BIODIVERSITY IN THENI DISTRICT

Water resources, climate and soil types - Ecosystems: flora and fauna, the impact of human activities on the ecosystem - environmental pollution: identification of pollution sources and pollution control measures.

(6 Hours)

FIELDWORK

Visit to Kodaikanal for documentation of environmental assets- river/forest/ grassland/hill/mountain/cholas. **(6 Hours)**

COURSE BOOK:

- Murugeshan, R., (2007). Environmental Science and Engineering, Milleniumpublication, Madurai.

UNIT I : Section - 1.3 to 1.37

UNIT II : Section - 2.1 to 2.7 & 2.10 to 2.27

UNIT III : Section - 3.1 to 3.37

UNIT IV : Section - 4.1 to 4.17

UNIT V :

https://en.wikipedia.org/wiki/Theni_district

https://nwm.gov.in/sites/default/files/Notes%20on%20Theni%20District_.pdf

https://tnmines.tn.gov.in/pdf/dsr/23.pdf

Note:

(i) Tamil Version for Tamil Literature and History Tamil Medium Students

(ii) UNIT-V materials prepared by Staff

Continuous Internal Assessment Component (CIA)

Theory:

Component	**Marks**
Internal test I	40
Internal test II	40
Field Visit	10
Field Visit Report	5
Attendance	5
Total	**100**

Continuous Internal Assessment Component (CIA)

Passing Minimum: 40% out of 100

Internal Question Pattern

Part - A

10 Questions × 1Mark =10 Marks

Part - B

2 Questions × 5 Marks = 10 Marks (Internal Choice)

Part - C

2 Questions × 10 Marks = 20 Marks (2 Questions out of 3)

(Open Choice and at least one Question from

பொதுத் தமிழ் - 4
(பிற துறை மாணவிகளுக்கு மட்டும்)

பருவம்: நான்கு **நேரம்: 6**

குறியீடு: 23GT4GS04 **புள்ளி: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	சங்க இலக்கியத்தில் காணப் பெறும் வாழ்வியல் சிந்தனைகளை அறிந்து கொள்வர்.	PSO-2	K1
CO - 2	தமிழின் தொன்மையையும் செம்மொழித் தகுதியையும் அறிவர்.	PSO-1	K2
CO - 3	நாடக இலக்கியம் மூலம் நடிப்பாற்றலையும், கலைத் தன்மையையும், படைப்பாற்றலையும் வளர்த்தல்.	PSO-3	K3
CO - 4	தமிழிலிருந்து அலுவலகக் கடிதங்களை மொழிபெயர்க்கும் அறிவைப் பெறுவர்.	PSO-4	K4
CO - 5	மொழியறிவோடு வேலை வாய்ப்பினைப் பெறுதல்.	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV			**பொதுத்தமிழ் - 4**						**Hours: 6**			
Code : 23GT4GS04			**(பிற துறை மாணவிகளுக்கு மட்டும்)**						**Credit: 3**			
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	3	3	4	5	5	3	5	3	4	4	3.91
CO - 2	4	5	3	3	3	3	5	3	3	4	3	3.55
CO - 3	3	3	5	4	4	4	3	4	5	3	4	3.82
CO- 4	5	3	3	3	4	4	3	4	3	5	3	3.64
CO - 5	3	3	3	5	4	4	3	4	3	3	5	3.64
Overall Mean Score												**3.71**

Result: The score for this course is **3.71** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

அலகு 1: எட்டுத் தொகை

நற்றிணை - (10, 14, 16), குறுந்தொகை - (16, 17, 19, 20, 25, 29), கலித்தொகை - (38, 51), அகநானூறு - (15, 33, 55), புறநானூறு - (37, 86, 112), பரிபாடல் - வையை, இருபத்திரண்டாம் பாடல், ஒளிறுவாள் பொருப்பன் உடல் சமத் திறுத்த) **18 Hours**

அலகு 2: பத்துப் பாட்டு

நெடுநல்வாடை - நக்கீரர் **18 Hours**

அலகு 3: நாடகம்

சபாபதி - பம்மல் சம்பந்த முதலியார் **18 Hours**

அலகு 4: இலக்கிய வரலாறு

பாடம் தழுவிய இலக்கிய வரலாறு **18 Hours**

அலகு 5: மொழித்திறன்

மொழிபெயர்ப்பு / கலைச்சொற்கள்

கொடுக்கப்பட்டுள்ள ஆங்கிலப் பகுதியைத் தமிழில் மொழிபெயர்த்தல்.

அலுவலகக் கடிதம் - தமிழில் மொழிபெயர்த்தல். **18 Hours**

பாட நூல்கள்

1. தமிழ்த்துறை வெளியீடு (தொகுப்பு), - பொதுத்தமிழ் - 4, ஜெயராஜ் அன்னபாக்கியம் மகளிர் கல்லூரி (தன்னாட்சி), பெரியகுளம்.
2. சங்க இலக்கியம், எட்டுத்தொகை, - எம். நாராயண வேலுப்பிள்ளை, நர்மதா பதிப்பகம், முதற்பதிப்பு -2011.
3. பத்துப் பாட்டு, மூலமும் உரையும், - திருநெல்வேலி தென்னிந்திய சைவ சிந்தாந்த நூற்பதிப்புக் கழகம், சென்னை 18, முதற்பதிப்பு - 2007.
4. பம்மல் சம்பந்த முதலியார் அவர்களின் சபாபதி நாடகம், அருட்பெருஞ்சோதி அச்சகம், சென்னை -1.
5. சிற்பி. பாலசுப்பிரமணியன். - தமிழ் இலக்கிய வரலாறு,

பார்வை நூல்கள்

1. புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு, தமிழண்ணல்.
2. வகைமை நோக்கில் தமிழ் இலக்கிய வரலாறு, எ.ஃப். பாக்கியமேரி.

General Essay, Translation and Letter Writing, Alankar

Semester: IV **Hours: 5**

Code : 23GH4GS04 **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Learn the Development of Hindi Translation	PSO-1	K1
CO - 2	Learning to be United Across Religions.	PSO-4	K2
CO - 3	Improve Personal and Official letter writing skills.	PSO-2	K3
CO - 4	Analytical Creativity will be Developed.	PSO-3	K4
CO - 5	Ability to Beautiful words with Syllables and Phrases.	PSO-5	K5

UNIT I **(15 Hours)**

- ❖ Anushashan
- ❖ Anuvad Abyas - III (1-2 Lessons) English to Hindi, Hindi to English
- ❖ Avedan Patra

UNIT II **(15 Hours)**

- ❖ Pariksham Ka Mahatva
- ❖ Anuvad Abyas - III (3-4 Lessons) English to Hindi, Hindi to English
- ❖ Sampathak ke naam Patra

UNIT III **(15 Hours)**

- ❖ Paropakar
- ❖ Anuvad Abyas - III (5 Lessons) English to Hindi, Hindi to English
- ❖ Ras Short Notes -(Shringar, Hasya, Veer, Karun, Raudra)

UNIT IV **(15 Hours)**

- ❖ Bhavaathmak Ekta
- ❖ Paarivarik Patra
- ❖ Chand Short Notes - (Doha, Sorta, Geethika, Rola, Hari Geethika)

UNIT V **(15 Hours)**

- ❖ Nari Ka Karthavya Aur Adhikaar
- ❖ Thuranth Patra
- ❖ Alankar -(Anupras, Yamak, Vakrokthi, Upama, Virodabhas)

COURSE BOOKS:

1. Nibandh Praveshika, Dakshina Bhaaratha Hindi Prachar Sabha, T. Nagar, Chennai-600017.

The follo wing Sahityotar (General) essay have been prescribed

- ❖ Anushashan
- ❖ Pariksham Ka Mahatva
- ❖ Paropkar
- ❖ Bhavathmak Ekta
- ❖ Nari Ka Karthavya Aur Adhikaar

2. Translation: Anuvad Abyas -III(1-5 Lessons) English to Hindi, Hindi to English Published by Dakshina Bharath Hindi Prachar Sabha, Thyagaraya Nagar, Chennai - 600017.
3. Alankar: Kavya Shashthra Published by Dakshina Bharath Hindi Prachar Sabha, Thyagaraya Nagar, Chennai - 600 017.

The following Alankar have been prescribed

- ❖ Ras- Short Notes -(Shringar, Hasya, Veer, Karun, Raudra
- ❖ Alankar -(Anupras, Yamak, Vakrokthi, Upama, Virodabhas)
- ❖ Chand Short Notes - (Doha, Sorta, Geethika, Rola, Hari Geethika

BOOKS FOR REFERENCE:

1. Letter Writing: Pramanik Alekan Aur Tippan Prof Viraj M.A. Kashmirgate, Delhi - 110006

The following topics have been prescribed

- ❖ Paarivarik Patra
- ❖ Avedan Patra
- ❖ Sampathak ke naam Patra
- ❖ Thuranth Patra

COMMUNICATIVE ENGLISH - IV

Semester: IV **Hours: 4**

Code : 23GE4GS04 **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recognize the literary genres through various literary works	PSO-5	K1
CO - 2	Compare the social norms of other cultures	PSO-3	K2
CO - 3	Apply the language skills through literature	PSO-2	K3
CO - 4	Connect the ideas provided in the text	PSO-4	K4
CO - 5	Prioritize their communication skills along with literature	PSO-1	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				**COMMUNICATIVE ENGLISH - IV**							**Hours: 4**
Code : 23GE4GS04											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	4	5	4	4	4	5	4	4	4	4	5	4.27
CO - 2	3	3	5	4	3	3	3	4	5	3	3	3.55
CO - 3	4	3	3	5	3	3	4	5	3	3	3	3.55
CO - 4	4	4	3	4	5	4	4	4	3	5	4	4.00
CO - 5	5	4	4	4	3	4	5	4	4	3	4	4.00
Overall Mean Score												**3.87**

Result: The score for this course is **3.87** (High relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: POETRY **12 Hours**

Dahlia Ravikovitch	-	"Pride"
Maya Angelou	-	"Phenomenal Woman"
William Wordsworth	-	" The Tables Turned"

UNIT II: LIFE STORY **12 Hours**

Adeline Yen Mah	-	From *Chinese Cinderella*
George Orwell	-	"Why I Write"

UNIT III: SHORT STORY **12 Hours**

O Henry - "A Retrieved Reformation"

Extract from a play

The Quality of Mercy (Trial Scene from *The Merchant of Venice* -

Shakespeare: Act IV- Scene 1-(1 to 163 lines)

UNIT IV: GRAMMAR **12 Hours**

Types of Sentences

Question Tags

UNIT V: DRAFTING **12 Hours**

Reading Comprehension

Book Review

Product Review

Resume Writing

COURSE BOOKS

- Course Materials will be provided by the Department of English.
- Savarimuttu, Rohan J. S, and G. Petricia Alphine Nirmala, *English Grammar and Usage - An Ideal Companion for Advanced Learners*. New Century Book House (P) Ltd, 2016.

BOOKS FOR REFERENCE

1. Orwell, George. *Why I Write.* Gangrel-GB, London, 1946.
2. Green, David. *Contemporary English Grammar: Structures and Composition*. Macmillan India Limited, Chennai, 1981.
3. Shakespeare, William. *The Merchant of Venice*, Peacock. 2014.

WEB SOURCES:

1. https://www.google.co.in/books/edition/Chinese-Cinderella-and-the-Secret-Drag on/JUqCzR5GTdQC?hl=en&gbpv=1&pg=PT3&printsec=frontcover
2. https://orwell.ru/library/essays/wiw/english/e-wiw
3. https://srjcstaff.santarosa.edu/~mheydon/whywriteD.pdf(correct
4. http://www.blupete.com/Literature/Essays/Hazlitt/RoundTable/LoveLife.htm
5. https://www.poetryinternational.com/en/poets-poems/poems/poem/103-3359-PRIDE

GENERAL CHEMISTRY-VI

Semester: IV **Hours: 5**
Code : 23CH4MC06 **Credit: 5**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the basic concepts of first law of thermodynamics, thermochemistry, chemical kinetics, metals and metallurgy, heterocyclic chemistry and hydrocarbons	PSO-1	K1
CO - 2	Explain the terms of thermodynamics, thermochemistry, chemical kinetics, metals and metallurgy, heterocyclic compounds and hydrocarbons	PSO-2	K2
CO - 3	Apply mathematical skills to derive the first law of thermodynamics, solving chemical kinetic problems and extraction of metals, heterocyclic chemistry and hydrocarbons	PSO-3	K3
CO - 4	Analyse the thermodynamic functions, thermochemistry, chemical kinetics, metallurgical process, heterocyclic chemistry and hydrocarbons	PSO-4	K4
CO - 5	Formulate the equations in thermodynamics, kinetics and purification of metals, elucidate structures in heterocyclic chemistry and hydrocarbons	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV			**GENERAL CHEMISTRY-VI**						**Hours: 5**			
Code : 23CH4MC06												**Credit: 5**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	3	3	3	4	5	3	3	4	3	3.55
CO - 2	3	3	5	5	4	3	3	5	3	3	4	3.72
CO - 3	4	5	3	3	3	3	4	3	5	3	3	3.63
CO - 4	4	3	3	3	3	5	4	3	3	5	3	3.55
CO - 5	3	4	3	3	5	4	3	3	4	4	5	3.72
Overall Mean Score												**3.63**

Result: The score for this course is **3.63** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: a) I LAW OF THERMODYNAMICS:

Introduction - importance of thermodynamics - terminology in thermodynamics - state of a system - state variables - thermodynamic equilibrium - macroscopic properties - processes and their types - nature of work and heat - first law: statement - internal energy - mathematical formulation - work of expansion - exact and inexact differentials - enthalpy of a system : enthalpy change during an isobaric process, enthalpy of vaporization and enthalpy of fusion - heat capacity: at constant volume (C_v) and at constant pressure (C_p) - relationship between C_p and C_v - expansion of an ideal gas: isothermal expansion, work done in isothermal reversible expansion and irreversible isothermal expansion - zeroth law of thermodynamics - absolute temperature scale

b) THERMOCHEMISTRY:

Definition - change of internal energy and enthalpy in a chemical reaction: enthalpy of combustion, formation, neutralization and precipitation - Hess's law of constant heat of summation, applications - Kirchoff's equation - calculation of bond energy from thermochemical data **(15 Hours)**

UNIT II: CHEMICAL KINETICS:

Rate of a reaction - factors influencing rates of reaction - rate constant - order of reactions: one reactant, two reactant and three reactant - zero order reaction - first order reaction - derivation of rate constant - hydrolysis of ethyl acetate - half-life period for a first order reaction - methods for determining order of a reaction - second order reactions - derivation of rate constant - molecularity of a reactions - difference between order and molecularity - effect of temperature on reaction rates - concept of activation energy - Arrhenius equation - collision theory - Lindemann's theory of unimolecular reactions **(15 Hours)**

UNIT III: METALS AND METALLURGY:

Ores - minerals - differences - occurrence of metals in nature - purification of ores - general methods involved in extraction of metals - concentration - froth flotation - roasting - calcination - chemical reduction - refining: zone refining - Van Arkel-de-Boer process - alloys - definition, examples and uses: coin, brass and bronze **(15 Hours)**

UNIT IV: HETEROCYCLIC CHEMISTRY:

Definition - classification - nomenclature and general characteristics - acidic and basic character - aromatic character - synthesis of pyrrole, furan, thiophene and pyridine - chemical properties: electrophilic substitution reactions, addition reactions and oxidation - condensed six-membered heterocycles: synthesis of quinoline and isoquinoline - properties: basic character, reduction, oxidation and electrophilic substitution **(15 Hours)**

UNIT V: HYDROCARBONS:

Polynuclear aromatic hydrocarbons: Naphthalene - nomenclature, Haworth synthesis - properties - reactions - electrophilic substitution reaction: halogenation, nitration, sulphonation, Friedel - Crafts acylation and alkylation - structural elucidation of naphthalene - anthracene - synthesis by Friedel-Crafts reaction, Diels - Alder reaction and Haworth synthesis - chemical properties: reduction, oxidation, electrophilic substitution, formylation, electrophilic addition reactions - uses **(15 Hours)**

COURSE BOOKS:

1. B.R.Puri, L.R.Sharma and M.S. Pathania, Principles of Physical Chemistry, Vishal Publishing Co, 48th Edition, 2023-2024. **Unit I-II**
2. B.R. Puri, L.R. Sharma and K.C. Kalia, Principles of Inorganic Chemistry, Milestone Publishers, 33rd Edition, 2023-2024. **Unit III**
3. P.L. Soni and H.M Chawla, Organic Chemistry, Sultan Chand and Sons, 29th Edition, 2022. **Unit IV-V**
4. M.K. Jain and S.C. Sharma, Modern Organic Chemistry, Vishal Publishing Co., 4th Edition, 2023. **Unit IV-V**

BOOKS FOR REFERENCE:

1. M.K. Jain, S.C. Sharma and Jyotsna Chaturvedi, Graduate Organic Chemistry, Vishal Publishing Co., Volume - III, 2018-19.
2. M.K. Jain and S.C. Sharma and Fateh Bahadur, Graduate Organic Chemistry, Vishal Publishing Co., Volume - I, 2018-19.

PRACTICAL: MICROSCALE ORGANIC ANALYSIS AND PREPARATION

Semester: IV **Hours: 4**

Code : 23CH4CP03 **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Observe the physical state, odour, colour and solubility of the given organic substance	PSO-1	K1
CO - 2	Explain the procedure to find the presence of special elements and functional group	PSO-2	K2
CO - 3	Compare mono and dicarboxylic acids, primary, secondary and tertiary amines, mono and diamides, mono and polyhydric phenols, aldehyde and ketone, reducing and non-reducing sugars	PSO-3	K3
CO - 4	Exhibit a solid derivative concerning the identified functional group	PSO-4	K4
CO - 5	Adopt safety measures in handling chemicals	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				**PRACTICAL: MICROSCALE ORGANIC ANALYSIS AND PREPARATION**							**Hours: 4**
Code : 23CH4CP03											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	3	3	4	3	5	3	4	3	4	3.73
CO - 2	4	2	5	5	3	3	4	5	2	3	3	3.55
CO - 3	4	5	3	3	3	3	4	3	5	3	3	3.55
CO - 4	4	3	3	3	4	5	4	3	3	5	4	3.73
CO - 5	3	4	3	3	5	4	3	3	4	4	5	3.73
Overall Mean Score												**3.66**

Result: The score for this course is **3.66** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

I. Microscale analysis of the organic substance containing one or two functional groups:

Acids, phenols, aldehydes, ketones, esters, nitro compounds, amines (primary, secondary and tertiary), amides (mono and di), anilides and carbohydrates. The compound is identified as

i) Aliphatic or aromatic

ii) Saturated or unsaturated

iii) Special elements presence/absence

iv) Nature of functional group

v) Confirmation by the preparation of a solid derivative

II. Preparation of Organic Compounds by hydrolysis:

1. Salicylic acid from methyl salicylate
2. Benzoic acid from benzamide

BOOKS FOR REFERENCE:

1. Practical manual prepared by the PG and Research Center of Chemistry, Reprint, 2023.
2. V. Venkateswaran, R. Veeraswamy and A. R. Kulandaivelu, Basic Principles of Practical Chemistry, Sultan Chand and Sons, Reprint 2023.

ALLIED: GENERAL CHEMISTRY-II

Semester: IV **Hours: 3**

Code : 23CH4AC4A **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge on the role of chemistry in day-to-day life, electrochemistry, principles of photochemistry, surface chemistry and catalysis	PSO-1	K1
CO - 2	Explain the preparation and properties of some important compounds, the concepts of electrochemistry, principles of photochemistry, surface chemistry and catalysis	PSO-2	K2
CO - 3	Apply the chemistry behind chemical compounds, electrochemical process, the principles of photochemistry in various photophysical processes	PSO-3	K3
CO - 4	Analyse the usage of drugs and quantum yield for the reactions, quality of a catalyst, isotherms and the structure of polymers	PSO-4	K4
CO - 5	Evaluate nature of drugs, chemical structure and uses of important polymers and reactions of surface chemistry	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				**ALLIED: GENERAL CHEMISTRY-II**								**Hours: 3**
Code : 23CH4AC4A												**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	3	4	3	4	4	
CO - 1	5	3	3	3	3	4	5	3	3	4	3	3.55
CO - 2	3	4	5	5	3	3	3	5	4	3	3	3.72
CO - 3	4	5	3	3	3	3	4	3	5	3	3	3.55
CO - 4	4	3	3	3	4	5	4	3	3	5	4	3.72
CO - 5	3	4	3	3	5	3	3	3	4	3	5	3.55
Overall Mean Score												**3.62**

Result: The score for this course is **3.62** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: CHEMISTRY IN THE SERVICE OF MANKIND:

a) Chemotheraphy: Antibiotics: definition - classification based on specificity of their action and gram staining method - antipyretics: definition - preparation and uses of aspirin and paracetamol - analgesics: definition, types and examples - antiseptics and disinfectants: definition, uses and examples - antimalerials: definition, uses and examples

b) Fertilizers: Definition - nutrients for plants - role of various elements in plant growth - natural and chemical fertilizers - classification of chemical fertilizers - manufacture of urea- mixed fertilizers - organic farming

c) Insecticides and Pesticides: Definition - preparation and uses of DDT and BHC

(9 Hours)

UNIT II: ELECTROCHEMISTRY:

Arrhenius theory of electrolytes - strong electrolytes - weak electrolytes - pH of the solutions: definition and calculation - buffer solutions - applications - commercial cells: Leclanche cell - lead storage cell - electroplating - principle and method - factors influencing the nature of deposit - applications - corrosion of metals - disadvantages - methods of preventing corrosion: metallic coatings, electroplating and cathodic protection **(9 Hours)**

UNIT III: PHOTOCHEMISTRY:

Definition - difference between photochemical and thermochemical reactions - laws of photochemistry: Beer - Lambert's law, Grotthus Drapper law and Stark - Einstein's Law - photophysical processes: Jablonski diagram - fluorescence and its applications - phosphorescence - photosynthesis - chemiluminescence - bioluminescence - quantum yield : definition and factors affecting quantum yield - kinetics of photochemical reactions: kinetics of hydrogen - chlorine reaction

(9 Hours)

UNIT IV: SURFACE CHEMISTRY:

a) Adsorption: Definition - difference between adsorption and absorption - types of adsorption - difference between physisorption and chemisorption - Freundlich adsorption isotherm - applications of adsorption

b)Catalysis: General characteristics of a catalyst - types of catalysis: homogeneous catalysis: acid-base catalysis and enzyme catalysis - heterogeneous catalysis - auto catalysis -catalytic poisoning - promoters - industrial applications of catalysts **(9 Hours)**

UNIT V: POLYMER CHEMISTRY:

Definition - classification of polymers based on origin, mode of formation, structure and application - difference between addition and condensation polymerization - rubber: natural rubber - vulcanization - synthetic rubbers: preparation and uses of buna rubbers and neoprene - plastics: thermoplastics and thermosetting plastics - distinction and uses - resins: definition, preparation and uses of Bakelite - chemical structure and uses of polyethylene, polypropylene, PVC, PET and Teflon **(9 Hours)**

COURSE BOOK:

1. A. Mary Imelda Jayaseeli, M. Kalanithi, C. Mary Anbarasi, S. Pooranalakshmi, Allied Chemistry III and IV, Shanlax publications., Madurai, 1st Edition, 2022.

   Unit I-V

BOOKS FOR REFERENCE:

1. P. L. Soni and Mohan Katyal, Text book of Inorganic Chemistry, Sultan Chand and Sons, Educational Publishers, Reprint, 2014.
2. B.R.Puri, L.R.Sharma and M.S. Pathania, Principles of Physical Chemistry, Vishal Publishing Co., 48th Edition, 2023-2024.

ALLIED: GENERAL ASPECTS OF CHEMISTRY-II

Semester: IV **Hours: 3**

Code : 23CH4AC4B **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the importance of distribution law and phase rule, radioactivity, coordination chemistry, importance of dyes and heterocyclic compounds	PSO-1	K1
CO - 2	Describe the importance of distribution law and phase rule, radioactivity, coordination chemistry, importance of dyes and heterocyclic compounds	PSO-2	K2
CO - 3	Illustrate distribution law and phase rule, radioactivity and coordination chemistry and importance of dyes and heterocyclic compounds	PSO-3	K3
CO - 4	Analyse the importance of distribution law and phase rule, radioactivity, coordination chemistry, dyes and heterocyclic compounds	PSO-4	K4
CO - 5	Evaluate distribution law and phase rule, radioactivity, coordination chemistry, importance of dyes and heterocyclic compounds	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				**ALLIED: GENERAL ASPECTS OF CHEMISTRY-II**								**Hours: 3**
Code : 23CH4AC4B												**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	3	3	3	4	5	3	3	4	3	3.55
CO - 2	3	4	5	5	3	3	3	5	4	3	3	3.72
CO - 3	4	5	3	3	3	3	4	3	5	3	3	3.55
CO - 4	4	3	3	3	4	5	4	3	3	5	4	3.72
CO - 5	3	4	3	3	5	3	3	3	4	3	5	3.55
Overall Mean Score												**3.62**

Result: The score for this course is **3.62** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: a) DISTRIBUTION LAW:

Statement and mathematical formulation - experimental verification - conditions under which the law is obeyed - deviation from the law (Statement only) - applications of distribution law

b) LIQUIDS IN LIQUIDS:

Distillation of homogeneous binary liquid mixtures - theory of fractional distillation and azeotropic distillation - partially miscible liquids: variation of solubility with temperature - critical solution (consolute) temperature - lower and upper - influence of impurity on C.S.T and applications - immiscible liquid systems: theory of steam distillation and its applications **(9 Hours)**

UNIT II: NUCLEAR CHEMISTRY AND RADIOACTIVITY:

Nuclear chemistry - nuclear particles - packing fraction - mass defect - binding energy of the nucleus - related problems - binding energy and stability - nuclear fission: atom bomb - nuclear fusion: hydrogen bomb, energy of the sun atmosphere - Radioactivity - rate of radioactive disintegration - units of radioactivity - half-life period - nature of radiations from radioactive elements **(9 Hours)**

UNIT III: a) COORDINATION COMPOUNDS:

Definition - nomenclature - definition of various terms involved in coordination chemistry - Werner's theory - EAN rule - VB theory (outline only) - nickel carbonyl - chelates

b) INDUSTRIAL CARBON:

Manufacture of graphite, carbon black, calcium carbide - silicon carbide **(9 Hours)**

UNIT IV: a) CONDENSED SYSTEM:

Naphthalene and anthracene: isolation from coal tar, synthesis, properties, uses and structures (no elucidation)

b) DYES:

Definition - theory of colour and constitution - classification according to the structure and application - preparation of methyl orange - bismark brown and malachite green **(9 Hours)**

UNIT V: HETEROCYCLIC COMPOUNDS:

Preparation, properties and structures of pyrrole, furan, thiophene, indole, pyridine, pyrazole, imidazole, quinoline and isoquinoline (no structural elucidation) **(9 Hours)**

COURSE BOOKS:

1. B.R.Puri, L.R.Sharma and M.S. Pathania, Principles of Physical Chemistry, Vishal Publishing Co., 48th Edition, 2023-2024. **Unit I-II**
2. B.R. Puri, L.R. Sharma and K.C. Kalia, Principles of Inorganic Chemistry, Milestone Publishers, 33rd Edition, 2022-2023. **Unit III**
3. M.K. Jain and S.C. Sharma, Modern Organic Chemistry, Vishal Publishing Co., 4th Edition, 2023. **Unit IV-V**

ALLIED PRACTICAL: VOLUMETRIC ANALYSIS

Semester: IV **Hours: 2**

Code : 23CH4AP4A **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recognize the techniques of titrimetric analyses	PSO - 1	K1
CO - 2	Describe the skills to do the volumetric titration using double burette method	PSO - 2	K2
CO - 3	Estimate the amount of substance present in the given solution	PSO - 3	K3
CO - 4	Demonstrate the different types of titrations such as acidimetry, alkalimetry and permanganometry	PSO - 4	K4
CO - 5	Develop problem solving skills	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				ALLIED PRACTICAL: VOLUMETRIC ANALYSIS							Hours: 2
Code : 23CH4AP4A											Credit: 1
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	4	4	4	3	4	5	4	4	4	3	4.00
CO - 2	3	4	5	5	3	3	3	5	4	3	3	3.73
CO - 3	4	5	4	4	3	3	4	4	5	3	3	3.82
CO - 4	3	3	4	4	4	5	3	4	3	5	4	3.82
CO - 5	3	4	4	4	5	3	3	4	4	3	5	3.82
Overall Mean Score												**3.84**

Result: The score for this course is **3.84** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs = Total of Mean Scores / Total No. of COs

DOUBLE TITRATION FOLLOWING MICROSCALE METHOD:

Making up of the solution to be estimated and following double burette method for estimation

I. ACIDIMETRY AND ALKALIMETRY

1. Estimation of Na_2CO_3
2. Estimation of NaOH
3. Estimation of Oxalic acid

II. PERMANGANIMETRY

1. Estimation of Ferrous sulphate
2. Estimation of Ferrous ammonium sulphate
3. Estimation of Oxalic acid

BOOK FOR REFERENCE:

Practical manual prepared by the PG and Research Center of Chemistry, Reprint, 2023

ALLIED PRACTICAL: QUANTITATIVE ESTIMATION

Semester: IV **Hours: 2**

Code : 23CH4AP4B **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Gain analytical skills in volumetric estimation	PSO-1	K1
CO - 2	Explain the principle of EDTA titrations	PSO-2	K2
CO - 3	Apply skills in colorimetric estimation of metal ions	PSO-3	K3
CO - 4	Estimate the hardness of the given sample of water	PSO-4	K4
CO - 5	Adopt safety measures in handling chemicals	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				**ALLIED PRACTICAL: QUANTITATIVE ESTIMATION**							**Hours: 2**
Code : 23CH4AP4B											**Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	4	4	3	3	5	4	4	3	3	3.82
CO - 2	4	3	5	5	3	3	4	5	3	3	3	3.73
CO - 3	3	5	3	3	4	3	3	3	5	3	4	3.55
CO - 4	3	3	3	3	4	5	3	3	3	5	4	3.55
CO - 5	3	3	3	3	5	4	3	3	3	4	5	3.55
Overall Mean Score												**3.64**

Result: The score for this course is **3.64** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

I. EDTA TITRATIONS

4. Estimation of Magnesium
5. Estimation of Zinc
6. Estimation of Hardness of water

II. COLORIMETRY

3. Estimation of Iron
4. Estimation of Copper

REFERENCE BOOK:

1. V.Venkateswaran, R. Veeraswamy and A. R. Kulandaivelu, Basic Principles of Practical Chemistry, Sultan Chand and Sons, Reprint 2023.

ALLIED PHYSICS - II

ELECTRICITY, ELECTRONICS AND MODERN PHYSICS

Semester: IV **Hours: 3**

Code : 23PH4AC4A **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Define the laws of electricity, electronics and modern physics	PSO - 1	K1
CO - 2	Explain the concepts of current electricity, semiconductor devices, atomic and nuclear physics	PSO - 1, PSO - 2	K2
CO - 3	Apply the principles of electricity, electronics and modern physics to solve the problems	PSO - 2, PSO - 3	K3
CO - 4	Examine the acquired knowledge through various experiments and models	PSO - 3, PSO - 4	K4
CO - 5	Assess the importance of electricity, electronics and modern physics in real life situation.	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV	ELECTRICITY, ELECTRONICS AND MODERN PHYSICS											Hours:3
Code:23PH4AC4A												Credit:3
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO-1	5	2	3	3	2	3	5	3	3	3	2	3.09
CO-2	5	2	3	3	2	5	5	5	3	3	2	3.45
CO-3	3	2	3	5	2	5	3	5	5	3	2	3.45
CO-4	3	2	5	5	2	3	3	3	5	5	2	3.45
CO-5	4	5	2	2	5	3	4	3	2	2	5	3.36
Overall Mean Score												**3.36**

Result: The score for this course is **3.36** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I: CURRENT ELECTRICITY

Kirchhoff's laws - Wheatstone's network- Carey-Foster's bridge - measurement of resistance - determination of temperature coefficient of resistance - Potentiometer - calibration of ammeter - calibration of Voltmeter. **(9 Hours)**

UNIT II: ANALOG ELECTRONICS

Formation of PN junction diode, Biasing, V-I characteristics - Zener diode - Characteristics of Zener diode - Bridge rectifier -Transistor - Working of an n-p-n transistor - CE Configuration -Characteristics of a Transistor (CE mode). **(9 Hours)**

UNIT III: DIGITAL ELECTRONICS

Decimal Number system - Binary Number system - Conversion of binary number into decimal number - Conversion of decimal number into binary number - Binary addition and subtraction. Boolean's algebra - Postulates and theorems of Boolean Algebra -De Morgan's theorems - Logic gates - NOT Gate (Inverter) - OR Gate - AND Gate, NOR Gate - NOR gate is a universal gate - NAND gate is a universal gate - Exclusive OR Gate. **(9 Hours)**

UNIT IV: ATOMIC PHYSICS

Bohr's atom model - Calculation of total energy - Bohr's interpretation of the Hydrogen spectrum - Spectral series of hydrogen atom - Energy level diagram- Atomic excitation - Critical potential- Pauli's exclusion principle - Periodic classification of element. **(9 Hours)**

UNIT V: NUCLEAR PHYSICS

Nuclear properties - Size, mass, density, charge, spin angular momentum, resultant angular momentum, nuclear magnetic dipole moment, electric quadrupole moment, parity of nuclei and isospin quantum number- Nuclear fission - energy released in fission - chain reaction - atom bomb - Nuclear fusion - source of stellar energy. **(9 Hours)**

COURSE BOOKS:

1. R. Murugeshan, Electricity and Electronics, I Edition, Annai Print Park, Madurai, 2016.

   UNIT I: Chapter - 2 (All sections)

   UNIT II: Chapter-4: 4.1- 4.5, 4.7, 4.9 - 4.12.

   UNIT III: Chapter - 5(All sections)

2. R. Murugeshan - Modern Physics, 18th Edition, S. Chand & co, New Delhi, 2016.

   UNIT IV: Chapter 4: 4.3, 4.7- 4.8, 4.15, 4.16

   UNIT V: Chapter 17: 17.3.

   Chapter 22: 22.1, 22.1.1, 22.2, 22.2.1, 22.6, 22.6.1

BOOKS FOR REFERENCE:

1. V.K. Mehta, Principle of Electronics, 7th Revised Edition, S. Chand & Co, New Delhi, 2014.
2. S.B. Patel, Nuclear Physics an Introduction, 3rd Edition, New International Publishers, 2021.

ALLIED PHYSICS - II

OPTICS, SPECTROSCOPY AND RELATIVITY

Semester: IV **Hours: 3**

Code : 23PH4AC4B **Credit: 3**

COURSE OUTCOMES

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Define the fundamentals of optics, spectroscopy and relativity	PSO - 1	K1
CO - 2	Summarize the concepts of geometrical optics, interaction of light with matter and relativistic approach.	PSO - 1, PSO - 2	K2
CO - 3	Solve the problems on optics, spectroscopy and relativity through the acquired knowledge.	PSO - 3	K3
CO - 4	Differentiate the nature of light in geometrical optics and interaction with an obstacle. Illustrate the postulates of special theory of relativity	PSO - 3, PSO - 4	K4
CO - 5	Assess the nature of light in various medium and the relativistic phenomena in different coordinates	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				**ALLIED PHYSICS - II: OPTICS, SPECTROSCOPY AND RELATIVITY**							**Hours: 3**
Code : 23PH4AC4B											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	2	3	3	2	3	5	3	3	3	2	3.09
CO - 2	5	2	3	3	2	5	5	5	3	3	2	3.45
CO - 3	4	2	3	5	2	3	4	3	5	3	2	3.27
CO - 4	3	2	5	5	2	3	3	3	5	5	2	3.45
CO - 5	4	5	2	2	5	3	4	3	2	2	5	3.36
Overall Mean Score												**3.33**

Result: The score for this course is **3.33** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: GEOMETRICAL OPTICS

Deviation produced by thin lens - Focal length of two thin lenses in contact - Definition of Cardinal points and Respective planes - Refraction through a thin prism - Dispersion through the prism - Dispersive power - Dispersion without deviation - Aplanatic Lens - Oil immersion objective - Rainbow - Theory of primary rainbow - secondary rainbow. **(9 Hours)**

UNIT II: INTERFERENCE AND DIFFRACTON

Interference - Interference in thin films - Production of colors in thin films - Air wedge - Newton's ring - Determination of wavelength - Jamin's Interferometer, Principle and use - Diffraction - Plane transmission grating (Normal incidence only) - Experiment to determine wavelengths. **(9 Hours)**

UNIT III: POLARIZATION AND FIBRE OPTICS

Polarization of light - Double refraction -Huygen's theory of double refraction in uniaxial crystals - Nicol prisms - QWP and HWP - Optical activity (No theory) - Biot's laws for rotatory polarization - Specific rotatory power - Half shade polarimeter. **(9 Hours)**

UNIT IV: SPECTROSCOPY, QUANTUM THEORY AND PHOTOELECTRICITY

Infrared spectroscopy - Ultraviolet spectroscopy - Planck's quantum theory - Raman effect - Experimental study - Characteristics of Raman lines - Quantum theory of Raman effect - Applications. Photoelectricity - Experimental investigation on the Photoelectric effect - Laws of Photoelectric emission - Einstein's Photoelectric equation -Photoelectric cells - Applications. **(9 Hours)**

UNIT V: RELATIVITY

Frame of reference - Newtonian principle of relativity - Galilean transformation equations -Michelson Morley experiment - Postulates of special theory of relativity - Length contraction - Time dilation - Variation of mass with velocity - Mass Energy equivalence. **(9 Hours)**

COURSE BOOKS:

1. R. Murugeshan, Optics Spectroscopy and Modern Physics, 1st Edition, Annai Print Park, Madurai, 2017.

   UNIT I: Chapter 1: (All sections)

   UNIT II: Chapter 2: (All sections)

   UNIT III: Chapter 3: 3.1 - 3.10

   UNIT IV: Chapter 4 (All sections)

2. R. Murugeshan, Modern Physics, 18th Edition, S. Chand & co, New Delhi, 2016.

   UNIT V: Chapter 1: 1.2 - 1,4, 1.6 - 1.7, 1.9, 1.10, 1.13, 1.14

BOOKS FOR REFERENCE:

1. Brijlal and N. Subramanyam, Textbook of Optics, S. Chand & Co, New Delhi, 2002.
2. R. Murugeshan, Modern Physics, S. Chand & Co, New Delhi, 2005.

ALLIED PHYSICS PRACTICAL - II: ELECTRICITY, ELECTRONICS AND MODERN PHYSICS

Semester: IV **Hours: 2**

Code : 23PH4AP4A **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Identify the integrated circuits and components	PSO - 1	K1
CO - 2	Explain the purpose of ICs and components	PSO - 1, PSO - 2	K2
CO - 3	Construct the logic gates using appropriate ICs	PSO - 3	K3
CO - 4	Examine the results with truth tables	PSO - 3, PSO - 4	K4
CO - 5	Assess the results	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				**ALLIED PHYSICS PRACTICAL - II: ELECTRICITY, ELECTRONICS AND MODERN PHYSICS**							**Hours: 2**
Code : 23PH4AP4A											**Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	2	4	3	2	3	5	3	3	4	2	3.27
CO - 2	5	2	3	3	2	5	5	5	3	3	2	3.45
CO - 3	3	2	3	5	2	3	3	3	5	3	2	3.09
CO - 4	3	2	5	5	2	3	3	3	5	5	2	3.45
CO - 5	3	5	4	2	5	3	3	3	2	4	5	3.54
Overall Mean Score												**3.54**

Result: The Score for this Course is **3.54** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

LIST OF PRACTICALS (Any 6)

1. Construction of AND, OR, NOT, NAND, NOR gates using IC 74 series.
2. Construction of AND, OR, NOT gates using universal gates.
3. Construction and verification of half adder and half subtractor.
4. Verification of Boolean laws using logic gates.
5. Verification of De-Morgan's theorems.
6. Characteristics of Zener Diode.
7. Calibration of low range voltmeter using potentiometer.
8. Determination of resistance, resistivity, and temperature co-efficient of resistance using Carey Foster's bridge.

ALLIED PHYSICS PRACTICAL - II: OPTICS, SPECTROSCOPY AND ELECTRICITY PRACTICAL

Semester: IV **Hours: 2**

Code : 23PH4AP4B **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Identify the required equipment and its purpose	PSO - 1	K1
CO - 2	Explain the working of the equipment.	PSO - 1, PSO - 2	K2
CO - 3	Focus and demonstrate the experiment through acquired knowledge	PSO - 3	K3
CO - 4	Deduce the result from appropriate formula	PSO - 3, PSO - 4	K4
CO - 5	Assess the result	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				ALLIED PHYSICS PRACTICAL - II: OPTICS, SPECTROSCOPY AND ELECTRICITY PRACTICAL							Hours: 2
Code : 23PH4AP4B											Credit: 1
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	2	3	3	2	3	5	3	3	3	2	3.09
CO - 2	5	2	3	3	2	5	5	5	3	3	2	3.45
CO - 3	3	2	3	5	2	3	3	3	5	3	2	3.09
CO - 4	3	2	5	5	2	3	3	3	5	5	2	3.45
CO - 5	4	5	2	2	5	5	4	5	2	2	5	3.72
Overall Mean Score												**3.36**

Result: The score for this course is **3.36** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

LIST OF PRACTICALS (Any 6)

1. Determination of thickness of wire using Air wedge.
2. Determination of refractive index of a prism using Spectrometer.
3. Determination of angle of the prism using Spectrometer.
4. Determination of dispersive power of a prism using Spectrometer.
5. Determination of wavelength of the spectrum using Spectrometer - Grating.
6. Determination of radius of curvature using Newton's Rings.
7. Determination of the resonant frequency of the circuit and self-inductance of the coil using LCR - Series Resonance circuits.
8. Determination of the resonant frequency of the circuit and self-inductance of the coil using LCR - Parallel Resonance circuits.

STREAM B - OFFICE FUNDAMENTALS

Semester: IV **Hours: 3**

Code : 23SE4OA4B **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire the knowledge to handle the tools of MS office	PSO-3	K1
CO - 2	Understand the basics to create animations, presentations and documents	PSO-4	K2
CO - 3	Analyse the data using spreadsheets in MS Excel for various applications.	PSO-1	K3
CO - 4	Develop computational skills	PSO-2	K4
CO - 5	Use DTP skills to become an entrepreneur.	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV							**OFFICE FUNDAMENTALS**					**Hours: 3**
Code : 23SE4OA4B												**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	3	5	3	3	3	3	3	5	3	3	3.36
CO - 2	2	3	3	3	5	5	2	3	3	5	3	3.36
CO - 3	5	4	3	3	3	3	5	3	3	3	4	3.55
CO - 4	3	3	3	5	3	3	3	5	3	3	3	3.36
CO - 5	3	5	3	3	3	3	3	3	3	3	5	3.36
Overall Mean Score												**3.40**

Result: The score for this course is **3.40** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNITI

MS Word: Formatting- Table Creation - Preparation of advertisement using drawing tool- Invitation card preparation. **(9 Hours)**

UNIT II

MS Excel: Excel Function (statistical)- Data filtering and sorting - Mark sheet, pay bill Preparation - Data analysis using chart. **(9 Hours)**

UNIT III

MS Access: Database Creation & Mark Sheet Preparation- Forms and Reports. Creation. **(9 Hours)**

UNIT IV

MS Power point: Theme - based presentation with Animation Effects.

(9 Hours)

UNITV

MS Outlook:Personalized Email and Account creation, sending mails with attachments and money transaction. **(9 Hours)**

COURSE BOOK:

- Course material compiled by the Department.

BOOKS FOR REFERENCE:

1. D. P. Nagpal, Computer Fundamentals, S. Chand & Company Ltd., New Delhi, 1999.
2. V. Rajaraman, Fundamentals of Computers, 3rdEdition, Prentice Hall of India Pvt. Ltd., 2001.
3. B. Ram, Computer Fundamentals, 3rdEdition, New Age International Pvt. Ltd., 2010.

E- RESOURCE:

1. https://onlinecourses.swayam2.ac.in/cec19_mg35/preview

USAGE OF CHEMICALS IN DAILY LIFE

Semester: IV **Hours: 2**

Code : 23CH4GE02 **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the usage of chemicals in our daily life	PSO - 1	K1
CO - 2	Understand the chemical name and structure of materials used in health care and consumer products	PSO - 2	K2
CO - 3	Apply the knowledge of chemistry for proper utilization of the consumer products	PSO - 3	K3
CO - 4	Analyse the role of chemistry for consumer products used in day today life	PSO - 4	K4
CO - 5	Validate the chemicals used for beneficial action for mankind	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				**USAGE OF CHEMICALS IN DAILY LIFE**								**Hours: 2**
Code : 23CH4GE02												**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	4	4	3	3	5	4	3	3	3	3.63
CO - 2	3	3	5	5	3	3	3	5	3	3	3	3.54
CO - 3	3	5	3	3	4	3	3	3	5	3	4	3.55
CO - 4	3	3	4	4	3	5	3	4	3	5	3	3.63
CO - 5	4	3	3	3	5	4	4	3	3	4	5	3.72
Overall Mean Score												**3.61**

Result: The score for this course is **3.61** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: HEALTH CARE:

Definition, sources and calorific value of carbohydrates, proteins and fats - need for vitamins in body - types of vitamins - sources and physiological role of vitamin A, B-12, C, D, E, K and folic acid - role of minerals in human body, iodine deficiency diseases and remedy **(6 Hours)**

UNIT II: a) CHEMOTHERAPY:

Definition and example for sulpha drugs, antibiotics, antimalarials, antipyretics, anaesthetics, antioxidants and antacids

b) HOUSEHOLD PRODUCTS:

Introduction-molecular formula, chemical name and uses of common salt, baking soda, caustic soda, vinegar, sodawater, moth balls, vanaspathi, mosquito coils and safety matches **(6 Hours)**

UNIT III: CONSUMER PRODUCTS-I:

Soaps and detergents - their action - preparation and uses of bleaching powder, shampoo, talcum powder, alcohol, hand sanitizer, chalk, tooth paste, sugar and candles - disinfectant and antiseptic

Fuels - classification - solid, liquid and gaseous fuels - nuclear fuel - examples and uses **(6 Hours)**

UNIT IV: CONSUMER PRODUCTS-II:

Chemical name and uses of food preservatives, flavouring agents, sweetening agents and coloring agents, paper, alloys and utensils, cement - colour chemicals used in paints

Fertilizers - need, natural sources - chemical fertilizers: urea, NPK fertilizers and super phosphate **(6 Hours)**

UNIT V: POLYMERS:

Fibers - natural fibers: cotton, wool and silk - artificial fibers: rayon and nylon - examples of natural biodegradable polymers: cellulose, cellulose acetate and cellophane - structure and uses of polyethylene, PET, PVC, polypropylene, Bakelite and Teflon **(6 Hours)**

COURSE BOOK:

1. Dr. M. Kalanithi, Sr. Johny Dathees, Usage of Chemicals in Daily Life, Emerald Publication, Chennai, 1st Edition, 2023. **Unit I-V**

BOOKS FOR REFERENCE

1. Kirpal Singh, Chemistry in Daily Life, PHI learning private Ltd, 3rd Edition.
2. P.L. Soni and H.M Chawla, Organic Chemistry, Sultan Chand and Sons, 29th Edition, 2022.
3. P.L. Soni, M. Katyal, Test book of Inorganic chemistry, Sultan Chand and Sons, 20th Edition, 2006.

GE-2: ORGANIZATION AND HEALTH PROGRAMME IN NCC

Semester: IV **Hours: 2**

Code : 23GE4NC02 **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Describe the history, honors and awards of Indian Military.	PSO - 1,PSO - 2, PSO - 4	K1
CO - 2	Explain the map and weapon training to remove the fear of a weapon from the hearts of youth.	PSO - 1, PSO - 4	K2
CO - 3	Illustrate the different types of disasters under different circumstances.	PSO - 2,PSO - 3, PSO 4, PSO - 5	K3
CO - 4	Analyze the practical knowledge in community development and other social programs.	PSO - 4, PSO - 5	K4
CO - 5	Assess the personality development and develop technical skill of first Aid.	PSO - 1, PSO - 2	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV				GE-2:ORGANIZATION AND HEALTH PROGRAMME IN NCC								Hours: 2
Code : 23GE4NC02												Credits: 2
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	4	4	2	2	2	4	5	3	3	5	3.55
CO - 2	4	4	4	2	3	2	4	4	4	4	5	3.64
CO - 3	5	4	3	2	2	3	3	3	5	3	2	3.18
CO - 4	5	5	4	3	2	3	5	5	4	5	3	4.00
CO - 5	4	3	3	3	2	2	4	4	5	5	4	3.55
Overall Mean Score												**3.58**

Result: The Score for this Course is **3.58** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of Cos = Total of Values / Total No. of POs & PSOs	Mean Overall Score for Cos = Total of Mean Scores / Total No. of Cos

GE-2: ORGANIZATION AND HEALTH PROGRAMME IN NCC

2hrs/Week

UNIT I: Indian Military and NCC Organization **6 Hours**

History of Indian Military - Paramilitary forces -BSF- CRPF and CISF - NCC Organization and History- Aims and Objectives of NCC - Motto of NCC - DG's Four Cardinal Principles of NCC- NCC Song- Ranks in Army, Air force and Navy - Certificate Examination in NCC- Honors and Awards.

UNIT II: Map Reading **6 Hours**

Map and its features - kinds of north - Service protractor and Compass-bearing - Conversion of bearings - Conventional signs - Setting of map - Finding own position - Map to ground - Ground to map - Night March chart.

UNIT III: Hygiene and Sanitation **6 Hours**

Personal Hygiene - Sanitation - Methods of purification of drinking water -Latrine types - Urinal Types.

UNIT IV: Types Of Disease and Pollution **6 Hours**

Define Health - Types of Health - Communicable and Non communicable Disease - Pollution and its type.

UNIT V: First Aid **6 Hours**

Aims of First Aid - Principle of First Aid - Motto of First Aid - List of items in First aid Box - Types of Bandages - Types of Fracture -Dislocation - Types of Wounds - Burns and Scalds - Sprain - Strain - Asphyxia - Drowning - Poison - Shock - Snake bite - Sun and Heat Stroke - Insect bite - Dog bite - Hanging - Artificial Respiration - Haemorrhage.

BOOKS FOR REFERENCE:

- Mishra R.C., A Handbook of NCC, Kanti Prakashan, Etawah, 2000.

ABILITY ENHANCEMENT COURSE-4 (AEC-4)

CAPACITY BUILDING

Semester: IV **Hours: 1**

Code : 23AE4CB04 **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Define the importance of capacity building	PSO-1	K1
CO - 2	Develop skills for life-long learning	PSO-2,4	K2
CO - 3	Asses the importance of organizational development	PSO-3	K3
CO - 4	Analyze the need of the community togetherness	PSO-4	K4
CO - 5	Evaluate tech-based learning experiences.	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: IV			**CAPACITY BUILDING**								**Hours: 1**
Code : 23AE4CB04											**Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of COs**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO -1	3	5	3	3	3	3	3	4	5	3	4	3.54
CO - 2	4	5	4	3	3	4	3	4	4	3	5	3.81
CO - 3	4	4	3	3	5	4	3	4	3	3	5	3.72
CO - 4	3	4	3	4	3	4	3	3	5	3	5	3.63
CO - 5	4	4	3	3	4	4	3	4	5	4	5	3.90
Overall Mean Score												**3.72**

Result: score for this course is **3.72** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I

Introduction to Capacity Building **(3 Hours)**

UNIT II

Skills Development -essential skills-communication-problem solving-life long learning **(3 Hours)**

UNIT III

Organizational Strengthening-strategic planning-Team Building-Case Studies **(3 Hours)**

UNIT IV

Community Empowerment- Grassroots Initiatives **(3 Hours)**

UNIT V

Technology and Innovation-tech enabled learning-Innovation in capacity Building-Future Trends **(3 Hours)**

BOOKS FOR REFERENCE:

1. Senge, Peter M.*The Fifth Discipline:The Art and Practice of the Learning Organisation.* Doubleday, 1990.
2. Gilley, Jerry W., and Ann Maycunich Gilley.*The Manager as Change Agent: A Practical Guide to Developing High-Performanca People and Organisations.* Jossey-Bass, 1985.
3. Kanter, Rosabeth Moss. *Leadership for Change : Enduring Skills for Change Masters.* Harvard Business Review Press, 2015.

Continuous Internal Assessment Component (CIA)

Component	Marks
Role Play	25
Collage	25
Poster Making	25
Team Activities	20
Attendance	5
Total	**100**

ORGANIC CHEMISTRY-I

Semester: V **Hours: 6**
Code : 23CH5MC07 **Credit: 5**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge on stereochemistry conformation, carbonyl compounds active methylene compounds, ethers, thio ethers, thiols and nomenclature of alkaloids	PSO-1	K1
CO - 2	Describe the configuration and conformation, reactions of aldehydes and ketones, acids, active methylene compounds, ethers, thio ethers, thiols and the general properties of alkaloids	PSO-4	K2
CO - 3	Sketch the various formulae of chiral compounds and illustrate the various reactions of aldehydes, ketones, acids, active methylene compounds, ethers, thio ethers, thiols and alkaloids	PSO-2	K3
CO - 4	Analyse stereoisomersm, reactions of aldehydes, ketones, acids, active methylene compounds, ethers, thio ethers and thiols and elucidate the structure of alkaloids	PSO-3	K4
CO - 5	Evaluate the importance of stereochemistry, reactivity of carbonyl compounds, acidity of carboxylic acids, action of heat on hydroxy acids, synthetic uses of active methylene compounds, synthesis of alkaloids and uses of ethers, thio ethers and thiols	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V				**ORGANIC CHEMISTRY-I**							**Hours: 6**
Code : 23CH5MC07											**Credit: 5**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	3	3	4	3	5	3	4	3	4	3.73
CO - 2	4	4	3	3	4	5	4	3	4	5	4	3.91
CO - 3	3	4	5	5	4	3	3	5	4	3	4	3.91
CO - 4	4	5	4	4	3	3	4	4	5	3	3	3.82
CO - 5	4	4	3	3	5	3	4	3	4	3	5	3.73
Overall Mean Score												**3.82**

Result: The score for this course is **3.82** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I: a) STEREOCHEMISTRY:

Introduction - definition - Fischer projection - Newmann and Sawhorse Projection formulae and their interconversions

Geometrical isomerism: cis-trans, syn-anti isomerism, E/Z notations

Optical Isomerism**:** optical activity, specific rotation, asymmetry, enantiomers, distereoisomers, meso structures - molecules with one and two chiral centres, racemization - methods of racemization: resolution - methods of resolution - Cahn-Ingold-Prelog (CIP) rules - R and S notations for one and two chirality (stereogenic) centres - molecules with no asymmetric carbon atoms - allenes and biphenyls

b) CONFORMATION:

Definition - difference between configuration and conformation - conformational analysis of ethane, butane and cyclohexane **(18 Hours)**

UNIT II: ALDEHYDES AND KETONES:

Introduction - nomenclature - general methods of preparation: Rosenmund's reduction, Stephen's method from carboxylic acids, Gattermann aldehyde synthesis, Houben-Hoesch synthesis - structure and reactivity of carbonyl group - relative reactivities of aldehydes and ketones in nucleophilic additions - nucleophilic addition reactions and their mechanism: addition of Grignard reagent, HCN, sodium bisulphite, water and alcohols - condensation reactions: Aldol - cross Aldol - Claisen Schmidt - Claisen - Perkin - Benzoin - Knoevenagel - Stobbe - comparative properties of aldehydes and ketones - α, β-unsaturated aldehydes and ketones: preparation - chemical properties - electrophilic additions across the carbon - carbon double bond - nucleophilic addition to carbonyl group - Michael, Diels-Alder and Tischenko reactions **(18 Hours)**

UNIT III: a) SATURATED CARBOXYLIC ACIDS:

Introduction - nomenclature - structure and bonding - isomerism - general methods of preparation: by oxidation, hydrolysis of cyanides, carbonation of organometallic reagents, Arndt-Eistert synthesis, haloform reaction - structure of the carboxylic acids and carboxylate anions - chemical properties: acidic character and acid constants (Ka and *p*Ka) - comparison of acidity of phenol and aromatic carboxylic acids - conversion into carboxylic acid derivatives - synthesis of acid chlorides, esters and anhydrides - reduction to alcohols - decarboxylation Kolbe's electrolysis - Curtius - Schmidt reactions - dicarboxylic acid: nomenclature - general methods of preparation - action of heat on dicarboxylic acids **(18 Hours)**

UNIT IV: a) UNSATURATED CARBOXYLIC ACIDS:

α, β-unsaturated monocarboxylic acid: preparation and properties of acrylic acid and cinnamic acid - α, β- unsaturated dicarboxylic acids: preparation and properties of maleic acid - fumaric acid

b) HYDROXY ACIDS:

Preparation, properties and uses of lactic acid, tartaric acid, malic acid, citric acid and salicylic acid - action of heat on α, β and γ - hydroxy acids

c) ACTIVE METHYLENE COMPOUNDS:

Active methylene group - preparation and synthetic uses of acetoacetic ester, malonic ester, diazo methane, diazoacetic ester and cyanoacetic ester

(18 Hours)

UNIT V: a) ETHERS, THIO ETHERS AND THIOLS:

Ethers: nomenclature, isomerism, general methods of preparations, reactions involving cleavage of C-O linkages, alkyl group and ethereal oxygen - Zeisel's method of estimation of methoxy group - thioethers: nomenclature, structure, preparation, properties and uses - thiols: nomenclature, preparations from alcohol and Grignard reagent - reactions different from alcohols

b) ALKALOIDS:

Introduction - nomenclature and classification - occurrence - general properties - isolation - general structure determination - structural elucidation of coniine, piperine and nicotine **(18 Hours)**

COURSE BOOKS:

1. M.K. Jain and S.C. Sharma, Modern Organic Chemistry, Vishal Publishing Co., 4th Edition 2023. **Unit I-V**
2. P.L. Soni and H.M Chawla, Organic Chemistry, Sultan Chand and Sons, 29th Edition, 2022. **Unit I-V**

BOOKS FOR REFERENCE:

1. K.S. Tewari, N.K. Vishnoi, a course books of Organic Chemistry, Vikas Publishing House Pvt. Ltd., 3rd Edition, 2006.
2. M.K. Jain, S. C. Sharma and Jyotsna Chaturvedi, Graduate Organic Chemistry, Volume I, Vishal Publishing Co., 3rd Edition, 2019.
3. M.K. Jain, S. C. Sharma and Jyotsna Chaturvedi, Graduate Organic Chemistry, Volume II, Vishal Publishing Co., 3rd Edition, 2019.
4. M.K. Jain, S.C. Sharma and Jyotsna Chaturvedi, Graduate Organic Chemistry, Volume III, Vishal Publishing Co., 3rd Edition, 2019.

PHYSICAL CHEMISTRY-I

Semester: V **Hours: 6**

Code : 23CH5MC08 **Credit: 4**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge on basic concepts of thermodynamics, phase rule, colligative properties, principles of group theory, catalysis and adsorption	PSO-1	K1
CO - 2	Explain the terms in thermodynamics, various phase equilibria, colligative properties, symmetry operations, catalysis and adsorption	PSO-2	K2
CO - 3	Develop and apply the generalisations and theorems involved in thermodynamics, various phase equilibria, colligative properties, group theory, catalysis and adsorption	PSO-3	K3
CO - 4	Analyse and illustrate the concepts in thermodynamics, phase rule, colligative properties, group theory, catalysis and adsorption	PSO-4	K4
CO - 5	Interpret and compare the various aspects in thermodynamics, phase rule, colligative properties, group theory, catalysis and adsorption	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V			**PHYSICAL CHEMISTRY-I**								**Hours: 6**
Code : 23CH5MC08											**Credit: 4**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	3	3	3	3	5	3	4	3	3	3.55
CO - 2	4	3	5	5	3	3	4	5	3	3	3	3.73
CO - 3	3	5	3	3	3	4	3	3	5	4	3	3.55
CO - 4	3	3	3	3	3	5	3	3	3	5	3	3.36
CO - 5	4	3	3	3	5	3	4	3	3	3	5	3.55
Overall Mean Score												**3.55**

Result: The score for this course is **3.55** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: a) THERMODYNAMICS II:

Limitations of the first law - need for the second law - spontaneous and reversible processes - cyclic process - Carnot's cycle - statements of second law of thermodynamics - concept of entropy - entropy change accompanying change of phase - calculation of entropy change of an ideal gas - entropy changes of an ideal gas in different process - physical significance of entropy - work and free energy functions - Helmholtz free energy and Gibbs free energy - variation of Gibbs free energy with temperature and pressure - criteria for reversible and irreversible processes (in terms of free energy changes only) and limitations - derivation of Gibbs Helmholtz equation - partial molar properties: concept of chemical potential - definition - Gibbs Duhem equation - Clapeyron Clausius equation - derivation and its applications - definition of fugacity and activity

b) THERMODYNAMICS III:

Introduction - Nernst heat theorem - third law of thermodynamics - exception - determination of absolute entropies of solids, liquids and gases **(18 Hours)**

UNIT II: PHASE EQUILIBRIUM:

Introduction - terms - systems with various phases - derivation of Gibbs phase rule - phase diagrams - application of phase rule to one component system: water system, polymorphism and sulphur system - application of phase rule to two component systems: eutectic mixtures - Pb-Ag system and KI-H_2O system - uses of eutectic mixtures - freezing mixtures - formation of compounds with congruent melting points: $FeCl_3$-H_2O system, formation of compounds with incongruent melting points: Na_2SO_4-H_2O system - solid gas equilibria: $CuSO_4$-H_2O system - deliquescence and efflorescence **(18 Hours)**

UNIT III: COLLIGATIVE PROPERTIES OF DILUTE SOLUTIONS:

Definition and various types of colligative properties - Raoult's law for vapour pressure lowering - osmosis and osmotic pressure - derivation of van't Hoff equation for calculating osmotic pressure measurement - determination of molar mass from osmotic pressure measurement - reverse osmosis - boiling point elevation - derivation of molal elevation constant (K_b) - determination of molar mass from boiling point elevation - freezing point depression - derivation of molal depression constant (K_f) - determination of molar mass from freezing point depression - related simple problems **(18 Hours)**

UNIT IV: GROUP THEORY:

Molecular symmetry elements and symmetry operations - products of symmetry operations - properties of a group - classes and sub groups - group multiplication table for C_2v point group - classification of molecules into point groups - C_{2v}, C_{3v}, C_{2h}, D_{2h}, D_{3h}, D_{4h}, D_{6h}, T_d and O_h - matrix representation for symmetry operations - transformation matrices - reducible and irreducible representations -Great Orthogonality theorem - use of G.O.T for construction of character table for C_{2v} **(18 Hours)**

UNIT V: a) CATALYSIS:

Catalysis - auto catalysis - promoters - negative catalysis - general characteristics of catalytic reactions - types of catalysis - homogenous catalysis: acid base catalysis, enzyme catalysis - mechanism and kinetics of enzyme catalysed reaction - derivation of Michaelis-Menten equation - effect of temperature on enzyme catalysis - heterogeneous catalysis: examples for catalysis involving solid, liquid and gaseous reactants - industrial applications of catalysts

b) ADSORPTION:

Definition - difference between adsorption and absorption - comparison of physical and chemical adsorption - factors influencing adsorption - Freundlich adsorption isotherm - Langmuir adsorption isotherm - applications of adsorption

(18 Hours)

COURSE BOOK:

1. B.R. Puri, L.R. Sharma and Madan S. Pathania, Principles of Physical Chemistry,Vishal Publishing Co, New Delhi, 47th Edition, 2023-2024. **Unit I-V**
2. B.R. Puri, L.R. Sharma, Madan S. Pathania and Dr. B.S.Lark, Graduate Physical Chemistry, Vishal Publishing Co., Volume- II, 2015. **Unit II**
3. B.R. Puri, L.R. Sharma, Madan S. Pathania and Dr. B.S.Lark, Graduate Physical Chemistry, Vishal Publishing Co., Volume- I. **Unit V**
4. K.V. Raman, Group Theory and its applications to Chemistry, Tata McGraw-Hills, Reprint, 1990. **Unit IV**

BOOK FOR REFERENCE:

1. Arun Bahl, B.S. Bahl and G.D. Tuli, Essentials of Physical chemistry, S. Chand and Company Pvt. Ltd. Reprint 2014.

INORGANIC CHEMISTRY-I

Semester: V **Hours: 5**

Code : 23CH5MC09 **Credit: 4**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge on basic concepts of transition elements, inner transition elements, coordination and organometallic compounds	PSO-1	K1
CO - 2	Explain the terms in transition elements, inner transition elements, coordination and organometallic compounds	PSO-3	K2
CO - 3	Apply the generalisations involved in transition elements, inner transition elements, coordination and organometallic compounds	PSO-5	K3
CO - 4	Analyse the methodology of transition elements, inner transition elements, coordination and organometallic compounds	PSO-4	K4
CO - 5	Interpret and compare the various aspects in transition elements, inner transition elements, coordination and organometallic compounds	PSO-2	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V				INORGANIC CHEMISTRY-I							Hours: 5
Code : 23CH5MC09											Credit: 4
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	3	3	3	3	3	5	3	3	3	3	3.36
CO - 2	3	5	3	3	3	3	3	3	5	3	3	3.64
CO - 3	3	3	4	4	5	3	3	4	3	3	5	3.64
CO - 4	4	3	3	3	3	5	4	3	3	5	3	3.55
CO - 5	3	3	5	5	3	3	3	5	3	3	3	3.55
Overall Mean Score												3.55

Result: The score for this course is **3.55** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: TRANSITION ELEMENTS:

General Characteristics: Electronic configuration - elements of first transition series - metallic character - atomic volumes and densities - melting and boiling points - atomic radii - ionic radii - ionisation energy - different oxidation states: variable valency - standard electrode potentials - reducing property - formation of coloured compounds - magnetic properties - tendency to form complexes - catalytic properties - comparison of transition elements with non-transition elements **(15 Hours)**

UNIT II: INNER TRANSITION ELEMENTS:

a) Lanthanoids: Introduction - electronic configurations - oxidation states - ionic radii: consequences and causes of lanthanoid contractions - colour - magnetic properties - chemical reactivity - extraction of mixture of lanthanoids salts from monazite sand - separation of lanthanoids: ion exchange chromatography

b) Actinoids: Introduction - electronic configurations - properties - oxidation states - ionic radii - colours of ions - formation of complexes - comparison of inner transition and transition metals - oxides of thorium and uranium: preparation, properties and uses - differences between 4f and 5f orbitals **(15 Hours)**

UNIT III: COORDINATION CHEMISTRY I:

Double salts and coordination compounds - definitions and terminology: complex ion - central ion - coordination number - coordination sphere - charge on a complex - ligands - types of ligands - chelating ligands and chelates - Werner's coordination theory - Werner's theory and isomerism - nomenclature of coordination compounds - Effective Atomic Number (EAN) - factors affecting the stability of complex ion - stereochemistry of coordination compounds with different coordination numbers - isomerism - structural isomerism: ionization, hydrate, coordination and linkage isomerisms - stereo isomerism: geometrical and optical isomerism in complexes of coordination number 4 and 6 **(15 Hours)**

UNIT IV: COORDINATION CHEMISTRY II:

Valence Bond Theory (VBT) - octahedral: inner and outer orbital complexes, square planar and tetrahedral complexes - shortcomings of VB theory - Crystal Field Theory (CFT): crystal field splitting in octahedral, square planar, and tetrahedral complexes - magnetic properties of metal complexes and crystal field theory - factors influencing the magnitude of crystal field splitting - comparison between VBT and CFT **(15 Hours)**

UNIT V: ORGANO METALLIC CHEMISTRY:

Introduction - types - general methods of preparation - physical and chemical properties - structure and bonding in mononuclear carbonyls: $Cr(CO)_6$, $Fe(CO)_5$, $Ni(CO)_4$ - binuclear carbonyls: $Mn_2(CO)_{10}$, $Fe_2(CO)_9$ - effective atomic number rule - preparation and properties of some metallic carbonyls: $Cr(CO)_6$, $Fe_2(CO)_9$ and $Co_2(CO)_8$ - Ferrocene: methods of preparation, physical and chemical properties **(15 Hours)**

COURSE BOOKS:

1. B.R. Puri, L.R. Sharma and K.C. Kalia, Principles of Inorganic Chemistry, Vishal Publishing Co., 33rd Edition, 2022-2023. **Unit I-V**
2. Modern Inorganic Chemistry, R.D.Madan, S.Chand and Company Ltd., Revised Edition, 2019. **Unit V**

BOOKS FOR REFERENCE:

1. P. L. Soni and Mohan Katyal, Textbook of Inorganic Chemistry, Sultan Chand and Sons Educational Publishers, New Delhi, Reprint, 2014.
2. Satya Prakash, G.D. Tuli, S.K. Basu and R.D. Madan, Advanced Inorganic Chemistry, S. Chand & Company LTD. 17th Revised Edition,1998

PRACTICAL: PHYSICAL CHEMISTRY EXPERIMENTS

Semester: V **Hours: 5**

Code : 23CH5CP04 **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge on colligative property, phase diagram, adsorption, conductometric and potentiometric titrations	PSO - 1	K1
CO - 2	Illustate colligative property, phase diagram, adsorption, conductometric and potentiometric titrations	PSO - 2	K2
CO - 3	Calculate molecular weight of the solute, rate constant of first order reaction and normality of unknown solution using conductometric and potentiometric titrations	PSO - 3	K3
CO - 4	Analyse and interpret the graphical representations	PSO - 4	K4
CO - 5	Develop problem solving skills	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V				**PRACTICAL: PHYSICAL CHEMISTRY EXPERIMENTS**								**Hours: 5**
Code : 23CH5CP04												**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	3	3	3	4	5	3	4	4	3	3.73
CO - 2	4	4	5	5	4	3	4	5	4	3	4	4.09
CO - 3	3	5	4	4	3	3	3	4	5	3	3	3.64
CO - 4	4	3	4	4	4	5	4	4	3	5	4	4.00
CO - 5	3	3	4	4	5	3	3	4	3	3	5	3.64
Overall Mean Score												**3.82**

Result: The score for this course is **3.82** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

LIST OF PRACTICALS:

1. Determination of Molecular Weight by Rast's method
2. Phase diagram: Simple eutectic
3. Critical Solution Temperature (CST) of phenol water system and effect of impurity (NaCl) on CST
4. Surface Chemistry: Adsorption Characteristics of Acetic Acid on Charcoal
5. Kinetics: Determination of relative strength of acids by acid catalyzed hydrolysis of ester
6. Electrochemistry:
    i) Conductometric titration between a strong acid and a strong base
    ii) Potentiometric titration between ferrous sulphate and potassium dichromate

COURSE BOOK:

- Practical manual prepared by the PG and Research Center of Chemistry, Reprint, 2023

BOOK FOR REFERENCE:

I. Venkateswaran, R. Veeraswamy and A. R. Kulandaivelu, Basic Principles of Practical Chemistry, Sultan Chand and Sons, Reprint 2023.

ANALYTICAL CHEMISTRY

Semester: V **Hours: 4**

Code : 23CH5DE1A **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Gain the knowledge on various precipitation techniques, error analysis, thermo and electro analytical techniques, instrumental methods of analysis and chromatographic techniques	PSO - 1	K1
CO - 2	Understand the basic concepts of different analytical techniques	PSO-2	K2
CO - 3	Apply the analytical skills in methods such as error analysis, thermal and electrogravimetry and chromatography	PSO-3	K3
CO - 4	Analyse the outcome of analytical techniques and error analysis	PSO-4	K4
CO - 5	Develop problem solving skills	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V				**ANALYTICAL CHEMISTRY**							**Hours: 4**
Code : 23CH5DE1A											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	3	3	4	4	5	3	4	4	4	3.91
CO - 2	3	4	5	5	4	3	3	5	4	3	4	3.91
CO - 3	4	5	4	4	3	3	4	4	5	3	3	3.82
CO - 4	3	3	3	3	4	5	3	3	3	5	4	3.55
CO - 5	3	4	4	4	5	3	3	4	4	3	5	3.82
	Overall Mean Score											**3.80**

Result: The score for this course is **3.80** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: a) CONCEPTS OF ANALYTICAL CHEMISTRY:

Storage and handling of chemicals - handling of acids, ethers, toxic and poisonous chemicals, antidotes, threshold vapour concentration and first aid procedure - heating methods - stirring methods - filtration techniques - calibration of pipette - standard measuring flask and burette - weighing principle in chemical balance and single pan balance

b) PRINCIPLES OF GRAVIMETRIC ANALYSIS:

Introduction to gravimetric analysis - precipitation methods - conditions for precipitation - supersaturation and precipitate formation - the purity of the precipitate: co-precipitation - post precipitation - solubility product and precipitation - precipitation from homogeneous solution - washing of the precipitate - organic precipitants: dimethylglyoxime, cupferron, oxine and cupron **(12 Hours)**

UNIT II: ERROR AND STATISTICS:

Introduction - accuracy - precision - classification of errors - minimization of errors - significant figures - normal distribution - correction of determinate errors and indeterminate errors - calculation of mean - median and standard deviation - F-test, t- test and Q-test - confidence limit - method of least squares **(12 Hours)**

UNIT III: a) THERMO ANALYTICAL METHODS:

Thermogravimetric analysis (TGA): introduction - analysis of $CuSO_4.5H_2O$ - instrumentation of TGA - factors affecting thermogram - applications of thermo gravimetry - Differential Thermal Analysis (DTA): instrumentation - DTA of calcium oxalate monohydrate

b) ELECTRO ANALYTICAL METHODS:

Electrogravimetry - electrolytic separation of metals - polarography: principle and applications - amperometric titrations: principle and applications **(12 Hours)**

UNIT IV: INSTRUMENTAL METHODS OF ANALYSIS:

Principle, instrumentation and applications of fluorimetry - nephelometry - flame photometry - atomic absorption spectrophotometry - photocatalytic reactor and photoelectric colorimeter - photometric titration **(12 Hours)**

UNIT V: CHROMATOGRAPHY:

Introduction - classification - principle, instrumentation and applications of Thin Layer Chromatography (TLC) - paper chromatography - column chromatography - ion-exchange chromatography - High Performance Liquid Chromatography (HPLC) - Gas Chromatography (GC) - separation of organic mixture using TLC and column chromatography - identification of components of ink using paper chromatography **(12 Hours)**

COURSE BOOKS:

1. R. Gopalan, P.S. Subramanian, K. Rengarajan, Elements of Analytical Chemistry, Sultan Chand & Sons, 3rd Edition, 2010. **Unit I-V**
2. S.M. Khopkar, Basic Concepts of Analytical Chemistry, Wiley Eastern Ltd. 2008. **Unit IV**
3. A.I Vogel, A Text book of Qualitative Inorganic Analysis, ELBS 4th Edition, 2002. **Unit IV**
4. V.K. Srivastava, K.K. Srivastava, Introduction to Chromatography, S. Chand and Company Ltd., 3rd Edition,1985. **Unit V**

TEXTILE CHEMICAL PROCESSING

Semester: V **Hours: 4**

Code : 23CH5DE1B **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge about textile processing, dyeing process and printing process	PSO - 1	K1
CO - 2	Explain the methodology of textile processing dyeing and printing	PSO - 2	K2
CO - 3	Illustrate the various process in textile industry	PSO - 3	K3
CO - 4	Analyse the advantages and disadvantages of textile industry	PSO - 4	K4
CO - 5	Formulate the dyeing and printing process units to set a start-up programme	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V			**TEXTILE CHEMICAL PROCESSING**								**Hours: 4**
Code : 23CH5DE1B											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	3	3	3	4	5	3	4	4	3	3.73
CO - 2	3	4	5	5	4	3	3	5	4	3	4	3.91
CO - 3	3	5	4	4	3	3	3	4	5	3	3	3.64
CO - 4	4	4	3	3	4	5	4	3	4	5	4	3.91
CO - 5	3	3	3	3	5	3	3	3	3	3	5	3.36
	Overall Mean Score											**3.71**

Result: The score for this course is **3.71** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: PRE-TREATMENTS:

Textile chemistry - scope of textile chemistry - textile chemical processing for the fibres: natural impurities and added impurities - singeing - de-sizing - scouring - bleaching - mercerization **(12 Hours)**

UNIT II: TEXTILE DYES:

Colouring materials - important features and application of dyes: vat dyes, azoic dyes, direct dyes, sulfur dyes, reactive dyes, disperse dyes, basic dyes, acid dyes and metallic dyes **(12 Hours)**

UNIT III: DYEING PROCESS:

Selection of dyes - dyeing objectives - dyeing methods - batch dyeing processes - continuous dyeing process - semi continuous dyeing process - dyeing: stock, yarn, skein, package, beam, piece, winch, space and garment - styles of dyeing **(12 Hours)**

UNIT IV: TEXTILE PRINTING:

Stencil printing - block printing - hand screen printing - automatic flatbed screen printing - rotary screen printing - heat transfer printing- styles of prints - direct prints - discharge prints - resist prints - pigment prints - blotch prints - flock printing **(12 Hours)**

UNIT V: TEXTILE FINISHES:

Classification of finishes - according to textile chemists - according to degree of performance - general finishes - napping - brushing: emerizing, sueding, sanding, peach finishes - functional finishes - stain repellent finishes - water proof finishes - antimicrobial finishes - moth control finishes - micro encapsulated finishes **(12 Hours)**

BOOK FOR REFERENCE:

1. Vishu Arora, Textile Chemistry, Abhishek Publications, Chandigarh, India, 1st Edition, 2010. **Unit I-V**
2. **https://www.cbse.gov.in/publications/vocational/Textile%20Design/CBSE%20CIT%20Textile%20Chemical%20Processing-XII%20text.pdf Unit I-V**

DAIRY CHEMISTRY

Semester:V **Hours: 4**

Code : 23CH5DE1C **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the composition of milk, milk products and milk adulteration	PSO - 1	K1
CO - 2	Explain the milk processing techniques, milk adulteration and analysis of milk product	PSO - 3	K2
CO - 3	Apply the methods of milk analysis, adulterated milk analysis	PSO - 4	K3
CO - 4	Illustrate the process of milk, analysis of milk adultrantion, milk and milk products	PSO - 2	K4
CO - 5	Evaluate the significant test for milk adulteration, milk and milk products	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V				**DAIRY CHEMISTRY**							**Hours: 4**
Code : 23CH5DE1C											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	3	3	3	3	5	3	4	3	3	3.55
CO - 2	3	5	3	3	4	3	3	3	5	3	4	3.55
CO - 3	4	4	3	3	3	5	4	3	4	5	3	3.73
CO - 4	3	3	5	5	3	4	3	5	3	4	3	3.73
CO - 5	4	4	3	3	5	3	4	3	4	3	5	3.73
	Overall Mean Score											**3.66**

Result: The score for this course is **3.66** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: COMPOSITION OF MILK:

Definition - composition - minor components of milk - salts and ash - trace elements - radioactive trace elements and gases - other components of milk: flavoring substances - phospholipids - sterols - carbohydrates other than lactose - vitamins and pigments - milk grades - constituents of milk - lipids - proteins - carbohydrates - vitamins and minerals - types of milk and milk products

(12 Hours)

UNIT II: PROCESSING OF MILK:

Microbiology of milk - destruction of micro-organisms - physical - chemical changes - types of pasteurization: bottle - batch - high temperature short time - ultra high temperature pasteurization **(12 Hours)**

UNIT III: MILK ADULTERATION:

Special tests - cane sugar - gelatin and calcium sucrate - preservatives - pasteurized milk - composition of milk - standard milk - detection of skimmed milk cream - forms of adulteration - methods of analysis - homogenized cream- reconstituted cream - condensed milk **(12 Hours)**

UNIT IV: MILK PRODUCTS:

Introduction - market milk - fermented milks - market cream - butter - butter oils - spreads - concentrated milk products - dried milk products - cheese - frozen desserts - casein - lactose - whey - specialty products **(12 Hours)**

UNIT V: ANALYSIS OF MILK AND MILK PRODUCTS:

Physical properties of milk: colour - odour - acidity - specific gravity - viscosity and conductivity - determination: total solids, total acidity and lactose

(12 Hours)

COURSE BOOKS:

1. B. Sivasankar, Food Processing and Preservation, Prentice-Hallmof India Pvt.Ltd., 3rd Edition, 2005. **Unit I**
2. A.G. Woodman, Food Analysis, Axis Books (India), 1st Edition, 2010. **Unit I-III**
3. Webb Johnson and Alford, Fundamentals of Dairy Chemistry, CBS Publishers & Distributors, 2nd Edition, 1987. **Unit I-IV**
4. Kavitha Marwaha, Food Process Engineering, Gene-Tech Books, 2010. **Unit II**
5. Alex V. Ramani, Food chemistry, MJP Publishers, 2021. **Unit V**

SPECTROSCOPY AND ITS APPLICATIONS TO CHEMISTRY

Semester: V **Hours: 4**
Code : 23CH5DE2A **Credit: 3**
COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge on the basic concepts of microwave, FT-IR, Raman, UV-Visible and NMR spectroscopy	PSO-1	K1
CO - 2	Explain the theory of rotational, vibrational, Raman, electronic and nuclear magnetic spectroscopy and its techniques	PSO-2	K2
CO - 3	Apply and illustrate the concept of microwave, FT-IR, Raman, UV-Visible and NMR spectroscopic techniques in various field	PSO-3	K3
CO - 4	Deduce the energy level diagram, rotation - vibration spectra, electronic transition of diatomic molecules and NMR spectrum of ethanol	PSO-4	K4
CO - 5	Formulate the spectral data of unknown compounds using microwave, FT-IR, Raman, UV-Visible and NMR spectra in structural elucidation	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V				SPECTROSCOPY AND ITS APPLICATIONS TO CHEMISTRY							Hours: 4
Code : 23CH5DE2A											Credit: 3
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	3	4	4	3	3	5	4	3	3	3	3.63
CO - 2	3	3	5	5	3	3	3	5	3	3	3	3.54
CO - 3	3	5	4	4	3	3	3	4	5	3	3	3.63
CO - 4	3	3	4	4	3	5	3	4	3	5	3	3.63
CO - 5	4	4	3	3	5	3	4	3	4	3	5	3.72
Overall Mean Score												3.63

Result: The score for this course is **3.63** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs = Total of Mean Scores / Total No. of COs

UNIT I: MICROWAVE SPECTROSCOPY :

Introduction to spectroscopy - regions of spectrum - absorption and emission spectrum - electromagnetic radiation spectrum - basic features of spectrometers - width and intensity of spectral lines - collision broadening and Doppler broadening - molecular spectra: Born - Oppenhemier approximation - microwave (rotational) spectra: derivation of energy of diatomic molecules - energy level diagram - relative intensities of rotational spectral lines - applications - uses of microwave oven **(12 Hours)**

UNIT II: VIBRATIONAL (INFRARED) SPECTROSCOPY:

Introduction - vibrational spectra of diatomic molecules - force constant - zero point energy - anharmonicity - rotation vibration spectra of diatomic molecules - vibrational frequencies of different functional groups: finger print region - applications of FT-IR spectroscopy: distinction between two types of hydrogen bonding - study of keto-enol tautomerism and conformational analysis **(12 Hours)**

UNIT III: RAMAN SPECTROSCOPY:

Introduction - quantum theory of Raman scattering - classical theory of Raman scattering - rotation - vibration Raman spectrum - mutual exclusion principle - experimental Raman spectroscopy - comparison between IR and Raman spectroscopy **(12 Hours)**

UNIT IV: UV- VISIBLE SPECTROSCOPY:

Electronic transitions in a diatomic molecule - Frank-Condon principle - electronic energy levels and transitions - shifts in the absorption maxima - effect of conjugation - Woodward Fieser rules - calculation of absorption maximum (λ_{max}) in dienes and α, β unsaturated carbonyl compounds - applications of UV-visible spectroscopy **(12 Hours)**

UNIT V: NMR SPECTROSCOPY:

Introduction - nuclear spin and mass number - nuclear magnetic moment - splitting of nuclear energy levels - NMR frequency - Larmor precession of a nucleus in a magnetic field - experimental technique of NMR spectroscopy - shielding and deshielding of protons - chemical shift - factors affecting chemical shift: inductive effect, van der Waals deshielding, anisotropic effects, hydrogen bonding - NMR spectrum of ethanol - spin - spin splitting - coupling constant - applications of NMR spectroscopy **(12 Hours)**

COURSE BOOKS:

1. B.R. Puri, L.R. Sharma and Madan S. Pathania, Principles of Physical Chemistry,. Vishal Publishing Co, New Delhi, 47th Edition, 2023-2024. **Unit I-V**
2. Y. R. Sharma, Elementary Organic Spectroscopy, Sultan Chand and Sons Reprint, 1st Edition, 2011. **Unit I-V**

BOOKS FOR REFERENCE:

1. C. N. Banwell and E. M. Mccash, Fundamentals of Molecular Spectroscopy, Tata McGraw-Hill Pvt. Ltd, 4th Edition.
2. M. K. Jain, S. C. Sharma, Modern Organic Chemistry, Vishal Publishing Co., 4th Edition, 2014.

NANO CHEMISTRY

Semester: V **Hours: 4**

Code : 23CH5DE2B **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge on fundamentals of nanomaterials and their applications	PSO-1	K1
CO - 2	Describe the methods of preparation of nanoparticles and their applications in different sectors	PSO-2	K2
CO - 3	Illustrate the nanotechnology in communication, pollution abatement and defence sector	PSO-3	K3
CO - 4	Analyse the applicability of nanomaterials and provide perspectives on future nanochemistry developments	PSO-4	K4
CO - 5	Evaluate nanotechnology, research in various sectors	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V							**NANO CHEMISTRY**					**Hours: 4**
Code : 23CH5DE2B												**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	4	4	3	3	5	4	3	3	3	3.63
CO - 2	3	3	5	5	3	4	3	5	3	4	3	3.72
CO - 3	3	5	3	3	4	4	3	3	5	4	4	3.72
CO - 4	4	3	3	3	3	5	4	3	3	5	3	3.54
CO - 5	3	3	4	4	5	3	3	4	3	3	5	3.63
Overall Mean Score												**3.65**

Result: The score for this course is **3.65** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: PREPARATION OF NANOMATERIALS:

Definition of nanomaterials and nanotechnology - size dependent properties of nanomaterials - alternate approaches for the preparation of nanomaterials - synthetic strategies - gas phase evaporation method - matrix isolation technique - sol-gel processing **(12 Hours)**

UNIT II: PROPERTIES OF NANOMATERIALS:

Formation of dangling bonds - atom like behaviour of nanoparticles - physicochemical properties - optical properties - electrical and electronic properties **(12 Hours)**

UNIT III: NANOMATERIALS IN COMMUNICATION SECTOR:

Nanotechnology in electronic communication and informatics - semiconductor lasers- light emitting diode materials - wireless communication - lithography **(12 Hours)**

UNIT IV: NANOMATERIALS IN POLLUTION ABATEMENT:

Pollution abatement - sensors - green nanotechnology - environmental monitoring and purification through smart particles - nanoscale-biopolymers - nanomaterials as catalysts in green manufacturing **(12 Hours)**

UNIT V: NANOMATERIALS IN DEFENSE SECTOR:

Chemical and biological warfare agents - nanomaterials based detection methods - protection and decontamination through nanomaterials **(12 Hours)**

COURSE BOOK:

1. B. Viswanathan, Nano materials, Narosa Publishing House, New Delhi, 1st Edition, 2009. **Unit I-V**

BOOKS FOR REFERENCE:

1. S. Shanmugam, Nanotechnology, MJP Publishers, 2016.
2. M. A. Shah and Tokeer Ahmad, Principles of Nanoscience and Nanotechnology, Narosa Publishing House, 2nd Reprint, 2013.

BIO AND PHARMACEUTICAL CHEMISTRY

Semester: V **Hours: 4**

Code : 23CH5DE2C **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO-1	Acquire knowledge about bio molecules and chemotherapy	PSO-1	K1
CO-2	Explain the functions of bio molecules, therapeutic drugs and pharmaceutical aids	PSO-2	K2
CO-3	Apply the concept in synthetic drugs andapplications	PSO-3	K3
CO-4	Analyse the structure of various therapeutic drugs	PSO-4	K4
CO-5	Evaluate the characteristics of synthetic and chemotherapeutic drugs	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V							**BIO AND PHARMACEUTICAL CHEMISTRY**					**Hours: 4**
Code : 23CH5DE2C												**Credit: 3**
Course Outcoms	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	3	3	4	3	5	3	3	3	4	3.54
CO - 2	4	3	5	5	3	3	4	5	3	3	3	3.72
CO - 3	3	5	4	4	3	3	3	4	5	3	3	3.63
CO - 4	4	3	3	3	3	5	4	3	3	5	3	3.55
CO - 5	3	3	4	4	5	3	3	4	3	3	5	3.63
Overall Mean Score												**3.61**

Result: The score for this course is **3.61** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs = Total of Mean Scores / Total No. of COs

UNIT I: a) PROTEINS:

Definition - structure and colour reactions of proteins - biological functions of proteins (elementary study)

b) HORMONES:

Definition - classification - sources - functions - testosterone, progesterone - thyroxin (structure only)

c) VITAMINS:

Vitamins - definition - occurrence - classification - deficiency diseases and human requirements of vitamins A, B_6, B_{12}, C, D, E and K **(12 Hours)**

UNIT II: SYNTHETIC DRUGS:

Introduction - characteristic of drugs - nature and sources of drugs - some important terminology: pharmacy - pharmacology - medicinal chemistry - pharmacodynamics - pharmacokinetics - molecular pharmacology - pharmacophore, antimetabolites - actinomycetes - bacteria - virus - fungi - mutation - pharmacopeia - chemotherapy **(12 Hours)**

UNIT III: ORGANIC PHARMACEUTICAL AIDS:

Preservatives - antioxidant - emulsifying agents - classification - colouring agents - flavouring agents - sweetening agents: structure, properties and uses of sucrose, sorbital and saccharin - ointment bases and related agents: hydrocarbon bases, water soluble bases - solvents - miscellaneous substance: structure, properties and uses of lactose, starch and steric acid **(12 Hours)**

UNIT IV: CHEMOTHERAPY I:

Definition - characteristics of drugs - physical and chemical properties of drugs - mode of action - sulpha drugs: preparation and uses of sulphadiazine and prontosil - antimalarials: preparation and uses of quinine, chloroquine and pamaquine - antibiotics: definition - classification - structure and uses: penicillin, tetracyclines, chlorotetracyclines and oxytetracyclines **(12 Hours)**

UNIT V: CHEMOTHERAPY II:

Antipyretics and analgesic drugs: structure, action and uses: aspirin - morphine - paracetamol - salicin - heroin - anesthetics: general and local volatile anesthetics - advantages and disadvantages - intravenous and non-volatile anesthetics: properties and examples - antiseptics and disinfectants: difference between antiseptics and disinfectants with examples **(12 Hours)**

COURSE BOOKS:

1. Jeyashree Ghosh, Text book of Pharmaceutical Chemistry, Publishers Sulthan Chand and Company Ltd., 1st Edition, 1997. **Unit II, IV-V**
2. P.L. Soni and H.M Chawla, Organic Chemistry, Sultan Chand and Sons, 29th Edition, 2022. **Unit I-III**
3. K S Tewari and N K Vishnoi, A Text Book of Organic Chemistry, Vikas Publishing House Pvt. Ltd., 3rd Edition, 2011. **Unit I**

INTERNSHIP/INDUSTRIAL TRAINING

Semester: V

Code : 23CH5IN01/23CH5IT01 **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Gain knowledge about industrial management	PSO-1	K1
CO - 2	Describe the different analytical skills used in industry	PSO-2	K2
CO - 3	Illustrate the practical and other procedures adopted during internship or industrial training	PSO-3	K3
CO - 4	Analyse the results of the industrial experiences	PSO-4	K4
CO - 5	Compile the internship work and exhibit the findings through PPT presentation	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V												
Code : 23CH5IN01/ 23CH5IT01						**INTERNSHIP/INDUSTRIAL TRAINING**						**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	3	3	3	3	5	3	4	3	3	3.55
CO - 2	3	4	5	5	4	3	3	5	4	3	4	3.91
CO - 3	4	5	3	3	5	3	4	3	5	3	5	3.91
CO - 4	3	3	4	4	3	5	3	4	3	5	3	3.64
CO - 5	3	4	4	4	5	3	3	4	4	3	5	3.82
Overall Mean Score												**3.77**

Result: The score for this course is **3.77** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs = Total of Mean Scores / Total No. of COs

JACEP - EXTENSION

Semester: V-VI **Hours: 60**

Code : 23SLPEX01 **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Impart knowledge on education.	PSO-2, PSO-3	K1
CO - 2	Get awareness of environmental issues and solve the issues.	PSO-1, PSO-5	K2
CO - 3	Develop a concern for the voiceless and faceless and rectify it.	PSO- 1, PSO-2, PSO-5	K3
CO - 4	Analyse the reasons for health problems and impart knowledge on a balanced diet.	PSO-1, PSO- 3	K4
CO - 5	Apply different fields of knowledge to the society.	PSO-3, PSO- 4, PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: V -VI	JACEP - EXTENSION											Hours: 60
Code : 23SLPEX01												Credit: 1
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	3	3	4	4	3	3	3	5	3	3	5	3.54
CO - 2	3	4	3	2	4	3	4	5	4	5	2	3.55
CO - 3	3	4	5	3	3	4	3	3	5	3	5	3.72
CO - 4	2	2	3	3	2	3	3	5	5	5	3	3.27
CO - 5	3	3	3	3	3	3	4	4	4	3	3	3.27
Overall Mean Score												3.47

Result: The Score for this Course is **3.47** (High Relationship)

Note:

Mapping	1 - 20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: LITERACY GROUP:

Giving orientation for the students about JACEP - importance of education awareness of dropouts and counselling the parents to re-admit the school dropouts- organizing activities based on the disciplines - arranging competitions for school children - educating the school children about the positives and negatives of social media- Higher studies after +2.

UNIT II: HEALTH AND HYGIENE GROUP:

Doing a survey on health problems - organizing medical camps and talks - organizing basic medical check-ups, conducting health and hygiene talk by B. Voc students of JAC to the adopted villages- Balance diet, orientation about home nurse- rapport with Government and NGO's

UNIT III: LIAISON GROUP & PEOPLE ORGANIZATION GROUP:

Motivating workers to access government savings schemes with unorganised sectors- celebrating important days - Services offered in E- Sevai centres- organizing income generation skill training for self-help groups. organizing population education programmes - conducting awareness programmes on emerging social issues - rapport with non-governmental organizations and local bodies to ensure the development of the villages - organizing youth, farmers and self-help group to function democratically-

UNIT IV: ENVIRONMENTAL GROUP:

Tree and sapling plantation - promotion of Herbal Gardens - observing environmental-related days -awareness campaign to educate the villagers to protect the environment.

UNIT V: APPLICATION OF KNOWLEDGE:

Conducting Special Skill Training for self-employment based on discipline to the target group with the help of NGO's and government organizations - awareness on social media.

BOOKS FOR REFERENCE:

1. Higher studies after +2
2. Services offered in E- Sevai services
3. பிறப்பு முதல் இறப்பு வரை அரசு ஆவணங்கள்/ சேவைகள் வழிகாட்டு கையேடு
4. அரசு நலத்திட்ட உதவிகள் தகவல் கையேடு
5. வருவாய் மற்றும் பேரிடர் மேலாண்மை துறை மூலம் பொது மக்களுக்கு இ சேவை வழியாக இணையதள மின் சேவை

SCHEME OF EVALUATION

	Continuous Internal Assessment	
1.	Attendance (60 hours)	10 Marks
2.	Field Visit & Report	50 marks
3.	Assignment	40 Marks
	Total	**100 marks**

ORGANIC CHEMISTRY-II

Semester: VI **Hours: 5**

Code : 23CH6MC10 **Credit: 4**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge on molecular rearrangements, , aliphatic and aromatic nitrogen compounds, dyes, organometallic compounds, terpenoids and green chemistry	PSO-1	K1
CO - 2	Describe the molecular rearrangements, reactions in aliphatic and aromatic nitrogen compounds, dyes, organometallic compounds, terpenoids and green chemistry	PSO-4	K2
CO - 3	Illustrate the mechanism of rearrangement reactions structure and conversions of carbohydrates, theories of dyes, reactions of aliphatic and aromatic nitrogen compounds, terpenoids, organometallic compounds and the principles of green chemistry	PSO-2	K3
CO - 4	Analyse the concepts of molecular rearrangements, carbohydrates, dyes, aliphatic nitrogen compounds aromatic nitro compounds, aromatic amino compounds, terpenoids, organometallic compounds and the importance of green chemistry	PSO-3	K4
CO - 5	Formulate various molecular rearrangements, reactions of carbohydrates, dyes, aliphatic nitrogen compounds, aromatic nitro compounds, aromatic amino compounds organometallic compounds, constitution of terpenoids and the applications of green Chemistry	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**ORGANIC CHEMISTRY-II**							**Hours: 5**
Code : 23CH6MC10											**Credit: 4**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	3	3	4	3	5	3	4	3	4	3.73
CO - 2	4	4	3	3	4	5	4	3	4	5	4	3.91
CO - 3	3	3	5	5	3	3	3	5	3	3	3	3.55
CO - 4	3	5	4	4	3	3	3	4	5	3	3	3.64
CO - 5	4	4	3	3	5	3	4	3	4	3	5	3.73
Overall Mean Score												**3.71**

Result: The score for this course is **3.71** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: MOLECULAR REARRANGENMENTS:

Definition - types: cationotropic, anionotropic, free radical migration - inter and intra molecular rearrangement - definition, example and detailed mechanism of the following: Beckmann, benzidine, benzil - benzilic acid, Claisen, Fries, Hofmann, pinacol-pinacolone rearrangements **(15 Hours)**

UNIT II: a) ALIPHATIC NITROGEN COMPOUNDS:

Diamide: preparation, properties, uses, structure and estimation of urea (biochemical method only)

b) AROMATIC NITRO COMPOUNDS:

Preparation - reduction of nitro benzene, electrophilic substitution reactions, nucleophilic substitution reactions - preparation and properties of picric acid and trinitrotoluene (TNT)

c) AROMATIC AMINO COMPOUNDS:

Preparation and uses of aniline, diphenylamine, N,N-dimethylaniline, diamines, Michler's ketone and acetanilide - effects of substituents on basic characteristics - distinction among primary, secondary and tertiary aliphatic and aromatic amines **(15 Hours)**

UNIT III: a) ORGANOMETALLIC COMPOUNDS:

Grignard reagents - preparation - structure - chemical reactions and synthetic applications - nucleophilic addition reactions followed by hydrolysis - nucleophilic substitution reactions - preparation, properties and applications of organolithium compounds and organozinc compounds

b) DYES, COLOUR AND CHEMICAL CONSTITUTION:

Introduction - colour and chemical constitution - theories of colour and chemical constitution - requirements of a compound to act as a dye - chemical nature - classification - nomenclature - preparation and uses of nitro and nitroso dyes: picric acid - azo dyes: methyl orange and Congo red - phthalein dyes: phenolphthalein - xanthen dyes: fluorescein - triphenyl methane dyes: Malachite green - anthraquinone dyes: alizarin - indigoid dyes: indigo **(15 Hours)**

UNIT IV: CARBOHYDRATES:

Definition - classification - reducing and non-reducing sugars - configuration of aldotriose and aldopentose - monosaccharides: manufacture of glucose from starch - constitution and chemical properties of glucose and fructose - Kiliani-Fischer synthesis (ascending the series of aldoses) - Wohl degradation (descending the series of aldoses) - epimerisation of an aldohexose - interconversion of glucose and fructose - disaccharides: structure of sucrose: Fischer and Haworth structures - inversion of sucrose - uses - polysaccharides: structure of starch - industrial uses of cellulose - test for carbohydrates **(15 Hours)**

UNIT V: a) TERPENOIDS:

Introduction - isoprene rule - classification - isolation of terpenoids - monoterpenoids - constitution of myrcene - citral - geraniol - cyclic terpenoids: preparation, properties and uses of menthol - bicyclic monoterpenoids: preparation, properties and uses of α-pinene and camphor - polyterpenes: structure of natural rubber

b) GREEN CHEMISTRY:

Principles, chemistry behind each principle and applications in chemical synthesis - green reaction media - green solvents, green reagents and catalysts - tools used: microwave and ultra-sound in chemical synthesis **(15 Hours)**

COURSE BOOKS:

1. M.K. Jain and S.C. Sharma, Modern Organic Chemistry, Vishal Publishing Co., 4th Edition, 2023. **Unit I-V**
2. P.L. Soni and H.M Chawla, Organic Chemistry, Sultan Chand and Sons, 29th Edition, 2022. **Unit I-V**
3. V. K. Ahluwalia and M. Kidwai, New Trends in Green Chemistry, Anamaya Publishers, New Delhi, 1st reprint of 2nd Edition, 2009**. Unit V**

BOOKS FOR REFERENCE:

1. K.S. Tewari, N.K. Vishnoi, A course books of Organic Chemistry, Vikas Publishing House Pvt. Ltd., 3rd Edition, 2006.
2. M.K. Jain, S. C. Sharma and Jyotsna Chaturvedi, Graduate Organic Chemistry, Volume II, Vishal Publishing Co., 3rd Edition, 2019.
3. M.K. Jain, S.C.Sharma and Jyotsna Chaturvedi, Graduate Organic Chemistry, Volume III, Vishal Publishing Co., 3rd Edition, 2019.

PHYSICAL CHEMISTRY-II

Semester: VI **Hours: 5**

Code : 23CH6MC11 **Credit: 4**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge on basic concepts of chemical equilibria, solutions, electrical conductance, EMF and photochemistry	PSO-1	K1
CO - 2	Explain the features involved in chemical equilibria, solutions of non electrolytes, electrical conductance, EMF of galvanic cells and photochemistry	PSO-2	K2
CO - 3	Develop and apply the principles and laws involved in chemical equilibria, solutions of non electrolytes, electrical conductance and trnasference, EMF of galvanic cells and photochemistry	PSO-3	K3
CO - 4	Analyse and illustrate the concepts in chemical equilibria, solutions of non electrolytes, electrical conductance, EMF of galvanic cells and photochemistry	PSO-4	K4
CO - 5	Interpret and compare the various aspects in chemical equilibria, solutions of non electrolytes, electrical conductance, EMF of galvanic cells and photochemistry	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI							**PHYSICAL CHEMISTRY-II**					**Hours: 5**
Code : 23CH6MC11												**Credit: 4**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	4	4	3	3	5	4	3	3	3	3.64
CO - 2	4	3	5	5	3	3	4	5	3	3	3	3.73
CO - 3	3	5	4	4	3	3	3	4	5	3	3	3.64
CO - 4	3	4	3	3	4	5	3	3	4	5	4	3.73
CO - 5	3	3	3	3	5	4	3	3	3	4	5	3.55
Overall Mean Score												**3.66**

Result: The score for this course is **3.66** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: CHEMICAL EQUILIBRIUM:

Free energy of a spontaneous reaction - role of temperature - standard free energy change - Law of mass action - thermodynamic treatment - van't Hoff reaction isotherm - distinction between ΔG and ΔG° - relation between Kp and Kc - homogenous equilibria - dissociation of PCl_5 - temperature dependence of the equilibrium constant - van't Hoff equation and its integrated form - homogeneous equilibria - factors affecting state of equilibrium - Le-Chatelier principle applied to Haber's process and physical equilibria **(15 Hours)**

UNIT II: SOLUTIONS OF NON ELECTROLYTES :

Solution of liquids in liquids - Raoult's law - chemical potentials of ideal and non-ideal solutions - Gibbs - Duhem - Margules equation - fractional distillation of binary liquid systems - azeotropic mixture - steam distillation of immiscible liquids - solubility of partially miscible liquids - phenol water system - effect of impurities on critical solution temperature - solutions of gases in liquids - factors influencing solubility of a gas - Henry's law - applications of Henry's law

(15 Hours)

UNIT III: ELECTROLYTIC CONDUCTANCE AND TRANSFERRENCE:

Electrolytic conductance - specific, equivalent and molar conductance - cell constant - variation of molar conductance with dilution - transport number and its determination (moving boundary method) - ionic mobility - Kohlrausch's law and its applications - temperature dependence of ionic conductance - applications of measurement of conductance : determination of degree of dissociation of weak electrolyte, ionic product of water and conductometric titrations - Ostwald's dilution law - Debye - Huckel theory of strong electrolytes (no derivation)

(15 Hours)

UNIT IV: ELECTROMOTIVE FORCE OF GALVANIC CELLS:

Galvanic cells - electrolytic and electrochemical cells - some common type of reversible electrodes: metal - metal ion electrodes, hydrogen electrode, calomel electrode and oxidation reduction electrode - single electrode potential - Nernst equation - conventional standard electrode potential - cell reactions - cell potentials - activity and mean ionic activity of an electrolyte - concentration cells: classification - derivation of emf of concentration cells with transference - liquid junction potential - commercial cells - lead storage cell - applications of emf measurements: determination of pH using glass and quinhydrone electrode and potentiometric titrations - oxidation - reduction indicators **(15 Hours)**

UNIT V: PHOTOCHEMISTRY:

Introduction - photophysical and photochemical processes - importance of photochemistry - difference between thermochemical and photochemical reactions - photophysical processes - Jablonski diagram - fluorescence - phosphorescence - light absorption by solutions: Beer- Lambert law - laws of photochemistry: Grotthus-Draper law - Stark-Einstein law - quantum efficiency - kinetics of photochemical reactions: decomposition of HI - energy transfer in photochemical reactions: photosensitization - photosynthesis in plants - chemiluminesence - Lasers: definition and applications in chemistry

(15 Hours)

COURSE BOOKS:

1. B.R. Puri, L.R. Sharma and Madan S. Pathania, Principles of Physical Chemistry, Vishal Publishing Co., 47th Edition, 2023-2024, New Delhi. **Unit I-V**

BOOK FOR REFERENCE:

1. Arun Bahl, B.S. Bahl and G.D. Tuli, Essentials of Physical chemistry, S. Chand and Company Pvt. Ltd. Reprint 2014.

INORGANIC CHEMISTRY-II

Semester: VI **Hours: 5**

Code : 23CH6MC12 **Credit: 4**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge on basic concepts of bioinorganic chemistry, inorganic polymers, silicates and applications of inorganic compounds	PSO-1	K1
CO - 2	Explain the terms in bioinorganic, inorganic polymers, silicates and important of inorganic compounds	PSO-3	K2
CO - 3	Illustrate the significance of biomolecules, inorganic polymers, silicates and industrially important compounds	PSO-4	K3
CO - 4	Analyse the role of biomolecules, inorganic polymers, silicates and important compounds	PSO-5	K4
CO - 5	Interpret and compare the various aspects in inorganic polymers, silicates and bioinorganic compounds	PSO-2	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**INORGANIC CHEMISTRY-II**							**Hours: 5**
Code : 23CH6MC12											**Credit: 4**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	3	3	3	3	5	3	4	3	3	3.55
CO - 2	3	5	3	3	3	3	3	3	5	3	3	3.36
CO - 3	3	4	3	3	3	5	3	3	4	5	3	3.55
CO - 4	4	3	3	3	5	3	4	3	3	3	5	3.55
CO - 5	3	3	5	5	3	4	3	5	3	4	3	3.73
Overall Mean Score												**3.55**

Result: The score for this course is **3.55** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: BIOINORGANIC CHEMISTRY I:

Introduction - role of Na, K (sodium pump), Mg, Ca (calcium pump), V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Mo, Pt, Hg and Pb metal ions in biological system - metalloenzymes: Zn enzymes - carboxy peptidase A and carbonic anhydrase - vitamin B_{12} - photosynthesis - chlorophyll - nitrogen fixation - metal toxification, detoxification and chelate therapy - cis-platin **(15 Hours)**

UNIT II: BIOINORGANIC CHEMISTRY II:

Energy sources for life - metalloporphyrins and respiration: cytochrome P450 - dioxygen binding, transport and utilization: structure and biological functions: haemoglobin and myoglobin, other biological dioxygen carriers: haemocyanin, haemerythrin - electron carriers: Fe-S proteins (rubredoxin and ferredoxin) - blue copper proteins - iron storage and transport: ferritin and transferrin **(15 Hours)**

UNIT III: INORGANIC POLYMERS:

Introduction - general properties - glass transition temperature - phosphorous based chain polymers: polyphosphazine, polyphosphonitrilic chlorides - sulphur based polymers: polymericsulphur, polymeric sulphur nitride - boron based polymers: polymeric boron nitride - silicon based polymers: silicone rubber - coordination polymers: natural and synthetic polymers - polymers with bis chelating agents **(15 Hours)**

UNIT IV: SILICATES:

Introduction - general properties - types - orthosilicates - pyrosilicates - chain silicates - cyclic silicates - sheet silicates - three-dimensional silicates - structure of aluminosilicates - micas - clay - fuller's earth - talc - feldspars - zeolites - silicones - properties - uses of silicones - silicon carbide: structure - preparation - properties - uses - lead pigments - white lead - manufacturing processes - sublimed white lead - red lead **(15 Hours)**

UNIT V: INDUSTRIAL APPLICATIONS OF INORGANIC COMPOUNDS:

Preparation and uses: titanium dioxide, titanium(IV)chloride, vanadium pentoxide, potassium dichromate, potassium permanganate, potassium ferrocyanide, potassium ferricyanide, sodium nitroprusside, green vitriol, blue vitriol, verdigris and white vitriol **(15 Hours)**

COURSE BOOKS:

1. B.R. Puri, L.R. Sharma and K.C. Kalia, Principles of Inorganic Chemistry, Vishal Publishing Co, 33rd Edition, 2022-2023. **Unit I-V**
2. R.D. Madan, Modern Inorganic Chemistry, S. Chand and Company Ltd., Revised Edition, 2019. **Unit IV**

BOOKS FOR REFERENCE:

1. P. L. Soni and Mohan Katyal, Textbook of Inorganic Chemistry, Sultan Chand and Sons Educational Publishers, New Delhi, Reprint, 2014.
2. James E. Huheey, Ellen A. Keiter, Richard L. Reiter and Okhil K. Medhi, Inorganic Chemistry Principles of structure and reactivity, Dorling Kindersley India Pvt. Ltd, 5th Edition, 2023.

PRACTICAL: INORGANIC PREPARATION AND GRAVIMETRIC ESTIMATION

Semester: VI **Hours: 5**

Code : 23CH6CP05 **Credit: 3**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENT WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire the knowledge on gravimetric estimation and preparation of inorganic complexes	PSO - 1	K1
CO - 2	Understand the precipitation procedures and the chemistry of complex preparation	PSO - 2	K2
CO - 3	Apply the practical skills for filtration, synthesis and purification	PSO - 4	K3
CO - 4	Illustrate the estimation of metal ions as their compounds using sintered and silica crucibles	PSO - 3	K4
CO - 5	Interpret the results of estimation and the yield of the complexes	PSO - 5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**PRACTICAL: INORGANIC PREPARATION AND GRAVIMETRIC ESTIMATION**							**Hours: 5**
Code : 23CH6CP05											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	3	3	3	4	5	3	4	4	3	3.72
CO - 2	4	3	5	5	3	3	4	5	3	3	3	3.72
CO - 3	3	4	3	3	4	5	3	3	4	5	4	3.72
CO - 4	4	5	3	3	3	4	4	3	5	4	3	3.72
CO - 5	3	3	4	4	5	4	3	4	3	4	5	3.81
Overall Mean Score												**3.74**

Result: The score for this course is **3.74** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

I. PREPARATION OF COMPLEXES

1) Preparation of ferrohexacyanoferrate (III) complex
2) Preparation of tetrammine copper (II) sulphate tetra hydrate
3) Preparation of tris - (thiourea) - copper (II) sulphate dihydrate

II. GRAVIMETRIC ESTIMATION

a) USING SINTERED CRUCIBLE

Estimation of

1. Lead as lead chromate
2. Barium as barium chromate
3. Calcium as calcium oxalate

b) USING SILICA OR PORCELAIN CRUCIBLE

Estimation of

4. Calcium as calcium oxide
5. Water of hydration in a hydrated salt ($BaCl_2$)
6. Barium as barium sulphate

BOOK FOR REFERENCE:

1. V.Venkateswaran, R. Veeraswamy and A. R. Kulandaivelu, Basic Principles of Practical Chemistry, Sultan Chand and Sons, Reprint 2023.

GROUP PROJECT

Semester: VI **Hours: 4**

Code : 23CH6PR01 **Credit: 3**

COURSE OUTCOMES :

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Identify the thrust areas in chemistry research	PSO-1	K1
CO - 2	Describe the different analytical skills used in synthesis and characterization of the compounds	PSO-2	K2
CO - 3	Illustrate the methodology of the project work	PSO-3	K3
CO - 4	Develop the presentation skills of their research findings	PSO-4	K4
CO - 5	Compile the research findings of the project work	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**GROUP PROJECT**							**Hours: 4**
Code : 23CH6PR01											**Credit: 3**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	3	3	3	4	5	3	4	4	3	3.72
CO - 2	4	4	5	5	4	3	4	5	4	3	4	4.09
CO - 3	4	5	3	3	4	4	4	3	5	4	4	3.90
CO - 4	4	4	3	3	3	5	4	3	4	5	3	3.72
CO - 5	4	4	3	3	5	3	4	3	4	3	5	3.72
Overall Mean Score												**3.83**

Result: The score for this course is **3.83** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs = Total of Mean Scores / Total No. of COs

INDUSTRIAL CHEMISTRY

Semester: VI **Hours: 3**

Code : 23CH6DE3A **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Recall the importance of chemical industries	PSO-1	K1
CO - 2	Understand the various aspects of sugar and paper industries, abrasives, lubricants and their intellectual property rights	PSO-3	K2
CO - 3	Apply the procedures for estimation of sugar, paper and manufacturing of abrasives, lubricants, and testing of various industrial products	PSO-4	K3
CO - 4	Analyse the industrial applications for mankind and intellectual property rights	PSO-2	K4
CO - 5	Formulate industrial procedures in various production and receiving copyrights	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**INDUSTRIAL CHEMISTRY**							**Hours: 3**
Code : 23CH6DE3A											**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	3	3	3	3	3	5	3	3	3	3	3.36
CO - 2	4	5	3	3	3	3	4	3	5	3	3	3.55
CO - 3	4	3	3	3	3	5	4	3	3	5	3	3.55
CO - 4	4	3	5	5	3	3	4	5	3	3	3	3.73
CO - 5	3	3	3	3	5	4	3	3	3	4	5	3.55
Overall Mean Score												**3.55**

Result: The score for this course is **3.55** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: SUGAR INDUSTRY:

Manufacture of cane sugar - extraction of juice - purification of juice - defection - sulphitation and carbonation - concentration - crystallization - separation of crystals - drying - refining - recovery of sugar from molasses - manufacture of sucrose from beet root - estimation of sugar - sugar industry in india **(9 Hours)**

UNIT II: PAPER INDUSTRY:

Raw materials - manufacture process - bleaching - colouring - calendaring - manufacturing of pulp: mechanical process - chemical process - filling - sizing - recycling of papers - process of recycling: collection, sorting and separation, pulping, screening, rolling, drying, polishing-quantity checking, cutting, products - benefits of paper recycling -paper industry in india **(9 Hours)**

UNIT III: ABRASIVES:

Definition - characterization - types - natural and synthetic abrasives - natural abrasives: diamond, corundum, emery, garnet, quartz - composition and uses - synthetic abrasives: carborundum, aluminium carbide, boron carbide, boron nitride, synthetic graphite - composition and uses **(9 Hours)**

UNIT IV: LUBRICANTS:

Definition - mechanism of lubricants - classification of lubricants - liquid lubricants, semi - solid lubricants, solid lubricants and synthetic lubricants - properties of lubricants - viscosity index - flashpoint - cloudpoint - pourpoint - aniline point and drop point - greases - properties - types - cutting fluids - selection of lubricants **(9 Hours)**

UNIT V: INTELLECTUAL PROPERTY RIGHTS:

Introduction to intellectual property rights - patents - factors for patentability - novelty, non obviousness, industrial applications - patent offices in india: trademark - types of trademarks - certification marks, logos, brand names, signatures, symbols and service marks **(9 Hours)**

COURSE BOOKS:

1. B.N. Chakrabatry, Industrial Chemistry, Oxford and IBH publishing Co.Pvt Ltd, 6th reprint, 1994. **Unit I-II**
2. P.L. Soni and H.M. Chawla, Text book of Organic Chemistry, Sultan Chand and Sons, Reprint, 2022. **Unit I-II**
3. D.M. Yusuff, Applied Chemistry, Nisa publications. **Unit-II**
4. B.K. Sharma, Industrial Chemistry, Goel publishing house, 14th Edition, 2004. **Unit I, III-IV**
5. Neeraj Pandey, Khushdeep Dharni, intellectual property rights, PHI earning, 2014. **Unit V**

MOLECULES OF LIFE

Semester: VI **Hours: 3**

Code : 23CH6DE3B **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO-1	Acquire knowledge about carbohydrates, amino acids, lipids, enzymes and vitamins and water	PSO-1	K1
CO-2	Discuss the biological functions of carbohydrates, amino acids, lipids, enzymes and vitamins and water	PSO-2	K2
CO-3	Sketch the structure of carbohydrates, amino acids, lipids, enzymes and water	PSO-3	K3
CO-4	Examine the impact of carbohydrates, amino acids, lipids, enzymes and water in human body	PSO-4	K4
CO-5	Evaluate the importance of of carbohydrates, amino acids, lipids, enzymes and water in daily life	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				MOLECULES OF LIFE							Hours: 3
Code : 23CH6DE3B											Credit: 2
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO-1	5	3	3	3	3	3	5	3	3	3	3	3.36
CO-2	4	3	5	5	3	3	4	5	3	3	3	3.73
CO-3	4	5	3	3	3	3	4	3	5	3	3	3.55
CO-4	4	3	3	3	3	5	4	3	3	5	3	3.55
CO-5	3	3	3	3	5	4	3	3	3	4	5	3.55
	Overall Mean Score											3.55

Result: The score for this course is **3.55** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs = Total of Mean Scores / Total No. of COs

UNIT I: CARBOHYDRATES:

Introduction - classification with examples - manufacture of cane sugar - functions of carbohydrates in the body - energy source, maintenance of heart action and central nervous system - digestion - absorption - metabolism of carbohydrates - bio-synthesis of sugar - tests for carbohydrates - Molisch's, Benedict, Seliwanoff's, iodine, Bial's, Fehlings and Barfoed's test - regulation of blood sugar - diabetes mellitus - sources of carbohydrates in the diet **(9 Hours)**

UNIT II: AMINO ACIDS AND NUCLEIC ACIDS:

Amino acids: definition - classification of amino acids on the basis of their chemical structure and nutritional requirement - isolation of amino acid from proteins - peptide linkage - polypeptides - nucleic acids: functions of DNA and RNA - difference between DNA and RNA **(9 Hours)**

UNIT III: LIPIDS:

Definition - classification - biological significance of lipids - metabolic and structural functions of lipids - digestion of lipids - absorption of lipids - lipid in blood - quantitative analysis of lipids and qualitative tests for lipids - biological importance of cholesterol and bile acids - tests for cholesterol and normal level of cholesterol **(9 Hours)**

UNIT IV: ENZYMES:

Introduction - general properties - classification- factors influencing enzyme action - regulatory enzymes - allosteric enzymes and covalently modulated enzymes - isoenzymes - industrial and medical applications of enzymes

(9 Hours)

UNIT V: MINERALS AND WATER:

Minerals: Introduction - source - function - deficiency and toxicity of calcium, phosphorous, sodium, potassium, iron and iodine - water: source and distribution of water in the body - functions of water - absorption - metabolism and storage of water **(9 Hours)**

COURSE BOOKS:

1. V. Alex Ramani, Food Chemistry, MJP Publishers, 2014, **Unit I-II**
2. Carroll Lutz and Karen Przytulski, Nutrition and Diet Therapy, 3rd Edition, F.A. Davis Company (Philadelphia) Publishers 2001, **Unit III-V**

BOOKS FOR REFERENCE:

1. M.K. Jain and S.C. Sharma and Fateh Bahadur, Graduate Organic Chemistry, Vishal Publishing Co., Volume - I, 2018-19.
2. I.L. Finar, Organic Chemistry, volume II, Dorling Kindersley, 5th Edition, 2008
3. P.L. Soni and H.M. Chawla, Text book of Organic Chemistry, Sultan Chand and Sons, Reprint, 2022.

FUEL CHEMISTRY

Semester: VI **Hours: 3**

Code : 23CH6DE3C **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge about various energy sources such as solid fuels, liquid fuels, gaseous fuels and bio fuel and their applications	PSO-1	K1
CO - 2	Explain the production and process of solid fuels, liquid fuels, gaseous fuels and bio fuels	PSO-3	K2
CO - 3	Discuss the commercial applications of solid fuels, liquid fuels, gaseous fuels and bio fuels	PSO-4	K3
CO - 4	Analyse the advantages and disadvantages of solid fuels, liquid fuels, gaseous fuels and bio fuels	PSO-2	K4
CO - 5	Validate the applicability of different fuels for mankind and their impact on environment	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				FUEL CHEMISTRY								Hours: 3
Code : 23CH6DE3C												Credit: 2
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	5	3	3	3	3	3	5	3	3	3	3	3.36
CO - 2	4	5	3	3	3	3	4	3	5	3	3	3.55
CO - 3	4	3	3	3	3	5	4	3	3	5	3	3.55
CO - 4	4	3	5	5	3	3	4	5	3	3	3	3.73
CO - 5	3	3	3	3	5	4	3	3	3	4	5	3.55
Overall Mean Score												3.55

Result: The score for this course is **3.55** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs = Total of Mean Scores / Total No. of COs

UNIT I: ENERGY SOURCES:

Renewable energy sources: solar, wind and geothermal energy - bioenergy - hydropower and ocean energy - non-renewable energy sources: fossil fuels and nuclear fuels - definition and examples - fuel - definition - calorific value - determination of calorific value - classification of fuels: primary and secondary - criterion for selection of fuel - properties: ignition temperature - flame temperature - flash point - fire point **(9 Hours)**

UNIT II: SOLID FUELS:

Natural - artificial - industrial solid fuels - coal: formation - properties - classification - coking - non coking and pulverization of coal - role of sulphur and ash in coal - analysis of coal: proximate and ultimate - advantages and disadvantages of solid fuels - fractional distillation of coal tar - uses of coal tar based on chemicals **(9 Hours)**

UNIT III: LIQUID FUELS:

Petroleum and petrochemicals - refining of petroleum - composition and uses of main petroleum fractions - cracking - thermal - catalytic cracking - advantages - octane rating - anti knock agents - unleaded petrol - cetane rating - antidiesel knock agents - hydrocarbons from petroleum - petrochemicals - direct and indirect petrochemicals - catalysts used in petroleum industry **(9 Hours)**

UNIT IV: GASEOUS FUELS:

Classification : natural - artificial gaseous fuels - examples and their importance - water gas - producer gas - semi water gas - LPG - manufacture - composition and uses - gobar gas - biogas generation - advantages and disadvantages **(9 Hours)**

UNIT V: BIO FUELS:

Definition - sources and classification: biodiesel - bioethanol - hydrogen fuel from biomass - uses manufacture of biodiesel - advantages of biofuels **(9 Hours)**

BOOKS FOR REFERENCE

1. B.K. Sharma, Industrial Chemistry, Goel Publishing House, 13th Edition, 2002. **Unit I-IV**
2. P.C. Jain and Jain, Engineering Chemistry, Dhanpat Rai Publishing Company (P) Ltd, 16th Edition, 2015. **Unit I-IV**
3. https://en.m.wikipedia. Org/wiki/Biofuels **Unit V**
4. https://www.studentenergy.org/topics/biofuels **Unit V**

WATER, MILK AND FOOD ANALYSIS

Semester: VI **Hours: 3**

Code : 23SE6CH04 **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge about water, milk and milk products, food and adulteration	PSO-1	K1
CO - 2	Explain the methods of water treatment, milk and food adulteration	PSO-2	K2
CO - 3	Apply the methods to do water treatment, adlutration checking in milk and food materials	PSO-3	K3
CO - 4	Analyse the hardness of water, various adutrants in milk and food materials using practical skills	PSO-4	K4
CO - 5	Evaluate the parameters of water contents, milk products and food materials	PSO-5	K5

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Semester: VI				**WATER, MILK AND FOOD ANALYSIS**							**Hours: 3**
Code : 23SE6CH04											**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	2	4	4	3	4	5	4	2	4	3	3.64
CO - 2	3	2	5	5	3	3	3	5	2	3	3	3.36
CO - 3	3	5	3	3	3	4	3	3	5	4	3	3.55
CO - 4	4	3	3	3	2	5	4	3	3	5	2	3.36
CO - 5	4	3	3	3	5	3	4	3	3	3	5	3.55
Overall Mean Score												**3.49**

Result: The score for this course is **3.49** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs = $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

UNIT I: WATER TREATMENT:

Sources of water - characteristics due to impurities in water - hardness of water - equivalents of calcium carbonate - units of hardness - disadvantages of hard water - scale and sludge formation in boilers **(12 Hours)**

UNIT II: ANALYSIS OF WATER:

Measurement of pH - electrical conductivity - turbidity - dissolved solids - estimation of free chlorine - acidity - total acidity - alkalinity - hardness: EDTA method - dissolved oxygen - biochemical oxygen demand - chemical oxygen demand calcium, magnesium, iron - chemical substances affecting health: ammonia, nitrate and nitrite, cyanide and sulphate **(12 Hours)**

UNIT III: MILK AND MILK PRODUCTS:

Composition of milk - flavour and aroma of milk - physical properties of milk - effect of heat on milk - pasteurization - homogenization - milk products - cream - butter - ice cream - milk powder - nutritive value of milk and milk products - fortified and special milks **(12 Hours)**

UNIT IV: FOOD ADDITIVES:

Introduction - chemistry of sweeteners: intense sweeteners, bulk sweeteners - food colours: natural colours, synthetic colours - permitted levels of colourants - list of permitted colourants - flavouring agents - antioxidants: chemistry of antioxidants, type of antioxidants and uses - ascorbic acid, butylated hydroxy anisole (BHA), citric acid, beta-carotene, lutein - emulsifiers - foodstuff containing emulsifiers - types of emulsions **(12 Hours)**

UNIT V: FOOD ADULTERATION AND TESTING:

Introduction - legal aspects of food adulteration and prevention - common food adulterants - analysis of various food adulterants: analysis of adulterants in edible oils, ghee, coffee powder, chilly powder, turmeric powder, meat and milk- harmful effect of the adulterants **(12 Hours)**

COURSE BOOKS:

1. Jain and Jain, Engineering Chemistry, Dhanpat Rai publishing company, 16th Edition, 2004. **Unit I-II**
2. Webb Johnson and Alford, Fundamentals of Dairy Chemistry, CBS Publishers & Distributors, 2nd Edition, 1987. **Unit III**
3. Alex V Ramani, Food Chemistry, MJP Publishers, 2021. **Unit IV-V**

PRINCIPLES AND APPLICATIONS OF GREEN CHEMISTRY

Semester: VI

Code : 23CH6SS01 **Credit: 2***

LEARNING OUTCOMES:

1. Recall the principles of green chemistry, green reagents and catalysts, green synthesis of organic compounds in organic synthesis
2. Describe the principles and preparation by green reagents, catalysts and green synthesis
3. Apply green methods and biocatalysis for organic synthesis
4. Analyze microwave-assisted synthesis, ultrasound-assisted green synthesis and biocatalysis for organic synthesis
5. Validate green chemistry principles for synthesis and household utility

UNIT I: BASIC PRINCIPLES OF GREEN CHEMISTRY:

Prevention of waste - maximum incorporation of the reactants into the final product - minimization of hazardous products - designing safer chemicals - energy requirements for synthesis - selection of appropriate solvent - selection of starting materials - use of protecting groups - use of catalyst - product designing - designing of manufacturing products - strengthening of analytical techniques

UNIT II: a) GREEN REAGENTS AND GREEN CATALYST:

Introduction - designing a green synthesis: choice of starting materials, reagent, catalyst and solvents - dimethyl carbonate - polystyrene Wittig reagent - polymeric phenyl thiomethyl lithium reagent - oxidation catalyst - basic catalyst - titanium dioxide photocatalyst

b) GREEN CHEMISTRY IN DAY TODAY LIFE:

Dry cleaning of cloths - versatile bleaching agent - environmental pollution

UNIT III: MICROWAVE-ASSISTED SYNTHESIS:

Microwave-assisted synthesis in water: hydrolysis of benzyl chloride - benzamide - N-phenyl benzamide - oxidation of toluene and alcohols - microwave-assisted synthesis in organic solvents: esterification and Fries rearrangement

UNIT IV: ULTRASOUND-ASSISTED GREEN SYNTHESIS:

Introduction - application: esterification, saponification, hydrolysis, oxidation and reduction

UNIT V: BIOCATALYSTS IN ORGANIC SYNTHESIS:

Introduction - biochemical oxidation and reduction - enzymes catalysed hydrolytic process: hydrolysis of N-acylamino acids

COURSE BOOK:

1. V. K. Ahluwalia and M. Kidwai, New Trends in Green Chemistry, Anamaya Publishers, New Delhi, 1st reprint of 2nd Edition, 2000. **Unit I-V**

BOOKS FOR REFERENCE:

1. V. K. Ahluwalia, Green Chemistry Environmentally Benign Reaction, Ane Books Pvt. Ltd., Reprint 2009.
2. Rashmi Sanghi and M. M. Srivastava, Green Chemistry Environment-Friendly Alternatives, Narosa Publishing House Pvt. Ltd., Fifth Reprint 2012.

HERBAL CHEMISTRY

Semester: VI

Code : 23CH6SS02 **Credit: 2***

LEARNING OUTCOMES:

1. Recognize medicinal plant diversity and medicinal values of some species in India
2. Describe the development of the medicinal plants sector in India and the medicinal values of some species and common plants
3. Examine the chemical constitution of herbal species and plants
4. Analyse the medicinal values of some species, their production and utility
5. Validate the medicinal values of some common plants and their applicability for mankind

UNIT I: MEDICINAL PLANTS DIVERSITY:

Introduction to the medicinal chemistry of herbs - priority species - scope and reasons of cultivation - propagation mode - conservation strategies - marketing constraints - future strategies

UNIT II: MEDICINAL AROMATIC PLANTS:

Introduction - history - market of medicinal and aromatic - prioritized identified medicinal plants - drawbacks in marketing of medicinal plants - situation of medicinal plants in nature

UNIT III: DEVELOPMENT OF MEDICINAL PLANTS:

Medicinal plants - traditional medicine - threats of medicinal plants in India - measures for conservation: In-situ, Ex-situ - advantages of cultivation of wild medicinal plants - current status - factors limiting medicinal plants cultivation

UNIT IV: MEDICINAL VALUES OF SOME IMPORTANT SPECIES:

Introduction - chemical constituent, edible and medicinal uses: bistorta, fagopyrum dibotrys, persicaria barbata, persicaria chinensis, polygonum plebeium and rumex vesicarius

UNIT V: MEDICINAL VALUES OF SOME COMMON PLANTS:

Introduction - medicinal uses: okra, onion, garlic, turmeric, spinach, garden mint, black pepper, wood apple, lantana, aloe, jack fruit, banana and sugarcane

COURSE BOOK:

1. D. Marngar and S. Jyrwa, Biodiversity: Herbal Medicine, Akansha Publishing House, New Delhi, 1st Edition, 2009. **Unit I-V**
2. http://phrmafacts.com/medicinal-chemistry-of-herbs/ **Unit I**

BOOK FOR REFERENCE:

1. P. Agarwal Shasi, Alok, Fatima and Verma. A, Current Scenerio of Herbal Technology Worldwide: An overview, Int. J Pharm Sci Res., 4(11), 4105-17, 2013.

ENERGY FOR FUTURE

Semester: VI

Code : 23CH6SS03 **Credit: 2***

LEARNING OUTCOMES:

1. Recognize the various sources of energy namely solar energy, wind energy, biomass and fuel cells
2. Explain the production of solar energy, wind energy, biomass conversion techniques and fuel cells
3. Illustrate the production of various types of energy and their advantages
4. Analyze the renewable energy sources, their production and their utility to mankind
5. Develop biomass conversion unit and fuel cell units thereby sustaining our motherearth

UNIT I: INTRODUCTION TO ENERGY SOURCES:

Introduction - energy consumption as a measure of prosperity- world energy futures - conventional energy sources: coal, oil, gas - agricultural and organic wastes - water power - thermal power and nuclear power - new energy technologies - non-conventional energy sources - solar energy - wind energy - energy from bio-mass and bio-gas - ocean thermal energy - tidal energy - geothermal energy and hydrogen energy - renewable energy resources

UNIT II: SOLAR ENERGY:

Solar radiation and its measurement: introduction, solar constant, solar radiation at the earth's surface, solar radiation geometry and solar radiation data - solar energy collectors: physical principles of the conversion of solar radiation into heat - flat plate and concentration collectors - solar energy storage system: sensible heat storage and latent heat storage - applications of solar energy: solar water heating and space heating

UNIT III: WIND ENERGY:

Introduction - basic principles of wind energy conversion - power in the wind - wind energy conversion - wind data and estimation - site selection - types of wind machines: horizontal axis and vertical axis performance of wind machines - generating systems: schemes of electric generation, generator control, load control and energy storage - application of wind energy

UNIT IV: BIO-ENERGY:

Introduction - biomass conversion techniques: wet processes and dry processes - classification of biogas plants - advantages and disadvantages of floating drum plant- types of biogas plants - biogas from plant waste - materials used for biogas generation - selection of a site for a biogas plant and digester design - fuel properties and utilization of biogas

UNIT V: CHEMICAL ENERGY SOURCES:

Fuel cells: introduction, conversion efficiency of fuel cells, types of electrodes, work output and EMF of fuel cells, applications of fuel cells - hydrogen energy: hydrogen production, electrolysis, thermo-chemical, fossil fuel and solar energy methods, hydrogen storage and hydrogen transportation, utilization of hydrogen gas - hydrogen as an alternative fuel for motor vehicles - safety and management

COURSE BOOKS:

1. Rai, G.D., Non-conventional Energy Sources, Khanna Publications, India. **Unit I-V**
2. Wengenmayr, R. Buhrke, T. and Brewer, W.D., Renewable Energy, Sustainable Energy Concepts for the Energy Change, second Edition, New York: Wiley VCH. **Unit I-V**
3. Nelson, V., Introduction to Renewable Energy (Energy and the Environment), New York: CRC Press. **Unit I-V**
4. Twidell, J. and Weir., Renewable Energy Resources, second Edition, New York, Taylor and Francis. **Unit I-V**

BOOKS FOR REFERENCE:

1. Chiras, D. Achieving Energy Independence through Solar, Wind, Biomass and Hydropower. Mother Earth News Wiser Living, 2006.
2. Tester, J.W., Drake, E.M., Driscoll, M.J., Golay, M.W., and Peters, W.A. Sustainable Energy., 2nd Edition, New Delhi: Prentice-Hall of India, 2006.

POLYMER CHEMISTRY

Semester: VI

Code : 23CH6SS04 **Credit: 2***

LEARNING OUTCOMES:

1. Recognize the chemical form of polymers
2. Explain microstructure of polymers and importance of biodegradable polymers
3. Classify the polymers based on different aspects
4. Analyze polymers and their applications
5. Evaluate the specific applications of polymers in daily life

UNIT I: STRUCTURE OF POLYMERS:

Introduction - classification of polymers based on origin, mode of formation, structure and application - organic and inorganic polymers - microstructure based on the chemical structure: homochain and heterochain polymers, homopolymer and co-polymers - microstructure based on the geometrical structure: linear, branched and cross-linked polymers - random - alternating - block and graft copolymers and stereo-regular polymers

UNIT II: ADDITION POLYMERS:

Types of polymerization: addition and condensation - addition polymers: definition, preparation, structure and uses of polyethylene, polypropylene, polystyrene, polyvinylchloride, polytetrafluoroethylene, polymethylmethacrylate, polyacrylonitrile, polyvinyl acetate, polychloroprene and styrene - butadiene - natural rubber

UNIT III: CONDENSATION POLYMERS:

Condensation polymers: introduction, preparation, structure and use of polyamides, polyesters, phenol-formaldehyde resin, cellulose acetate, silicones and polyurethanes

UNIT IV: SPECIFIC APPLICATIONS:

Polymers as adhesives and fillers - common plastic polymers used in packaging: polyethylene terephthalate, high-density polyethylene and low-density polyethylene

UNIT V: BIODEGRADABLE PLASTICS:

Composition of biodegradable plastics - starch-based plastics - bacteria-based plastics - soy-based plastics - biodegradable polyesters - biopolymers: definition, example and applications - quality of polymers: the permissible limit of microns in polythene bags - grades of plastic bottles

BOOKS FOR REFERENCE:

1. V.R. Gowariker, N.V.Viswanathan and Jayadev Sreedhar, Polymer Science, New age International Pvt.Ltd., Publishers, Reprint 2014. **Unit I-II**
2. K. Bagavathisundari, Applied Chemistry, MJP Publishers, 2nd Edition, 2008. **Unit III-V**
3. https://plasgranltd.co.uk/plasgran-guide-plastic-recycling-grades/ **Unit V**
4. https://www.quora.com/Why-is-the-allowed-limit-of-polythene-bags-in-India-40-micron-Are-polythene-bags-le sser-than-40-not-recyclable **Unit V**

DIPLOMA COURSE

CHEMISTRY OF MODERN COSMETICS

Semester: Non Semester **Hours: 60**

Code : DCCHMC01 **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Discuss the chemistry of cosmetics and different modes of application	PSO-1, PSO-2	K1, K3
CO - 2	Aware of the chemical aspect of cosmetics	PSO-3	K4
CO - 3	Apply relevant theoretical perspectives to practical application	PSO-3	K3, K4
CO - 4	Apply the indepth knowledge about the cosmetics and its applications in real life context	PSO-4	K3, K4
CO - 5	Brighten their career as beautician and utilize the opportunities	PSO-5	K3

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Non Semester												**Hours: 60**
Code : DCCHMC01				**CHEMISTRY OF MODERN COSMETICS**								**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	3	4	3	3	3	4	3	3	4	3	3.27
CO - 2	3	3	3	4	3	4	3	3	4	3	4	3.36
CO - 3	3	4	3	4	3	3	3	4	4	4	4	3.54
CO - 4	3	3	4	3	4	3	3	4	3	4	3	3.36
CO - 5	3	.4	3	3	4	2	4	4	3	2	4	3.27
Overall Mean Score												**3.36**

Result: The score for this course is **3.36** (High relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I: CHEMISTRY OFCOSMETICS:

Definition- history of cosmetics - cosmetic formulation - skin care - hair care - deodorants and antiperspirants - colour cosmetics: mascara, eye shadow - eyebrow pencils - sun protection - aerosols - nail cosmetics - mouth cosmetics-perfumesandfragrances. **(12 Hours)**

UNIT II: COSMETICS FOR THE SKIN-I:

a) Powders: Face powder: discussion of these properties - raw materials used - manufacturing methods - properties - formulae: light base with ZnO and white base with heavy powders

b) Creams: General considerations - classification - raw materials - cold - cleansing - all purpose creams - formulae of creams: lubricating - night- skin protective and hand creams - vanishing and foundation - liquid creams: cream oil base, finished cream formulae. **(12 Hours)**

UNIT III: COSMETICS FOR THE SKIN-II:

Lotions: Classification - difference from liquid creams and gums - mucilage making - astringents, antiseptics and preservatives - clarification- hand lotions: varieties - increased uses - formulae- skin toning lotion - skin fresheners: definition and functions - formulae- medicated lotions: limitations - Deodorants: general consideration - bath and bathing preparation. **(12 Hours)**

UNIT IV: COSMETICS FOR HAIR AND SHAVING MEDIA:

Shampoos: Anatomy of the hair and scalp -function - formulation - sulfonation - soapless, soap and cream shampoos. Shaving media: brushless shaving creams - raw materials - formulae - shaving soaps - shaving powder formulae - cosmetics for the nails - enamels or polishes - manicure-formulae. **(12 Hours)**

UNIT V: COSMETICS FOR TEETH AND MOUTH:

Dentifrices and Mouth Washes: general consideration - importance of packages - claims - raw materials - abrasives - sweeteners - flavors - foaming agents - liquid addition - colloidal binding agents - formulae - defectsincosmetics-suggestionsforcorrection. **(12 Hours)**

BOOKS FOR REFERENCE:

1. E. G. Thomssen, Modern Cosmetics, Universal publishing corporation Bombay, Reprinted in India, 1985. **Unit I - V**
2. Kirpal Singh, Chemistry in Daily Life, PHI Learning Private Limited, New Delhi, 3rd edition, 2012. **Unit I - V.**

PRACTICAL: HANDLING COSMETICS LAB-I

Semester: Non semester **Hours: 60**

Code : DCCHMCP1 **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Acquire knowledge on different types cosmetics	PSO-2	K2
CO - 2	Classify the types of manicure	PSO-3	K3
CO - 3	Equip their skills in hair cutting	PSO-3	K3
CO - 4	Focus their carrier advancement in hair dressing	PSO-3, PSO-5	K3
CO - 5	Apply the techniques as a beautician	PSO-5	K3

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Non semester				**PRACTICAL: HANDLING COSMETICS LAB-I**							**Hours: 60**
Code : DCCHMCP1											**Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	5	4	3	4	4	3	5	4	3	3	4	3.81
CO - 2	4	3	3	4	4	4	4	3	4	4	3	3.63
CO - 3	5	4	3	4	4	3	4	4	4	3	4	3.81
CO - 4	5	4	4	4	3	4	4	3	4	4	3	3.81
CO - 5	4	4	4	4	3	4	4	4	3	3	4	3.72
Overall Mean Score												**3.76**

Result: The score for this course is **3.76** (High relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling

Mean Score of COs = $\frac{\text{Total of Values}}{\text{Total No. of POs \& PSOs}}$	Mean Overall Score for COs= $\frac{\text{Total of Mean Scores}}{\text{Total No. of COs}}$

1. **Introduction class**
    - Skin types
    - Threading
    - Face safety
2. **Manicure**
    - skin type
    - Pedicure
    - Pedicure skin type
    - waxing
3. **Hair cutting**
    - Baby cutting
    - Women cutting
4. **Hair dressing**
    - Hair curling
    - Hair straightening
    - Head massage
5. **Hair do**
    - Bridal hair do
    - Different types of Knot

PRACTICAL: HANDLING COSMETICS LAB-II

Semester: Non semester **Hours: 60**

Code : DCCHMCP2 **Credit: 1**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Classify the different types of mehandi in different occasion	PSO-2	K2
CO - 2	Equip their skills and creativities in nail care	PSO-3	K3
CO - 3	Apply the techniques as a beautician in skin bleaching	PSO-3	K3
CO - 4	Focus their carrier advancement as beautician	PSO-3, PSO-5	K3
CO - 5	Inculcate business ethics	PSO-5	K4

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Non semester				**PRACTICAL: HANDLING COSMETICS LAB-II**							**Hours: 60**
Code : DCCHMCP2											**Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	4	4	3	3	4	4	3	4	4	3	3.54
CO - 2	4	3	4	4	3	4	3	3	3	4	3	3.45
CO - 3	4	4	3	4	3	3	3	4	3	4	4	3.54
CO - 4	3	3	3	4	4	4	4	3	4	5	4	3.72
CO - 5	3	4	4	4	4	4	3	4	3	4	5	3.81
Overall Mean Score												**3.61**

Result: The score for this course is **3.61** (High relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

1. **Mehandi**
    a. Mehandi types
    b. Mehandi for different occasion
2. **Nail care**
    a. Nail polishing
    b. Nail shape
    c. Nail art
3. **Skin bleaching**
    a. Skin type
    b. Facial and types
4. **Saree draping models**
    a. Athpourey
    b. Nauvari
    c. Nivi
    d. Pinkosu
    e. Coorgi
5. **Bridal make up**
    a. Matte
    b. Natural
    c. Shimmer
    d. Smoky

CERTIFICATE COURSE
IT SKILLS FOR CHEMISTS

Semester: Non Semester **Hours: 60**

Code : 23CH1SD01 **Credit: 2**

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Draw chemical structures with Chem draw tools	PSO-2	K1, K3
CO - 2	Apply the knowledge of chem Draw in report writing	PSO-3	K3, K4
CO - 3	Equip the skills in origin software	PSO-3	K3, K4
CO - 4	Interpret spectral data using origin software	PSO-5	K3, K4
CO - 5	Gain knowledge on the informatics methods to solve chemical problems	PSO-2,3	K1, K3

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Non Semester				**IT SKILLS FOR CHEMISTS**							**Hours: 2**
Code : 23CH1SD01											**Credit: 2**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	3	4	3	3	3	4	3	3	4	3	3.27
CO - 2	3	3	3	4	3	4	3	3	4	3	4	3.36
CO - 3	3	4	3	4	3	3	3	4	4	4	4	3.54
CO - 4	3	3	4	3	4	3	3	4	3	4	3	3.36
CO - 5	3	.4	3	3	4	2	4	4	3	2	4	3.27
Overall Mean Score												**3.36**

Result: The score for this course is **3.36** (High relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I: CHEM DRAW - I:

Introduction - definition - modes - main tools - analysis window - chemical properties window - panels in drawing - chemical structures - drawing tools and objects - templates - conversion of name to structure and vice versa.

(12 Hours)

UNIT II: CHEM DRAW - II:

Significance of chem draw - role of chem draw in chemistry - chem sketch practices: benzene, DDT, BHC, glucose, sucrose, enantiomers, 18- annulene - writing equations - chem sketch - 3D - drawing chemical structure - pasting them in text - saving files as images. **(12 Hours)**

UNIT III: ORIGIN:

Introduction - file: new - open - save project - edit : copy - paste - import : single ASCII - graphical plot : line, symbol, line+symbol - column bars - multicurve - export graph - windows : work book. **(12 Hours)**

UNIT IV: DATA ANALYSIS USING ORIGIN:

Format menu - analysis - linear and non linear graphs - UV - Visible spectral data - FT-IR spectral data- fitting linear graph for first order rate constant: ester hydrolysis - fitting non-linear graph for conductometric titrations. **(12 Hours)**

UNIT V: CHEMINFORMATICS:

Cheminformatics: History, Representing molecules: older systems - connection tables, line notation - Inchi, SMILES, WLN canonicalization. Line notation versus connection tables. Query languages - SMARTS. Nomenclature: IUPAC names, trade names, common names. Molecular similarity: Ways to measure similarity - 2D topology, 3D configuration, Physical properties, clustering. Chemical registration system Chemistry softwares. **(12 Hours)**

REFERENCES:

1. Polanski, J. (2009). Chemoinformatics. Poland: Elsevier Publications.
2. Chem draw Ultra 12.0 and OriginPro 9.0

SKILL DEVELOPMENT PROGRAMME

ANALYTICAL SKILLS FOR CHEMIST

Sub.Code:25CH1SD01 **Hours: 2**

Credit: 2

COURSE OUTCOME

Upon completion of this course the student will be able to

1. Purify and isolate the organic substance
2. Identify the organic compounds in a mixture with TLC and Column chromatography
3. Interpret the spectral data of an organic compound

UNIT I: ISOLATION AND PURIFICATION TECHNIQUES:

Addition reaction – condensation reaction – substitution-elimination-rearrangement – Filtration – recrystallization and sublimation – organic reagents: alcoholic $KMnO_4$ – acidified $K_2Cr_2O_7$ – $LiAlH_4$ and $NaBH_4$ – solvent extraction – common drying agents for organic compounds – drying by distillation – distillation at atmospheric pressure.

LAB WORK: Recrystallization of benzoic acid from water and N-bromoacetanilide from alcohol **(12 Hours)**

UNIT II: CHROMATOGRAPHIC TECHNIQUES:

a) THIN LAYER CHROMATOGRAPHY (TLC):

Introduction – Principles of TLC – Preparation of TLC plates – preparation and applications of samples: Developing the chromatogram – location of components

b) COLUMN CHROMATOGRAPHY:

Principles of column chromatography – choice of adsorbents and solvents – packing the column – developing the chromatogram and separating the components

LAB WORK: Separation of o-nitro and *p*-nitroaniline using thin layer and column chromatography **(12 Hours)**

UNIT III: SPECTROSCOPIC TECHNIQUES – I:

a) UV-VISIBLE SPECTROSCOPY:

Principle of absorption - Beer's Lambert's Law – Electronic levels and transitions-applications of UV Visible spectroscopy

b) FT-IR SPECTROSCOPY:

Principle - Vibrational frequencies of different functional groups – - applications of FT-IR spectroscopy

LAB WORK: Analysis of UV- visible and FT-IR spectrum of acetophenone and cinnamic acid **(12 Hours)**

UNIT IV: SPECTROSCOPIC TECHNIQUES – II:

Nuclear Magnetic Resonance (NMR) Spectroscopy: Principles of NMR –Chemical shift, shielding and deshielding effects - number of signals - Spin-spin splitting – NMR spectrum of ethanol, toluene, phenyl acetic acid and benzyl alcohol -Interpretation of NMR spectrum of Schiff base /aspirin / N-bromo acetanilide

(12 Hours)

UNIT V: a) SYNTHESIS AND CHARACTERISATION:

Aldol condensation – Micheal addition – Friedel-Crafts alkylation and acylation and Diels Alder reaction – Synthesis of aspirin, N-bromoacetanilide, 3,5 - dimethyl pyrazole and a Schiff base from benzaldehyde and aniline -characterisation of the compounds by IR, NMR and UV spectral techniques – submission of report

b) HANDS ON TRAINING:

Instrumentation of UV- visible spectrophotometer**,** FT-IR - calibration - analysis of an organic compound using spectral techniques, thin layer chromatography and Column chromatography **(12 Hours)**

BOOKS FOR REFERENCE:

1. M. K. Jain, S.C. Sharma and Jyotsna Chaturvedi, Graduate Organic Chemistry, Volume I, Vishal Publishing Co., 3rd edition 2019. **Unit I**
2. Y.R.Sharma, Elementary Organic Spectroscopy, S. Chand & Company Pvt. Ltd., Revised Edition, 2013. **Unit II-IV**
3. V. K. Srivastava, K. Kishore, Introduction to Chromatography: Theory and Practice, S. Chand, 1991. **Unit II**
4. V.K.Ahulvalia, Organic Reaction Mechanisms, Narosa Publishing House Pvt. Ltd., 4th edition, 2007. **Unit V**
5. R. Gopalan, P.S.Subramanian, K. Rengarajan, Elements of Analytical Chemistry, Sultan Chand & Sons, 3rd Edition, 2010. **Unit I-V**
6. B.S.Furiniss, A. J. Hannaford, P. W. G. Smith, A. R. Techell, Vogel's Text book of practical organic chemistry, 5th edition, 2008. **Unit I-V**

EVALUATION PATTEREN FOR CERTIFICATE COURSE:
ANALYTICAL SKILLS FOR CHEMIST
TESTING AND EVALUATION

Internal	External	Total
60	40	100

Components: 25CH1SD01

Component		Marks	
Internal Test – I	:	30	Converted to 60
Internal Test – II	:	30	
Lab work	:	30	
Report submission	:	30	
Total	**:**	**120**	

INTERNAL QUESTION PATTEREN
CERTIFICATE COURSE - ANALYTICAL SKILLS FOR CHEMIST

SECTION	Types of Question	Number of Qns.	Number of Qns. to be answered	Marks for each Qn.	Total
A Q. No (1-8)	-	8 (MCQ)	8	8	**8**
B Q. No (9-12)	Open Choice	4	3	4	**12**
C Q. No (13-14)	Open choice	2	1	10	**10**

EXTERNAL QUESTION PATTEREN FOR
CERTIFICATE COURSE - ANALYTICAL SKILLS FOR CHEMISTS

Class: **Time: 2 Hours**
Date:
Max.: 40 Marks

SECTION	Types of Question	Number of Qns.	Number of Qns. to be answered	Marks for each Qn.	Total
A Q. No (1- 10)	One question from each unit and not exceeding two questions	10 (MCQ)	10	1	**10**
B Q. No (11 - 15)	Internal choice Either or question from each unit	5	3	4	**12**
C Q. No (16 - 20)	Open choice, One question from each unit	5	3	6	**18**

SKILL DEVELOPMENT PROGRAMME (CERTIFICATE COURSE)

GANDHIAN THOUGHT

PAPER I: LIFE OF MAHATMA GANDHI

Code: CCHYGT01 **Hour: 1**

Credit: 1

COURSE OUTCOMES:

- Gain Knowledge on the Early Life of Mahatma Gandhi.
- Analyse the racial equality and Mahatma Gandhi's Experience in South Africa.
- Explain the role of Mahatma Gandhi in Indian Freedom Struggle.
- Assess the constructive works of Mahatma Gandhi in Indian Nationalism.
- Discuss the major Incidents from the Life of Mahatma Gandhi.

UNIT I

Family background and beginnings of the Mahatma - Birth and childhood - Education and family life - lessons learned - The London Experience.

UNIT II

Making of the Mahatma: Gandhi in South Africa - From a barrister to a people's leader - Towards racial equality - From family life to ashram life - Birth of Satyagraha and constructive work - experiments with truth.

UNIT III

Beginnings of Indian Freedom Struggle: Early resistances and 1857 Revolt - Birth of Indian National Congress: Moderates, Extremists and Terrorists - Gandhi leads the nation in a new direction - Early micro satyagrahas.

UNIT IV

Mahatma Gandhi leads the Freedom struggle to victory: Major satyagrahas - Constructive Work - Sabarmathi and Sevagram - Various currents of Indian Nationalism - Towards partition and freedom - The final martyrdom.

UNIT V

Video shows on Gandhi - Field and life experiences - Incidents from the life of Gandhi that inspired and shaped your life.

தாள் I - மகாத்மா காந்தியின் வாழ்வு - CCHYGT01

Code: CCHYGT01 **Hour: 1**

Credit: 1

COURSE OUTCOMES:

- Gain Knowledge on the Early Life of Mahatma Gandhi.
- Analyse the racial equality and Mahatma Gandhi's Experience in South Africa.
- Explain the role of Mahatma Gandhi in Indian Freedom Struggle.
- Assess the constructive works of Mahatma Gandhi in Indian Nationalism.
- Discuss the major Incidents from the Life of Mahatma Gandhi.

அலகு 1

குடும்ப பின்னணியும் மகாத்மாவின் தொடக்கமும் - பிறப்பும் குழந்தைப் பருவமும் - கல்வியும் குடும்ப வாழ்வும் - கற்ற பாடங்கள் - இலண்டன் அனுபவங்கள்.

அலகு 2

மகாத்மா உருவாகிறார் - தென்னாப்பிரிக்காவில் காந்தி - பாரிஸ்டரிலிருந்து மக்கள் தலைவராக - இன சமத்துவத்தை நோக்கி - குடும்ப வாழ்விலிருந்து ஆசிரம வாழ்வுக்கு - சத்தியாகிரகம் மற்றும் தீர்மானப்பணியின் தொடக்கம் - சத்திய பரிசோதனைகள்.

அலகு 3

இந்திய விடுதலைப் போராட்டத்தின் தொடக்கம் - ஆரம்ப கால எதிர்ப்புகளும் 1857 எழுச்சியும் - இந்திய தேசிய காங்கிரசின் தொடக்கம் - மிதவாதிகள், தீவிரவாதிகள் மற்றும் பயங்கரவாதிகள் - காந்தி நாட்டை புதிய திசையில் நடத்துகிறார் - ஆரம்ப வட்டார சத்தியாகிரங்கள்.

அலகு 4

மகாத்மா காந்தி இந்திய விடுதலைப் போராட்டத்தை தலைமையேற்று நடத்துகிறார் - தேசிய சத்தியாகிரங்கள் - நிர்மாணப் பணிகள் - சபர்மதியும் சேவாகிராமும் - இந்திய தேசியத்தின் பல்வேறு போக்குகள் - பிரிவினையும் விடுதலையும் - மகத்தான உயிர் தியாகம்.

அலகு 5

காந்தியைப் பற்றிய படங்கள் - கள மற்றும் வாழ்க்கை அனுபவங்கள் - உங்களது வாழ்வை பரவசப்படுத்திய, உருக்கிய மகாத்மா காந்தியின் வாழ்க்கை நிகழ்ச்சிகள்.

RECOMMENDED BOOKS

PAPER I

Mahatma Gandhi	: An Autobiography சத்திய சோதனை
R. Nanda	: Mahatma Gandhi - A Biography
Ravindra varma	: Gandhi in Anecdotes, Navajivan Publishers, Ahmedabad, 2001
டி.டி. திருமலை	: காந்தி
கல்கி	: மாந்தருள் ஒரு தெய்வம் இவானதி பதிப்பகம் சென்னை 1991
திரு.வி.க.	: காந்தியடிகளும் மனித வாழ்க்கையும்
ஜெயகாந்தன்	: வாழ்விக்க வந்த காந்தி
J.B. Kriplani	: Gandhi His Life and Thought
லூயி பிஷர்	: மகாத்மா காந்தி
Louis Fischer	: The Life of Mahatma Gandhi, Harper Collins Publishers, Uttarpradesh, 2017
பா. ஆனந்தி, மங்களவதி கேப்ரியல் ரூ	: காந்திய சிந்தனை வினா-விடை
வி.ஏ. வித்யா	: (Gandhian Thought Quiz)
சி. பெரிதாய் ரூ பா. ஆனந்தி	: மகாத்மா காந்தியடிகளின் காலம்

COURSE BOOK:

- மகாத்மா காந்தியின் வாழ்வும் அறவியலும் - டாக்டர் பா. ஆனந்தி ரூ டாக்டர் ச. செயப்பிரகாசம்
- Life and Values of Mahatma Gandhi - Dr. B. Ananthi & Dr. S. Jeyapragasam

PAPER II: NON VIOLENCE AND SARVODAYA

Code: CCHYGT02 **Hour: 1**

Credit: 1

COURSE OUTCOMES:

- Gain Knowledge on Mahatma Gandhi's Non - violence
- Discuss the Policies of Mahatma Gandhi on Truth and Action
- Analyse Sarvodaya and Antyodaya
- Assess the values introduced through Brahmacharya and Aparigraha
- Relate violence and Truth in our day today life with the teachings of Gandhiji

UNIT I

Meaning of Nonviolence (*ahimsa*): Nonkilling and noninjuring - Love, service and forgiving - Nonviolent Action: Peaceful resolution of conflict, nonviolent life style & constructive work and Satyagraha - Nonviolent values and ethics

UNIT II

Truth: Absolute and Relative - Moving beyond falsehood, errors and mistakes - Truth and pluralism - Truth and action - Truth and Nonviolence

UNIT III

Sarvodaya (welfare of all at all levels) and Antyodaya (welfare of the last first) - Means and Ends - Removal of untouchability - Communal Harmony - Uplift of Women

UNIT IV

Removal of poverty: Full & total appropriate employment - Self-dependence, Self - reliance, Swaraj and Swadeshi (love thy neighbour) - Self-control and Sublimation (*brahmacharya*) - Simple and Ethical living - *Aparigraha* (nonpossession) and Trusteeship (stewardship) - Appropriate and Holistic Science and Technology.

UNIT V

Place of Nonviolence and truth in our day to-day life and ways to enhance them - learn and practice three skills which would enhance your self-reliance and ability to help (serve) others in need - Resolve conflicts peacefully - Experience inter-religious relationships, dialogue and prayers.

தாள் II - அகிம்சையும் சர்வோதயமும்

Code: CCHYGT02 **Hour: 1**

Credit: 1

COURSE OUTCOMES:

- Gain Knowledge on Mahatma Gandhi's Non - violence
- Discuss the Policies of Mahatma Gandhi on Truth and Action
- Analyse Sarvodaya and Antyodaya
- Assess the values introduced through Brahmacharya and Aparigraha
- Relate violence and Truth in our day today life with the teachings of Gandhiji

அலகு 1

அகிம்சையின் பொருள் - கொல்லாமையும் துன்பம் செய்யாமையும் - அன்பு, தொண்டு மற்றும் மன்னித்தல் - அகிம்சைச் செயல்- அமைதி வழியில் சிக்கல் தீர்வு, அகிம்சை வாழ்வியலும் நிர்மாணப்பணியும், சத்தியாகிரகம் - அகிம்சை அறவியலும் விழுமியங்களும்.

அலகு 2

உண்மை : பேருண்மையும் (முழுமை உண்மையும்) சார்பு உண்மையும்- பொய்மைகள், தவறுகள் மற்றும் குற்றங்களுக்கு அப்பால் செல்லுதல் - உண்மையும் பன்மியமம் - உண்மையும் செயலும் - உண்மையும் அகிம்சையும்.

அலகு 3

சர்வோதயமும் (அனைவரின் நலம் அனைத்து நிலைகளிலும்) அந்தியோதயமும் (கடையவர் நலன் முதலில்) - குறிக்கோளும் வழிமுறையும் - தீண்டாமை நீக்கம் - சமூக ஒற்றுமை - மகளிர் முன்னேற்றம்.

அலகு 4

வறுமை நீக்கம் : முழுமையான ஏற்புடைய வேலை வாய்ப்பு - தற்சார்பும் தன்னிறைவும், சுயராஜ்ஜியம் மற்றும் சுதேசி (அயலவரை நேசி) - புலனடக்கமும் மேன்மையாக்கமும் (பிரம்மச்சரியம்) - எளிய மற்றும் அறவியல் வாழ்வு உடைமையின்மையும், அறங்காவலர் நெறியும் - ஏற்புடைய மற்றும் முழுமை அறிவியலும் தொழில் நுட்பமும்.

அலகு 5

நமது அன்றாட வாழ்வில் அகிம்சையும் உண்மையும் பெறுமிடமும் அதனை மேம்படுத்தும் வழிகளும் - உங்களது தற்சார்பையும் தேவையில் பிறருக்கு உதவும் ஆற்றலையும் வளர்க்கும் ஏதாவது மூன்று திறன்களைக் (ளுமடைடள) கற்றல் - அமைதி வழியில் சிக்கல் தீர்வு அனுபவங்கள் - சர்வசமய நட்புறவு, உரையாடல் மற்றும் வழிபாட்டு அனுபவம் பெறல்.

RECOMMENDED BOOKS

PAPER II

M.K. Gandhi	: Sarvodaya
	: Nonviolence in Peace and War (2 Vols)
Richard B. Gregg	: Power of Nonviolence
மு. வசந்தா (பதி.)	: சர்வோதயம்
R.R. Diwakar	: The Saga of Satyagraha
ச. செயப்பிரகாசம்	: அகிம்சை, மதுரை, 2008

COURSE BOOK:

- மகாத்மா காந்தியின் வாழ்வும் அறவியலும் - டாக்டர் பா. ஆனந்தி ரூ டாக்டர் ச. செயப்பிரகாசம்
- Life and Values of Mahatma Gandhi - Dr. B. Ananthi & Dr. S. Jeyapragasam

SKILL DEVELOPMENT PROGRAMME (SDP)

LIBRARY AND INFORMATION SCIENCE

THEORY PAPER & PRACTICAL

PROGRAMME OUTCOMES (PO)

PO. NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Gain theoretical knowledge and apply the expertise in different fields.
2.	Acquire Industry specific skills and can emerge as entrepreneurs.
3.	Develop critical and rational thinking to solve societal issues.
4.	Explore the knowledge and acclimatize it in the ever changing work environment.
5.	Evolve theories and develop innovative discipline specific ideas.
6.	Comprehend the nuances and develop innovative, discipline-specific ideas.

THEORY PAPER & PRACTICAL

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PO MAPPED
1.	Have knowledge about the Library Resources and Services.	PO-2, PO-5
2.	To get Equipped with capabilities required for placement in Libraries	PO-2, PO-5
3.	To Use maximum of resources available in the Library.	PO-1
4.	Get the basic practical approaches to use online resources.	PO-5, PO-6
5.	Familiarize with the Principles of Management in Library Services.	PO-4

OBJECTIVES:

- To familiarize the students with the methods of maintaining Library Resources and Services.
- To equip them with capabilities required for placement in Libraries.

TEACHING HOURS

The Certificate course will be conducted in 60 contact hours per year as follows

Theory = 30 Hours
Practical = 30 Hours

ELIGIBILITY

Any III U.G. and any P.G. Student

SYLLABUS
THEORY PAPER

Code: 23GL1SD01 **Hours: 2**

Credit: 1

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Have knowledge about the various types of Libraries.	PSO - 1	K1
CO - 2	Understand the various kinds of Reference sources available in the Library	PSO - 1	K2
CO - 3	Get the analytical approaches to classify and Arrange the reading materials in Library	PSO - 2	K4
CO - 4	Apply various methods to search the reading material and thereby get it at the earliest	PSO - 3	K3
CO - 5	To Acquire knowledge about the managerial principles and techniques in Libraries.	PSO - 5	K5

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Code: 23GL1SD01				THEORY PAPER							Hours: 2 Credit: 1
Course Outcomes	Programme Outcomes (PO)						Programme Specific Outcomes (PSO)					Mean Score of CO's
	1	2	3	4	5	6	1	2	3	4	5	
CO - 1	3	4	4	4	4	4	3	4	4	4	4	3.82
CO - 2	4	4	4	4	4	4	4	4	4	4	4	4
CO - 3	3	3	4	4	4	3	3	4	4	3	3	3.45
CO - 4	4	4	4	4	4	4	4	4	4	4	4	4
CO - 5	4	4	4	3	3	3	3	3	4	4	4	3.55
Overall Mean Score												3.76

Result: The score for this course is **3.76** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of POs & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

UNIT I: LIBRARY AND SOCIETY

Five Laws of Library Science - Extension services - Types of Library - Orientation to Library Staff and Students

UNIT II: INFORMATION SOURCES & SERVICES

Information - Reference Service, Definition, Kinds - Kinds of Sources of Information - Standard Ready Reference Sources - Bibliography - Definition, Types - Abstract: APA style.

UNIT III: CLASSIFICATION THEORY

Library classification - Definition, need and purposes - Colon Classification 6th Edition and Dewey Decimal Classification 20th Edition : General features.

UNIT IV: CATALOGUING THEORY

Definition, objectives and functions of catalogue - Physical and inner forms of catalogue - OPAC

UNIT V: LIBRARY MANAGEMENT

Principles of Management - Library Rules - Library routines (Selection, Acquisition, Technical processing) - Circulation Systems(Charging & Discharging), Automated charging system - Preservation of reading materials

UNIT VI: INFORMATION TECHNOLOGY

Computer application to Library work - Internet: General features, Search engines -e-resources - E-Library / Digital Library - INFLIBNET N-List, SHODHSINDH

PRACTICAL PAPER

Code: 23GL1SDP1 **Hours: 2**

Credit: 1

COURSE OUTCOMES:

CO. NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PSO ADDRESSED	COGNITIVE LEVEL
CO - 1	Apply colon classification scheme in classifying the reading materials.	PSO - 2	K3
CO - 2	Analyse the title according to Dewey Decimal Classification Scheme.	PSO - 2	K4
CO - 3	Synthesis code for the book title according to colon Classification.	PSO - 5	K6
CO - 4	Apply code for the book title according to Dewey Decimal Classification.	PSO - 2	K3
CO - 5	Get practical approaches to search and download online resources.	PSO- 2	K3

K1 - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

RELATIONSHIP MATRIX FOR COURSE OUTCOMES, PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

Code: 23GL1SDP1				**PRACTICAL PAPER**							**Hours: 2** / **Credit: 1**
Course Outcomes	**Programme Outcomes (PO)**						**Programme Specific Outcomes (PSO)**					**Mean Score of CO's**
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**	**4**	**5**	
CO - 1	3	3	4	4	4	4	3	4	4	4	3	3.64
CO - 2	4	3	4	4	4	4	4	4	3	4	4	3.82
CO - 3	4	4	4	4	4	3	3	4	4	3	3	3.64
CO - 4	3	4	4	4	4	4	4	4	4	4	4	3.91
CO - 5	3	4	4	3	3	3	3	3	4	4	4	3.45
Overall Mean Score												**3.69**

Result: The score for this course is **3.69** (High Relationship)

Note:

Mapping	1-20%	21 - 40%	41 - 60%	61 - 80%	81 - 100%
Scale	1	2	3	4	5
Relation	0.0 - 1.0	1.1 - 2.0	2.1 - 3.0	3.1 - 4.0	4.1 - 5.0
Quality	Very Poor	Poor	Moderate	High	Very High

Values Scaling:

Mean Score of COs = Total of Values / Total No. of Pos & PSOs	Mean Overall Score for COs= Total of Mean Scores / Total No. of COs

Colon Classification -6th edition, Main Classes

1. Dewey Decimal Classification 20th edition - I, II & III Summary
2. Computer - Internet searching and to download information
3. INFLIBNET N-List - Searching process

BOOKS FOR REFERENCE:

1. Library Organisation and Decision Making - J. B.Sharma - Pointer Publishers, Jaipur - 2008
2. Library and Information Science - C.K. Sharma, Akhil Kumar Singh and Rakesh Kumar- Atlantic publishers & distributors (P) Ltd. - 2008
3. Reference Service - Mr. Krishan Kumar
4. Basics of Library and Information Science - K.T.Dilli, Vikas Publishing.
5. Preservation of Library, Archival and Digital Documents - L.S.Ramaiah & G. Sujatha - ESS ESS Publications, New Delhi - 2008
6. E-Libraries in Computer age - C.Praveen S ingh - Alfa publications, New Delhi - 2008
7. Colon Classification - S.R.Ranganathan - 6th Edition - Asia publishing house, New Delhi - 1960
8. Dewey Decimal Classification - Edited by John P Comaromi etc. - 20th Edition - Forest press, New York - 1989

EVALUATION METHOD

Theory Paper Code : 23GL1SD01		Practical Paper Code : 23GL1SDP1	
Internal	25 Marks	Internal	40 Marks
External	75 Marks	External	60 Marks
Total	**100 Marks**	**Total**	**100 Marks**

CONTINUOUS INTERNAL ASSESSMENT COMPONENT (CIA) - 2023-2026 -UG

CIA components for Practical can be decided by the respective Departments.

Passing Minimum in the Continuous Internal Assessment is Compulsory for appearing the External Semester Examination

Theory:

Component	Marks	Marks
Internal test I	40	Converted to 25
Internal test II	40	
Quiz	10	
Assignment	5	
Attendance	5	
Total	**100**	**25**

PRACTICAL:

Continuous Internal Assessment (CIA) - 40 Marks

External Practical Exam - 60 Marks

PASSING MINIMUM FOR EXTERNAL SEMESTER EXAMINATION -UG

Semester Examination		
Theory	40% out of 75 Marks (i.e. 30 Marks)	40% out of 100 Marks (i.e. 40 Marks)
Practical	40% out of 60 Marks (i.e. 24 Marks)	

INTERNAL QUESTION PATTEREN (UG)

Class: **Time: 2 Hours**

Date: **Max.: 40 Marks**

Title of the Paper

Course Outcome	Bloom's K-level	Q. No	SECTION
			SECTION – A (10 x 1 = 10 marks) MCQs
			SECTION – B (2 × 5= 10 Marks) Answer ALL Questions. (Internal Choice)
			SECTION – C (2x 10 =20 Marks) Answer All Question. (Internal Choice)

EXTERNAL QUESTION PATTEREN

UG External Question Pattern for the courses carrying credits 5 and above

Class: **Time: 3 Hours**

Date: **Max.: 100 Marks**

Title of the Paper

Course Outcome	Bloom's K-level	Q. No	SECTION
			SECTION – A (15 x 1 = 15 marks) MCQs
			SECTION – B (5× 2= 10 Marks) Answer any FIVE Questions out of SEVEN
			SECTION – C (5x 5 =25 Marks) Answer All Question. (Internal Choice, one question from each Unit)
			SECTION – D (5x 10 =50 Marks) Answer All Question. (Internal Choice, one question from each Unit)

EXTERNAL QUESTION PATTEREN

UG External Question Pattern for the courses carrying credits below 5

Class: **Time: 2 ½ Hours**

Date: **Max.: 75 Marks**

Title of the Paper

Course Outcome	Bloom's K-level	Q. No	SECTION
			SECTION – A (15 x 1 = 15 marks) MCQs
			SECTION – B (5x 6 = 30 Marks) Answer All Question. (Internal Choice, one question from each Unit)
			SECTION – C (3x 10 =30 Marks) Answer All Question. (Internal Choice)

SKILL DEVELOPMENT PROGRAMME (SDP)

LIBRARY AND INFORMATION SCIENCE

PROGRAMME OUTCOMES (PO)

PO NO.	UPON COMPLETION OF THIS PROGRAMME THE STUDENTS WILL BE ABLE TO
1.	Gain theoretical knowledge and apply the expertise in different fields.
2.	Acquire Industry specific skills and can emerge as entrepreneurs.
3.	Develop critical and rational thinking to solve societal issues.
4.	Explore the knowledge and acclimatize it in the ever-changing work environment.
5.	Evolve theories and develop innovative discipline specific ideas.
6.	Comprehend the nuances and develop innovative, discipline-specific ideas.

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO NO.	UPON COMPLETION OF THIS COURSE THE STUDENTS WILL BE ABLE TO	PO MAPPED
1.	Have knowledge about the Library Resources and Services.	PO-2, PO-5
2.	To get Equipped with capabilities required for placement in Libraries	PO-2, PO-3
3.	To Use maximum of resources available in the Library.	PO-1
4.	Get the basic practical approaches to use online resources.	PO-5, PO-6
5.	Familiarize with the Principles of Management in Library Services.	PO-4

OBJECTIVES:

- To familiarize the students with the methods of maintaining Library Resources and Services.
- To equip them with capabilities required for placement in Libraries.

TEACHING HOURS

The Certificate course will be conducted in 180 contact hours per year as follows

Theory - Paper I = 60 Hours

Theory - Paper II = 60 Hours

Practical Paper = 60 Hours

ELIGIBILITY

Plus Two passed / Any U.G. and P.G. Student

SYLLABUS

THEORY PAPER - 1: FUNDAMENTALS OF LIBRARY AND INFORMATION SCIENCE

Code: 24GL1SD01 **Hours: 2**

Credit: 1

COURSE OUTCOMES:

- Have knowledge about the types, principles, classification, cataloguing and routine work of the Library
- Understand the types, principles, classification, cataloguing and routine work of the Library
- Apply the principles, classification, cataloguing and routine work of the Library
- Get the analytical approaches in the types, principles, classification, cataloguing and routine work of the Library
- Evaluate the types, principles, classification, cataloguing and routine work of the Library

UNIT I

Library concept and definitions; Types of libraries - Public, Academic and Special Libraries - Role of libraries in modern society.

UNIT II

Five Laws of Library Science and their implications. Principles of Management - Library Budget, Types

UNIT III

Library classification - Definition, need and purposes - Colon Classification 6th Edition and Dewey Decimal Classification: Main Classes

UNIT IV

Library Cataloguing - Definition, objectives and functions of catalogue - Physical and inner forms of catalogue - OPAC

UNIT V

Various sections in a Library- Routine work in Acquisition, Technical, Circulation, Maintenance, Reference, and Binding Sections

BOOKS FOR REFERENCE:

1. Library Organisation and Decision Making - J. B.Sharma - Pointer Publishers, Jaipur - 2008
2. Library and Information Science - C.K. Sharma, Akhil Kumar Singh and Rakesh Kumar- Atlantic publishers & distributors (P) Ltd. - 2008
3. Basics of Library and Information Science - K.T.Dilli, Vikas Publishing.
4. Colon Classification - S.R.Ranganathan - 6th Edition - Asia publishing house, New Delhi - 1960
5. Dewey Decimal Classification - Edited by John P Comaromi etc. - 20th Edition - Forest press, New York - 1989
6. Current Trends and Fundamentals in Library and Information Science - Sr. R. Fatima Mary **Sylvia**,Pavai Publications, Chennai - 2012

THEORY PAPER -2: INFORMATION SOURCES & SERVICES

Code: 24GL1SD02 **Hours: 2**

Credit: 1

COURSE OUTCOMES:

- Have knowledge about the types and kinds of Information Sources and Services.
- Understand the types and kinds of Information Sources and Services.
- Apply the types and kinds of Information Sources and Services.
- Get the analytical approaches of the types and kinds of Information Sources and Services in the practical life situation.
- Evaluate the types and kinds of Information Sources and Services.

UNIT I

Sources of Information - Documentary - Non- Documentary - Types of Information Sources - Primary, Secondary, Tertiary Sources

UNIT II

Kinds of Sources of Information - Standard Ready Reference Sources and Long-Range Reference Sources

UNIT III

Information Services - Reference Service - Definition, Need and Types - Ready Reference Service - Long Range Reference Service - User Needs - User Education, Extension services.

UNIT IV

E-resources - Concept and evolution; Merits and demerits of e-resources

UNIT V

Library Automation and Digitization- Digital Library- Artificial Intelligence applications in Libraries

BOOKS FOR REFERENCE:

1. Reference Service - Mr. Krishan Kumar
2. Digital Libraries Tools & Techniques - C. Praveen Singh - Alfa Publications, New Delhi - 2008
3. Library and Information Science - C.K.Sharma, Akhil Kumar Singh and Rakesh Kumar - Vol.III - Atlantic Publishers & Distributors (P) Ltd. - 2008
4. Current Trends and Fundamentals in Library and Information Science - Sr. R. Fatima Mary **Sylvia**, Pavai Publications, Chennai - 2012

PRACTICAL PAPER

Code: 24GL1SDP1 **Hours: 2**

Credit: 1

COURSE OUTCOMES:

- Acquire the knowledge of Colon Classification, Dewey Decimal Classification, ICT and INFLIBNET
- Understand the concept of Colon Classification, Dewey Decimal Classification, ICT and INFLIBNET
- Apply the knowledge of Colon Classification, Dewey Decimal Classification, ICT and INFLIBNET
- Analyse the practical knowledge of Colon Classification, Dewey Decimal Classification, ICT and INFLIBNET
- Synthesis the practical approaches of Colon Classification, Dewey Decimal Classification, ICT and INFLIBNET

Paper 3 - INFORMATION PROCESSING PRACTICE

Code: 24GL1SDP1 **Hours: 2**

Credit: 1

1. Classification: Colon Classification 6th edition, Main Classes
2. Classification: Dewey Decimal Classification 20th edition - I, II & III Summary
3. ICT - Internet Browsing; Downloading
4. E-Resources in INFLIBNET N-List - Browsing; Downloading

BOOKS FOR REFERENCE:

1. Digital Libraries Tools & Techniques - C. Praveen Singh - Alfa Publications, New Delhi - 2008
2. Colon Classification - S.R.Ranganathan - 6th Edition - Asia publishing house, New Delhi - 1960
3. Dewey Decimal Classification - Edited by John P Comaromi etc. - 20th Edition - Forest press, New York - 1989

EVALUATION METHOD

Theory Paper – 1 Fundamentals of Library and Information Science Code : 24GL1SD01		**Theory Paper - 1 Information Sources & Services Code : 24GL1SD02**		**Practical Paper Code : 24GL1SDP1**	
Internal	25 Marks	Internal	25 Marks	Internal I	50 Marks
External	75 Marks	External	75 Marks	Internal II	50 Marks
Total	**100 Marks**	**Total**	**100 Marks**	**Purely Internal, Total**	**100 Marks**

CONTINUOUS INTERNAL ASSESSMENT COMPONENT (CIA) - 2023-2026 -UG
CIA components for Practical can be decided by the respective Departments.

Passing Minimum in the Continuous Internal Assessment is Compulsory for appearing the External Semester Examination

Theory: Internal Component

Component	**Marks**	**Marks**
Internal test I	40	Converted to 25
Internal test II	40	
Assignment I	10	
Quiz	10	
Total	**100**	**25**

Question Patern					
SECTION	**Types of Question**	**Number of Qns.**	**Number of Qns. to be answered**	**Marks for each Qn.**	**Total**
A Q. No (1-15)	Multiple Choice	15	15	1	15
B Q. No (16-21)	either or type.	6	5	5	30
C Q. No (22-24)	either or type	3	3	10	30

YOGA FOR YOUTH EMPOWERMENT

Semester: Non semester **Hours: 2**

Code : 23YYSD01 **Credit: 2**

OBJECTIVES:

- Providing value education to improve the students' character.
- Understanding yogic life and physical health.
- Maintaining youthfulness.
- Measure and method in five aspects of life.

UNIT: 1

Physical Health: Manavalakalai (SKY) Yoga - Introduction - Education as a means for youth empowerment - Greatness of Education - Yoga for youth Empowerment.

Simplified Physical Exercises - Hand, Leg, Breathing. Eye exercises - Kapalabathi, Makarasana Part I, Makarasana Part II, Body Massage, Acu pressure, Relaxation exercises – Benefits. **Yogasanas I** - Pranamasana - Hastha Uttanasana - Pada asthasana – Aswa Sanjalana Asana - Thuvipatha asva Sanjalana asana - Astanga Namaskara –Bhujangasana. Altha Muktha Savasana, Aswa Sanjalana Asana – Pada Hasthasana - Hastha Uttanasana - Pranamasana. **Pranayama** - Naddi suddi -Clearance Practice- Benefts. Simplified Physical Exercise - Kayakalpa Pracices - Meditation Practices. **(6 Hours)**

UNIT II

Life force: Reasons or Diseases - Natural reasons (Genetic / imprints, Planetary Position, Natural calamities and climatic changes) - Unnatural reasons (Food habits, Thoughts, Deeds). **Philosophy of Kaya kalpa** - Physical body - Sexual vital fluid - Life force - Bio-Magnetism-Mind. **Maintaining youthfulness** - Postponing old age - Transformation of food into seven components - Importance of sexual vital fluid - Measure and method in five aspects of life - Controlling undue Passion. **Kayakalpa practice** - Aswini Mudra - Ojas breath - Benefts of Kaya Kalpa. **(6 Hours)**

UNIT III

Mental Health: Mental Frequencies - Beta, Apha, Theta and Delta wave - Agna Meditation explanation-benefits. **Shanti meditation** - Shanthi Meditation explanation – benefits. **Thuriya Meditation** - Thuriya Meditation explanation – benefits. **Benefits of Blessing** - Self blessing (Auto suggestion) - Family blessing - Blessing the others -World blessing - Divine protection. **(6 Hours)**

UNIT IV

Values: Human Values - Self-control - Self-confidence - Honesty Contentment- Humility Modesty Tolerance- Adjustment- Sacrifice- Forgiveness. Purity (Body, Dress, Environment) - Physical purity - Mental purity - Spiritual purity. **Social Values** - Nonviolence - Service Patriotism Equality. Respect for parents and elders - care and protection - Respect for teacher. Punctuality - Time Management. **(6 Hours)**

UNIT V

Morality (virtues): Importance of introspection - I - Mine (Ego, Possessiveness) Six Evil Temperaments - Greed - Anger- Miserliness - Immoral sexual passion Inferiority and superiority Complex - Vengeance. Maneuvering of Six Temperaments - Contentment Tolerance - Charity Chastity - Equality – Pardon (Forgiveness). Five essential Qualities acquired through Meditation - Perspicacity- Magnanimity - Receptivity - Adaptability -Creativity (Improved Memory Power). **(6 Hours)**

BOOKS FOR REFERENCE:

- Yoga for modern age - Thathuvagnani Vethathiri Maharishi.
- Simplified Physical Exercises- Thathuvagnani Vethathiri Maharishi.
- Kayakalpam - Thathuvagnani Vethathiri Maharishi.
- Thirukkural - Rev.Dr.G.U.Pope.
- Mind- Thathuvagnani Vethathiri Mahaishi.
- Sound Health through yoga- Dr.Chandrasekaran.
- Light on yoga –BKS Jyenger.
- Unavu murai - Thathuvagnani Vethathiri Maharishi.

EVALUATION

YOGA FOR YOUTH EMPOWERMENT

Internal	External	Total
25	75	**100**

CIA Components

Component		Marks
Test-I	:	40
Test - II	:	40
Assignment	:	05
Quiz/Seminar	:	10
Attendance	:	05
Total	**:**	**100**

The total internal marks obtained for 100 will be Converted into marks obtained for 25

YOGA FOR YOUTH EMPOWERMENT

(EXTERNAL – EVALUATION)

Time: 3 Hours **Max. Marks: 75**

Part	Types of questions	Number of Qns.	Number of Qns. to be answered	Marks for each qn.	Total
A Q. NO (1-20)	MCQ(Four questions from each Unit)	20	20	1	20
B Q. NO (21-25)	Either (or) type. (Two questions from each unit)	10	5	5	25
C Q. NO (25-30)	Open choice (One question from each unit)	5	3	10	30

PRACTICAL - YOGA FOR YOUTH EMPOWERMENT -23YYSD02

Semester: Non- Semester

Hours: 2

Code : 23YYSD02 **Credit: 1**

1. **Simplified Physical Exercises** - Hand, Leg, Breathing. Eye exercises - Kapalabathi, Makarasana Part I, Makarasana Part II, Body Massage, Acu pressure, Relaxation exercises – Benefits.
2. **Yogasanas I** - Pranamasana - Hastha Uttanasana - Pada asthasana – Aswa Sanjalana Asana - Thuvipatha asva Sanjalana asana - Astanga Namaskara – Bhujangasana. Altha Muktha Savasana, Aswa Sanjalana Asana – Pada Hasthasana - Hastha Uttanasana - Pranamasana.
3. **Pranayama** - Naddi suddi - Clearance Practice- Benefts. Simplified Physical Exercise - Kayakalpa Pracices - Meditation Practices.

YOGA FOR YOUTH EMPOWERMENT – PRACTICAL -I (Internal Only)

CIA Components for Internal Assessment

Components		**Marks**
Component- I (**Physical Exercises)**	:	50
Component- II (**Yogasanas I)**	:	25
Component –III (**Pranayama)**	:	25
Total	**:**	**100**