VIVEKANANDA COLLEGE

College with Potential for Excellence

Residential & Autonomous – A Gurukula Institute of Life-Training

Re-accredited (3rd Cycle) with 'A' Grade (CGPA 3.59 out of 4.00) by NAAC

Affiliated to Madurai Kamaraj University

(Managed by Sri Ramakrishna Tapovanam, Tirupparaitturai, Trichy)

TIRUVEDAKAM WEST, MADURAI DISTRICT– 625 234

www.vivekanandacollege.ac.in

Post Graduate and Research Department of Chemistry

Programme**: B.Sc. Chemistry**

CBCS and Learning Outcomes based Curriculum Framework

(LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

POST GRADUATE AND RESEARCH DEPARTMENT OF CHEMISTRY

Programme : B.Sc. Chemistry

Vision

- ✓ To prepare the students of chemistry in such a way that they are self-reliant, highly informative and a better candidate in the demanding and ever changing world.
- ✓ To prepare the knowledgeable graduates for careers in academia, industry and government.

Mission

- ✓ To foster robust degree programme that prepare students for advanced studies in chemistry and careers in chemical industry.
- ✓ To encourage students to face IIT-JAM, CSIR-NET, GATE, SET and other competitive examinations.
- ✓ To invite scientists from National/International laboratories for lectures of global standard.
- ✓ To function as a vibrant and high quality research centre by supporting the faculty involved in such pursuits.

About the Programme

Programme Educational Objectives (PEOs)

A graduate of B.Sc., Chemistry programme after three years will have

PEO 1	Depth knowledge in fundamentals of chemistry, effective skills to critically assess, analyze and solve problems in chemistry
PEO 2	Enormous job opportunities at all level of chemical, pharmaceutical, paper, food, leather, cement and materials related industry
PEO 3	Ability to qualify common entrance, competitive and service commissions examinations
PEO 4	Extending continuous progress in their professional career through lifelong learning and respecting human values and ethics with environment concern
PEO 5	Developing teamwork, leadership skills and moral values procured through life training for the welfare of their working environment and society

Graduate Attributes (GAs)

	Attributes	Description	Part
GA 1	**Modern Tool Usage**	Application of appropriate techniques, resources and modern tools to complex activities with an understanding of the limitations	**Hand**
GA 2	**Environment and Sustainability**	Understanding the impact of solutions in societal and environmental contexts for sustainable development	**Hand**
GA 3	**Technical and Entrepreneurial Skills**	Creating confidence to become an entrepreneur by providing entrepreneurial and technical skills	**Hand**
GA 4	**Capacity**	Ability to face the realities of life and withstand current challenges	**Hand**
GA 5	**Graduate and Society**	Application of reasoning to assess social health, safety, legal and cultural issues and the consequent responsibilities relevant to the social practice	**Heart**
GA 6	**Ethics and Values**	Application of ethical principles, professional ethics, responsibilities and norms of the life through value oriented life training	**Heart**
GA 7	**Creativity**	Demonstration of knowledge, understanding of management principles and application of these to	**Heart**

		one's own work to manage projects and in multidisciplinary environments	
GA 8	**Harmonious Development of Individual**	Making an individual as perfect man through the harmonious development of physical, emotional and intellectual cultures	**Heart**
GA 9	**Adaptability**	Accepting the ground realties and adapt to the situation to overcome frustrations and failures.	**Heart**
GA 10	**Knowledge**	Application of knowledge of the respective discipline to the solution of complex problems in the day-to-day life	**Head**
GA 11	**Critical Thinking**	Analysis of problems to reach substantiated conclusion by using the principles of mathematics, natural and social sciences and byusing research-based knowledge and research methods	**Head**
GA 12	**Problem Solving**	Designing of solution for complex problems that meet the specified needs with appropriate consideration as to public health and safety, cultural and societal environment	**Head**
GA 13	**Leadership Quality**	Functioning effectively as an individual, as a member or a leader in diverse teams and in multidisciplinary settings	**Head**
GA 14	**Communication**	Communication with society at large, such as, effective reporting, documentation designing, effective presentations and clear instructions	**Head**
GA 15	**Life-long learning**	Recognizing the need for independent and life-long learning in the context of technological changes	**Head**

Programme Outcome (POs)

P.No.	Programme Outcome
PO1	Disciplinary Knowledge and Critical Thinking
PO2	Effective Communication and Digital Literacy
PO3	Social Interaction and Problem Solving
PO4	Effective Citizenship and Social Responsibility
PO5	Professional Ethics and Human Values
PO6	Environment and Sustainability
PO7	Self –directed and life – long learning

Programme Specific Outcomes (PSOs)

PSO 1	*The students will understand the existence of matter in the universe as solids, liquids, and gases which are composed of molecules, atoms and sub atomic particles.*
PSO 2	*Students will learn to estimate inorganic salt mixtures and organic compounds both qualitatively and quantitatively using the classical methods of analysis in practical classes.*
PSO 3	*Students will grasp the mechanisms of different types of reactions both organic and inorganic and will try to predict the products of unknown reactions.*
PSO 4	*Students will learn to synthesize the chemical compounds by maneuvering the addition of reagents under optimum reaction conditions.*

PSO 5	*Students will get aware and handle the sophisticated instruments/equipment and Develop research oriented skills.*

Under Graduate Programmes - Question Paper Pattern for Both CIA & End Semester Examinations

With Effect From: 2021-22 onwards

Part I (Tamil / Sanskrit) and Part II English

LOCF Syllabus UG: Section A – Remembering (K1)
Section B – Remembering (K1)
Section C – Understandinging (K2)
Section D – Applyinging (K3)

CIA Test Question Paper Pattern (UG) – 3 Tests per Semester – 2 Hours

Section - A: MCQs (Compulsory)	10 X 1 =10 Marks
Section - B: VSA (5 out of 7)	5 X 2 = 10 Marks
Section - C: SA (3 out of 5)	3 X 6 = 18 Marks
Section - D: LA (1 out of 2)	1 X 12 =12 Marks

Total	**50 Marks**

End Semester Examinations Question Paper Pattern (UG) – 3 Hours

Section - A: MCQs	10 X 1 =10 Marks **(From Question Bank given by the Course Teacher)**
Section - B: VSA (5 out of 7)	5 X 2 =10 Marks
Section - C: SA (Either-or)	5 X 5 = 25 Marks
Section - D: LA (3 out of 5)	3 X 10 =30 Marks

Total	**75 Marks**

Part III (Core, Allied &Elective)

CIA Test Question Paper Pattern (UG) – 3 Tests per Semester – 2 Hours

Section - A: MCQs (Compulsory)	10 X 1=10 Marks
Section - B: VSA (5 out of 7)	5 X 2 = 10 Marks
Section - C: SA (3 out of 5)	3 X 6 = 18 Marks
Section - D: LA (1 out of 2)	1 X 12=12 Marks

Total	**50 Marks**

End Semester Examinations Question Paper Pattern (UG) – 3 Hours

Section - A: MCQs	10 X 1 =10 Marks **(From Question Bank given by the Course Teacher)**
Section - B: VSA (5 out of 7)	5 X 2 =10 Marks
Section - C: SA (Either-or)	5 X 5= 25 Marks
Section - D: LA (3 out of 5)	3 X 10 =30 Marks

Total	**75 Marks**

Part IV (SBS-Skills Based Subjects)

CIA Test Question Paper Pattern (UG) – 3 Tests per Semester at Department Level– 1 Hour

Section - A: MCQs	5 X 1 = 5Marks
Section - B: VSA (2 out of 4)	2 X 2 = 4 Marks
Section - C: SA (1 out of 2)	1 X 6 = 6 Marks
Section - D: LA (1 out of 2)	1 X 10=10 Marks

Total	**25 Marks**

For competitive exam questions Pattern (OMR with 4 options will be used) 50X1=50 (**1 hour**)

End Semester Examinations Question Paper Pattern (UG) – 2 Hours

Section - A: MCQs	10 X 1 = 10 Marks **(From Question Bank given by the Course Teacher)**
Section - B: VSA (5 out of 7)	5 X 2 = 10 Marks
Section - C: SA (Either-or)	3 X 9 = 27 Marks
Section - D: LA (2 out of 4)	2 X 14= 28 Marks

Total	**75 Marks**

For competitive exam questions Pattern (OMR with 4 options will be used) 75X1=75 (**2 hours**)

Part IV (Non Major Elective, Value Education and Environmental Studies)

CIA Test Question Paper Pattern (UG) – 1 Test per Semester – 2 Hours

Section - A: MCQs	10 X 1 = 10 Marks
Section -B: VSA (5 out of 7)	5 X 2 = 10 Marks
Section - C: SA (3 out of 5)	3 X 6 = 18 Marks
Section - D: LA (1 out of 2)	1 X 12= 12 Marks

Total	**50 Marks**

End Semester Examinations Question Paper Pattern (UG) – 2 Hours

Section - A: MCQs	10 X 1 = 10 Marks **(From Question Bank given by the Course Teacher)**
Section - B: VSA (5 out of 7)	5 X 2 = 10 Marks
Section - C: SA (Either-or)	3 X 9 = 27 Marks
Section - D: LA (2 out of 4)	2 X 14= 28 Marks

Total	**75 Marks**

Part V (End Semester Examinations only)

EXTENSION ACTIVITIES

End Semester Examinations Question Paper Pattern (UG) – 2 Hours

Section - A: MCQs	10 X 1 = 10 Marks
Section - B: VSA (5 out of 7)	5 X 2 = 10 Marks
Section - C: SA (Either-or)	3 X 9 = 27 Marks
Section - D: LA (2 out of 4)	2 X 14= 28 Marks

Total	**75 Marks**

Part VI (End Semester Examinations only) UG & PG

1. General Knowledge **– (One Examination per Semester– UG & PG) – 1 Hour**

Section – A: MCQs	50 X 1 =50 Marks (**OMR Sheet**)

Total	**50** Marks
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2. Wit for Wisdom and Humour for Health – (One Examination per Year – UG & PG) – 1 Hour

Section – A: LA (5 out of 7)	5 X 20= 100 Marks

Total	**100** Marks
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3. Spiritual Education– (One Examination per Year – UG & PG) – 1 Hour

Section – A: VSA	20 X 2= 40 Marks
Section – B: SA (3 out of 5)	3 X 5 = 15 Marks
Section –C: LA (2 out of 4)	2 X 10 =20 Marks

Total	**75** Marks
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4. Physical Training– (One Examination for III Year UG & II Year PG Students) – 1 Hour

Section - A: MCQs	10 X 1 = 10 Marks
Section – B: SA ((Either-or))	4 X 5 = 20 Marks
Section – C: LA (2 out of 4)	2 X 10 =20 Marks

Total	**50** Marks

Continuous Internal Assessment (CIA) - Distribution of Marks

	UG		**PG**	
Part - I, II Part - III	Test (Best Two)	15 Marks	Test (Best Two)	15 Marks
	Cycle Test (5 × 1 = 5)	5 Marks	Quiz / Seminar	5 Marks
	Assignment (5 × 1 = 5)	5 Marks	Assignment	5 Marks
	Total	**25 Marks**	**Total**	**25 Marks**
Part- IV	Test (Best Two for SBS)	20 Marks		
	Assignment	5 Marks		
	Total	**25 Marks**		

Abbreviations:

MCQs: Multiple Choice Questions
SA : Short Answer
VSA: Very Short Answer
LA : Long Answer

VIVEKANANDA COLLEGE, TIRUVEDAKAM WEST – 625 234

PG AND RESEARCH DEPARTMENT OF CHEMISTRY

Programme:B.Sc. Chemistry(Under CBCS and LOCF)

SCHEME OF EXAMINATIONS, (Batch 2021-2024)

FIRST SEMESTER

Part	Study Component	Course Code	Course Title	Hrs.	Credits	C.I.A. Marks	E.S.E. Marks	Total Marks
I	Tamil	P1LT11	Kavithai Ilakkiyaamum Kathai Ilakkiyamum	6	3	25	75	100
	Sanskrit	P1LS11	Fundamental grammar and History of Sanskrit Literature –I					
II	English	P2LE11	English for Basic Communication Skills	6	3	25	75	100
III	Core Course	07CC11	Organic Chemistry - I	4	4	25	75	100
III	Core Course	07CC12	Inorganic Chemistry - I	3	4	25	75	100
III	Core Course	07CP23	Volumetric Analysis and Organic Estimation	3	-	-	-	-
III	AEC	06AE01	Allied Physics–I	4	4	25	75	100
III	AEC	06AE03	Allied Physics Practical	2	-	-	-	-
IV	GEC	07GE11	Food Chemistry	2	2	25	75	100
			TOTAL	**30**	**20**			300

SECOND SEMESTER

Part	Study Component	Course Code	Course Title	Hrs.	Credits	CIA Marks	ESE Marks	Total Marks
I	Tamil	P1LT21	Idaikkala Ilakkiyamum Nadaga Ilakkiyamum	6	3	25	75	100
	Sanskrit	P1LS21	Poetry, Grammar & History of Sanskrit Literature – II					
II	English	P2LE21	English for Advanced Communication Skills	6	3	25	75	100
III	Core Course	07CC21	Organic Chemistry – II	4	4	25	75	100
	Core Course	07CC22	Physical Chemistry - I	3	4	25	75	100
	Core Course	07CP23	Volumetric Analysis and Organic Estimation	3	4	40	60	100
	AEC	06AE02	Allied Physics - II	4	4	25	75	100
	AEC	06AE03	Allied Physics Practical	2	2	40	60	100
IV	GEC	07GE21	Chemistry in Medicine	2	2	25	75	100
			TOTAL	**30**	**26**			**500**
07CP23 End Semester Practical Examinations = 4 Hrs								

THIRD SEMESTER

Part	Study Component	Course Code	Course Title	Hrs.	Credits	C.I.A. Marks	E.S.E. Marks	Total Marks
I	Tamil	P1LT31	Kappiya Ilakkiyamum Urainadai Ilakkiyamum	6	3	25	75	100
	Sanskrit	P1LS31	Prose, poetics and History of Sanskrit Literature –III					
II	English	P2LE31	English for Academic Excellence and Success	6	3	25	75	100
III	Core Course	07CC31	Inorganic Chemistry -II	4	4	25	75	100
	Core Course	07CC32	Physical Chemistry – II	3	4	25	75	100
	Core Course	07CP43	Organic Analysis and Preparation	3	-	-	-	-
	AEC	05AE01/09AE01	Mathematics – I/Animal Organisation	6/4	4/4	25/25	75/75	100
	AEC		Practical	2	-	-	-	-
IV	SEC	07SE31	Medicinal & Pharmaceutical Chemistry	2	2	25	75	100
			TOTAL	**30**	**20**			**300**

FOURTH SEMESTER

Part	Study Component	Course Code	Course Title	Hrs.	Credits	CIA Marks	ESE Marks	Total Marks
I	Tamil	P1LT41	Sanga Ilakkiyamum Neethi Ilakkiyamum	6	3	25	75	100
	Sanskrit	P1LS41	Drama and History of Sanskrit Literature – IV					
II	English	P2LE41	English for Career and Professional Developments	6	3	25	75	100
III	Core Course	07CC41	Organic Chemistry – III	4	4	25	75	100
	Core Course	07CC42	Inorganic Chemistry- III	3	4	25	75	100
	Core Course	07CP43	Organic Analysis and Preparation	3	4	40	60	100
	AEC	05AE02/09AE02	Mathematics – II/Biology and Human Welfare	3/4	3/4	25/25	75/75	100
	AEC	05AE03/09AP03	Mathematics – III/AEC Practical	3/2	3/2	25/40	75/60	100
IV	SEC	07SE41	Water Analysis	2	2	25	75	100
07CP43 End Semester Practical Examinations = 4 Hrs								
			TOTAL	**30**	**26**			**500**

FIFTH SEMESTER

Part	Study Component	Course Code	Course Title	Hrs.	Credits	C.I.A. Marks	E.S.E. Marks	Total Marks
III	Core Course	07CC51	Organic Chemistry –IV	5	4	25	75	100
	Core Course	07CC52	Physical Chemistry – III	5	4	25	75	100
	Core Course	07CP53	Practical Physical Chemistry	5	4	40	60	100
	Core Course	07CP62	Inorganic Analysis and Gravimetric Estimation	6	-	-	-	-
	DSE	07DS5A	Metals and Catalysis	5	5	25	75	100
		07DS5B	Polymer Chemistry					
IV	SEC	07SE51	Applied Chemistry	2	2	25	75	100
	ES	ESUG51	Environmental Studies	2	2	25	75	100
			TOTAL	**30**	**21**			**400**
07CP53 End Semester Practical Examinations = 6Hrs								

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SIXTH SEMESTER

Part	Study Component	Course Code	Course Title	Hrs.	Credits	CIA Marks	ESE Marks	Total Marks
III	Core Course	07CC61	Physical Chemistry- IV	6	4	25	75	100
	Core Course	07CP62	Inorganic Analysis and Gravimetric Estimation	6	4	40	60	100
	DSE	07DS6A	Project	5	5	25	75	100
		07DS6B	Textile Chemistry					
	DSE	07DS6C	Organic Spectroscopy	5	5	25	75	100
		07DS6D	Stereochemistry					
IV	SEC	07SE61	Industrial Chemistry and Clinical Chemistry	2	2	25	75	100
	SEC	07SE62	Chemistry for Competitive Examinations	2	2	25	75	100
	SEC	07SE63	Nano chemistry and Green Chemistry	2	2	25	75	100
	VE	VEUG61	Value Education	2	2	25	75	100
V	EA	EAUG61	Extension Activity		1	25	75	100
07CP62 End Semester Practical Examinations = 6 Hrs								
			TOTAL	**30**	**27**			**400**
			Total Hours	**180**				
			Total Credits		**140**			**2400**
			Total Marks					

Note:
AEC - Ability Enhancement Course.
GEC - Generic Elective Course.
SEC - SkillEnhancement Course.
DSE - Discipline Specific Elective.

விவேகானந்த கல்லூரி, திருவேடகம் மேற்கு - 625 234.
தமிழ்த்துறை,

Programme : B.A., BSc., (CBCS and LOCF)

(For those students admitted during the Academic Year 2021 – 2022 and after)

பாடத்திட்டத்தின் கட்டமைப்பு (PROGRAMME STRUCTURE)

UG Language PART – I **TAMIL**		SEMESTER: **I**
Subject Title: கவிதை இலக்கியமும் கதை இலக்கியமும்		
Course Code: P1LT11/P1CT11	Hours per week**: 18**	Credit**: 03**
CIA Marks: **25**	ESE Marks: **75**	Total Marks: **100**

நிரல் கல்வி திட்டத்தின் குறிக்கோள்கள்
(Programme Educational Objectives)

- செம்மொழியான தமிழ் மொழியின் இலக்கியம் மற்றும் இலக்கணத்தின் வரலாறு தொடர்பான சிறப்பு கூறுகளை வழங்குதல்.
- தமிழ் இலக்கியத்தின் வாயிலாக பண்டைய தமிழர்கள் தங்கள் வாழ்க்கையில் பின்பற்றிய சுய ஒழுக்கங்களையும், அதன் மதிப்புகளையும் எடுத்துரைத்து அதனை செயல்படுத்த வழிவகை செய்தல்.
- தாய் மொழி அல்லாத பிற மொழியினைக் கற்றுத் தேர்ந்த மாணவர்களுக்குத் தமிழ் மொழியில் உள்ள இலக்கியத்தின் உறுதியான திறன்களை எடுத்துரைத்து, அதனை அம்மாணவர்கள் பெற முயற்சித்தல்.
- அனைத்து வகைகளிலும் முழுமையான ஆளுமைத் திறன்களின் வளர்ச்சியை ஊக்குவித்தல்.

Programme Learning Outcomes (PLOs)

1. தமிழர்களின் பெருமையினை உணர்ந்து கொள்ளுதல்.
2. படைப்பாளர்களின் தன்மைகளை அறிந்து படைப்பாற்றல் பெறுதல்.
3. வாழ்க்கையின் ஒழுக்க நெறிகளைக் கடைபிடித்தல்.
4. மொழியினைப் பிழையின்றி பேச எழுதப்பழகுதல்.
5. இலக்கியங்களின் படைப்பாளர்களின் வரலாற்றினை அறிந்து கொள்ளுதல்.

முன்னுரை(Preamble)

1. மரபின் பழம்பெருமையினை மாணவர்களுக்கு உணர்த்துதல்.
2. புதுக்கவிஞர்களின் படைப்பாக்கங்களின் பொருண்மை வழி கட்டமைப்பு நிலைகளை எடுத்துரைத்தல்.
3. தனி மனித ஒழுக்கம் சார்ந்த நிலைகளைக் கடைபிடிக்க வலியுறுத்துதல்.
4. தமிழ் எழுத்துக்களின் வகைமைகளை வெளிக்கொணர வழிவகை செய்வித்தல்.
5. தமிழிலக்கியத்தின் கவிதை மற்றும் கதை இலக்கிய வரலாற்றினை புலப்படுத்துதல்.

பாடதிட்டத்தின் முடிவுகள்(Course Learning Outcomes (CLOs)

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

NO	Course Learning Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	மரபுக்கவிதை வாயிலாக மொழியின் சிறப்புகள், பொதுவுடைமை குறித்ததான சிந்தனைகளை வரையறை செய்வர்.	K_1, K_2
CLO 2	புதுக்கவிதைகளின் வழி சமூக போக்குகளையும், மக்களின் வாழ்வியல் நிலைப்பாட்டையும் கலந்துரையாடுவர்.	K_2, K_3
CLO 3	சிறுகதை மற்றும் நாவல் இலக்கியங்கள் வழி படைப்புகள் வெளிப்படுத்தும் மக்களின் வாழ்க்கை முறைகளையும், படைப்பாளர்களின் வரலாற்றினையும், கதையெழுதும் உத்திகளையும் விவரிப்பர்.	K_2, K_3
CLO 4	தமிழ் மொழியின் எழுத்து வடிவங்கள் குறித்தும் அவற்றை வகைப்படுத்தும் திறன்கள் குறித்தும் வெளிப்படுத்துவர்.	K_2
CLO 5	மொழியினைப் பிழையின்றி எழுதுதல், பேசுதல், ஒலி வேறுபாட்டினை அறிந்து மயக்கம் நீக்குதல் போன்ற ஒரு மொழியின் பயன்பாட்டுத் தன்மையைத் தெளிவுறுத்துவர்.	K_1, K_2, K_3

K_1-Knowledge **K_2-Understand** **K_3-Apply**

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO6	PLO7
CLO 1	9	3	9	9	3	9	9
CLO 2	9	3	9	3	9	3	9
CLO 3	9	3	9	9	3	9	9
CLO 4	9	1	3	9	9	-	9
CLO 5	9	1	3	9	9	-	9
	45	11	33	39	33	21	45

Note: Mapping Score Strong-9, Medium- 3 and Low-1

பாடத்திட்டம் (Syllabus)

அலகு - 1	மரபுக்கவிதைகள் 1.1 பாரதியார் கவிதைகள் 1. தமிழ் (நான்கு பத்தி) 2. நடிப்புச் சுதேசிகள் 1.2. பாரதிதாசன் கவிதைகள் **1.** நீங்களே சொல்லுங்கள் **2.** புதியதோர் உலகம் செய்வோம் 1.3. நாமக்கல் கவிஞர் வெ.இராமலிங்கம் பிள்ளை 1.குருதேவர் இராமகிருஷ்ணர் (3 பாடல்கள்) 1.4. சோழவந்தானூர் அரசஞ்சண்முகனார் 1.திருவடிப்பத்து (மதுரை மீனாட்சியம்மை மீது பாடியது)	18மணிநேரம்
அலகு - 2	புதுக்கவிதைகள் 2.1 கவிஞர் கண்ணதாசன் - 'அனுபவமே கடவுள்' 2.2. கவிஞர் வைரமுத்து - "தீக்குச்சிக்குத் தின்னக் கொடுப்போம்' 2.3 கவிஞர் மு.மேத்தா- "பொங்கும் கனவுகள்', 'தாய்'	18மணிநேரம்
அலகு - 3	சிறுகதை - நாவல் இலக்கியம் 3.1.'உள்ளம் பெருங்கோயில்' - சிறுகதைத் தொகுப்பு (தமிழ்த்துறை வெளியீடு) 3.2.'ஆத்தங்கரை ஓரம்' - நாவல்இலக்கியம் - வெ.இறையன்பு	18மணிநேரம்
அலகு - 4	தமிழ் இலக்கணம் - எழுத்து 4.1 முதல் எழுத்துகள் - சார்பெழுத்துகள் 4.2 மொழி முதல் எழுத்துகள்-மொழி இறுதிஎழுத்துகள் 4.3 வல்லெழுத்து மிகும் இடங்கள் 4.4 வல்லெழுத்து மிகாஇடங்கள்	18மணிநேரம்
அலகு - 5	தமிழ் இலக்கிய வரலாறும் பயன்பாட்டுத் தமிழும் ய. கவிதை இலக்கியத்தின் தோற்றமும் வளர்ச்சியும் டி. கதை இலக்கியத்தின் தோற்றமும் வளர்ச்சியும் உ. மரபுப்பிழை நீக்குதல் - பிறமொழிச் சொற்களை நீக்குதல் - பிழையற்றத் தொடரைத் தேர்ந்தெடுத்தல் - ஒருமை பன்மை மயக்கம் - ஓர் எழுத்து ஒரு மொழிக்குரிய பொருள் - ஒலி வேறுபாடுகளும் பொருள் வேறுபாடுகளும் - பொருத்தமான பொருள் - பொருத்தமான தொடர் அறிதல்.	18மணிநேரம்

பாட நூல்கள்(Text books)

1. தமிழ்ச் செய்யுள் தொகுப்பு, தமிழ்த்துறை வெளியீடு, விவேகானந்த கல்லூரி, திருவேடகம் மேற்கு.
2. சிறுகதைத்தொகுப்பு, 'உள்ளம் பெருங்கோயில்' தமிழ்த்துறை வெளியீடு, விவேகானந்த கல்லூரி, திருவேடகம் மேற்கு.
3. ஆத்தங்கரை ஓரம் - நாவல் நியூ செஞ்சுரி புக் ஹவுஸ்(பி)லிட், 41-பி, சிட்கோ இண்டஸ்டிரியல் எஸ்டேட், அம்பத்தூர், சென்னை- 600 098.

பார்வை நூல்கள் (Reference Books)

1. தமிழ் இலக்கிய வரலாறு முனைவர் கி.இராசா நியூ செஞ்சுரி புக் ஹவுஸ்(பி)லிட், 41-பி, சிட்கோ இண்டஸ்டிரியல் எஸ்டேட், அம்பத்தூர், சென்னை- 600 098.
2. நற்றமிழ் இலக்கணம டாக்டர் சொ.பரமசிவம் பாட்டுப் பதிப்பகம், 1269, 32-ஆம் தெரு,'ஐ' பிரிவு, சென்னை - 600 040.

கற்பிக்கும் முறைகள்(Pedagogy)

விரிவுரை கொடுத்தல்,கலந்துரையாடல், காட்சிப் பதிவுகளின் வழியாக புலப்படுத்துதல்.

கற்பிக்க உதவுதல் (Teaching Aids)

கரும்பலகை பயன்படுத்துதல், காட்சி திரைவழியாகப் புலப்படுத்துதல்.

DEPARTMENT SANSKRIT

Programme: B.A./ B.Sc. (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

PART – I **: Sanskrit**		SEMESTER - I
Course Title **: FUNDAMENTAL GRAMMAR AND HISTORY OF LITERATURE –VEDAS TO PANCAMAHAKAVYAS**		
Course Code: **P1LS11**	Hours per week: **6**	Credits: **3**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble:

Sanskrit is offered as an alternative language under Part –I for B.A./ B.Sc students during first four semesters the above column explains the scheme of the I semester.

Course learnig Outcomes (CLOs)

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

Number	Statement	Knowledge Level
CLO 1	Identifying DevanāgarĪ script, Describe modern literature and Illustrate	K1, K2
CLO 2	Discriminate spirituality in Literature	K2
CLO 3	Classify and discuss traditional names of Divine beings to animals in the world	K2
CLO 4	Describe and defend history of early Sanskrit literature	K2
CLO 5	Practice Creativity and Demonstrate various culture of world	K2, K3

K1-Knowledge **K2**-Understand **K3**-Apply

Mapping of CLO with PLO

	PLO 1	**PLO 2**	**PLO 3**	**PLO 4**	**PLO 5**	**PLO6**	**PLO7**
CLO 1	9	9	3	9	9	-	9
CLO 2	3	3	9	9	9	-	9
CLO 3	9	3	9	9	9	-	3
CLO 4	9	9	9	9	9	-	9
CLO 5	9	9	3	9	9	-	9
	39	33	33	45	45	-	39

Note: Mapping Score Strong-9, Medium- 3 and Low-1

Syllabus

Unit 1: Introduction to Sanskrit script, Verbs, nouns and Pronouns. Introduction: Definitions and Scope of Sanskrit. – Sanskrit (DevanāgarĪ) scripts. Formation of verbs and nouns. Characteristics of pronoun.

Unit 2: Introduction to History of early (vedic) Sanskrit literature. Classification of Vedas. Content of Vedas. Moral values inculcated through Vedas.

Unit 3: Introduction to Purāṇa literature. Origin of Purāṇa literature. Classification of Purāṇa. Mahāpurāṇa and Upapurāṇa. moral, social, environmental values inculcated through Purāṇas.

Unit 4: Introduction to Kāvya (poetry) literature. Definition of Kāvya. Types of Kāvya. Characteristics of Mahākāvya. Description of moral, social, environmental values inculcated through Kāvyas

Unit 5: Introduction to Translation. Strategies adopted in translation. Translating Sanskrit verses into English. Translating English sentences into Sanskrit. Introducing International Phonetic code (IPC). Transliteration from Sanskrit (DevanagarĪ) script to IPC. Transliterating from IPC to Sanskrit (DevanagarĪ) script.

Text Book(s)

Sāhityarasakaṇa, compiled by Dr. S. Jagadisan, Published by AMG Publications, Madurai -625010. Year of publication 1996.

A History of Sanskrit Literature, compiled by Dr. S. Jagadisan, Published by AMG Publications, Madurai -625010. Year of publication 1996.

Reference Books

A Short History of Sanskrit Literature, by T.K. Ramachandra Aiyyar, published by R.S. Vadhyar & Sons, Kalpathi, Palakkad -678003

A History of Sanskrit Literature, by A. Berriedale Keith, published by Mothilal Banarsidass Publishers Private Limited, Delhi, 2017.

Pedagogy

Chalk & Talk, Group Discussion, PPT

Teaching Aids

Green Board, LCD Projector, Interactive White Board

DEPARTMENT OF ENGLISH

Programme: B.A., B.Com., B.Com.(CA), & B.Sc.

(For the students of the Academic Year 2021-22 onwards)

PART – II**: English**		SEMESTER**–I**
Course Title**: Basic English Communication Skills**		
Course Code: **P2LE11/ P2CE11**	Hours per week: **6**	Credit: **3**
CIA Marks: **25**	ESE Marks: **75**	Total Marks: **100**

Preamble

- The students are expected to inculcate English language proficiency and its socio-linguistic competency.
- The students are also expected to use the language skills for creativity and innovation with high quality both in study and profession.

Course Learning Outcomes (CLO)

On the successful completion of the course, the students would be able to:

No	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Recognize listening, and reading proficiency through the prose discourse	K1, K2, K3
CLO 2	Use and interpret imaginative, and creative skills through the poetic genre	K1, K2, K3
CLO 3	Discuss the socio-linguistic and psychological behaviour of author, and characters found in the one-act-play	K1, K2, K3
CLO 4	Examine the functions of English language and its grammar in transactions	K1, K2, K3
CLO 5	Execute and exercise LSRW skills in everyday interactions	K1, K2, K3

K1-Remembering K2 – Understanding K3 – Applying

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO6	PLO7
CLO 1	9	9	9	9	9	-	9
CLO 2	9	9	9	3	9	-	9
CLO 3	9	9	9	3	3	-	9
CLO 4	9	9	3	-	-	-	9

CLO 5	9	9	9	3	3	1	9
	45	45	39	18	24	01	45

Note: Mapping Score Strong-9, Medium- 3 and Low-1

Syllabus

Unit-1 Poetry

1. The Lord of My Life – Rabindranath Tagore
2. The Road Not Taken – Robert Frost
3. Hawk Roosting – Ted Hughes

Unit-2 Prose

1. The Secret of Work – Swami Vivekananda
2. Fourscore and Seven Years ago… – Abraham Lincoln
3. What Kind of Peace Do We Want? – J.F. Kennedy

Unit-3 Short Stories

1. A Shadow – R K Narayan
2. Karma – Khushwant Singh
3. The Romance of a Busy Broker – O Henry

Unit-4 Grammar

1. Parts of Speech
2. Kinds of Sentence
3. Punctuation

Unit-5 Oral & Written Communication

1. **Listening** – Comprehension practice from Poetry, Prose, Short-stories, observing/viewing E-content (with subtitles), Guest/Invited Lectures, Conference/Seminar Presentations & Tests and DD National News Live, BBC, CNN, VOA etc
2. **Speaking** – In Group Discussion Forum, speak about Tongue Twisters, Critical Thinking, Seminar Presentations on Classroom-Assignments, and Peer-Team interactions/AIF in Class-room
3. **Reading** – Pronunciation practice and enhancement from Poetry, Prose, Short-stories, Magazines, Newspaper etc
4. **Writing** – Asking & Giving Directions/Instructions, Developing Hints, and Filling Forms.

Text Books

1. *The Norton Anthology English Literature*. New York/London: W.W.Norton, 2012. (or) Vinay Harwadker, and A.K.Ramanujan, ed. *The Oxford Anthology of Modern Indian Poetry*. New Delhi: OUP, 1994. (or) Robert Anderson et al. *Elements of Literature: Fourth Course Literature of the United States*. Florida: HRW Inc. 1993. (or) Dr.M.Moovendhan, ed. *Wings of Poesy*. Chennai: Thamarai Publications, 2018. (or) < https://www.poemhunter.com/poem/lord-of-my-life/> The Lord of My Life – Rabindranath Tagore <https://allpoetry.com/Hawk-Roosting> Hawk Roosting <https://poets.org/poem/road-not-taken> The Road Not Taken.
2. Swami Vivekananda. "The Secret of Work." *Links: Indian Prose in English*. Ed. G.S.Balarama Gupta. New Delhi: Macmillan Indian Limited, 1989.
3. Dr.P.C.James Daniel, ed. *Gateway to English: An Anthology of Prose*. Chennai: Harrows Publications, 2018. http://www.abrahamlincolnonline.org/lincoln/speeches/gettysburg.htm
4. Abhijit Acharijee, and Rakesh Ramamoorthy, ed. *Frontiers of Communication: An Anthology of Short Stories and Prose*. Chennai: Cambridge University Press, 2018.
5. Mchael Swan and Catherine Walter. *How English Works*: *A Grammar Practice Book*. Oxford: OUP, 1997. (or) Wren and Martin. *High School English Grammar and Composition*. New Delhi: S.Chand & Company LTD.1935.
6. Owen Hargie, David Dickson, and Dennis Tourish. *Communication Skills for Effective Management*. New York: Palgrave Macmillan, 2004. (or)

7. British Council | LearnEnglish <https://learnenglish.britishcouncil.org/skills>
8. BBC News < https://www.bbc.com/news> VOA Learning English <https://learningenglish.voanews.com/>
9. University Grants Commission (UGC), New Delhi < https://www.ugc.ac.in/subpage/EContent-URL.aspx> British Council | LearnEnglish < https://www.youtube.com/channel/UCOtnu-KKoAbN47IuYMeDPOg> Cambridge Assessment English <https://www.cambridgeenglish.org/test-your-english/>
10. CLIL (Content & Language Integrated Learning) – Module by TANSCHE

Note: (*Text: Prescribed chapters or pages will be given to the students by the department and the college)*

Pedagogy

Chalk & Talk, Group Discussion, PPT

Teaching Aids

Green Board, LCD Projector, Interactive White Board

DEPARTMENT OF CHEMISTRY

Programme : B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – III: **Core Course Theory**		SEMESTER **I**
Course Title: **ORGANIC CHEMISTRY – I**		
Course Code: **07CC11**	Hours per week: **4**	Credits: **4**
CIA: **25 Marks**	ESE: **75 Marks**	Total: **100 Marks**

Preamble

Students are enabled to

- ✓ Revive the fundamental concepts of chemistry learned at school level with detailed explanations.
- ✓ Gain the knowledge on basics of organic chemistry such as IUPAC nomenclature and reaction mechanism.
- ✓ Learn the methods preparations, properties and importance of aliphatic, aromatic hydrocarbons, alcohol, thiol and phenol.

Course Learning Outcomes (CLO)

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

No.	Course Learning Outcomes	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Recall the fundamental concepts IUPAC nomenclature and aromaticity rules and apply it for problems solving.	K1, K2 & K3
CLO 2	Comprehend and explain the nature of electronic effects, types of naming reactions and intermediates.	K1, K2 & K3
CLO 3	Explain the methods of preparation, properties and importance of alcohols, thioalcohols and phenols.	K1, K2 & K3
CLO 4	Acquire the knowledge of preparations, structures and reactions of polynuclear hydrocarbons.	K1, K2 & K3
CLO 5	Summarize the preparation, properties and importance of aliphatic hydrocarbons.	K1, K2 & K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7
CLO 1	9	1	3	1	3	1	3
CLO 2	9	1	3	1	3	3	3
CLO 3	9	1	3	1	3	3	3
CLO 4	9	1	3	1	3	3	3
CLO 5	9	1	3	1	3	1	3
Weightage of the course	**45**	**5**	**15**	**5**	**15**	**11**	**15**

9-Strong 3-Medium 1-Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	9	9	1	3
CLO 2	9	9	9	1	3
CLO 3	9	9	9	1	3
CLO 4	9	9	9	1	3
CLO 5	9	9	9	1	3
Weightage of the course	45	45	45	5	15

9-Strong; 3-Medium; 1-Low

Syllabus

UNIT-I: NOMENCLATURE AND AROMATICITY

IUPAC Nomenclature: IUPAC rules for naming organic compounds – acyclic and cyclic compounds – empirical formula – molecular and structural formula – isomerism - structural isomerism.

Aromaticity: Hückel's rule – aromatic, anti-aromatic and non-aromatic characters in benzenoid and non-benzenoid compounds.

UNIT-II: ELECTRON DISPLACEMENT EFFECTS, TYPES OF ORGANIC REACTIONS AND INTERMEDIATES

Electron displacement effects: Inductive, resonance, mesomeric, electromeric, hyper conjugation and steric effect.

Types of organic reactions: Substitution, addition, elimination, rearrangement and polymerization (definition and examples only) – nucleophiles, electrophiles and their types – homolytic and heterolytic cleavages.

Intermediates: Formation, structure and stability of carbocations, carbanions, free radicals, carbene, nitrene and benzyne.

UNIT-III: ALCOHOLS, THIOALCOHOLS AND PHENOLS

Alcohols: Preparation of ethanol, physical properties, chemical properties, reaction of alcohols with metals, acids and phosphorous halides –Lucas test and Victor Meyer's test –preparation of benzyl alcohol, dihydric and trihydric alcohol – preparation of glycols, glycerols and nitroglycerin.
Thioalcohols: Preparation and properties of ethyl mercaptan.
Phenols: Preparation of phenols, physical properties, acidic character of phenol – acidity of phenol *vs.* alcohol – Reimer-Tiemann reaction, Kolbe-Schmidt, reaction with formaldehyde, picric acid, phthalein reaction.
Disubstituted phenol: Resorcinol, catechol and quinol (preparations only).

UNIT-IV: **BENZENE AND POLYNUCLEAR COMPOUNDS**

Benzene: Cyclohexatriene *vs.* benzene – structure of benzene: Kekule structure and Dewar structure – preparation of benzene – molecular orbital diagram – resonance structure –electrophilic aromatic substitution of benzene – mechanism of halogenations, nitration, sulphonation, Friedel-craft's alkylation and acylation – addition and catalytic reduction reactions – oxidation reactions with $KMnO_4$.
Reactivity and orientation: Ortho-, para-, meta-directors, activators and deactivators, orientation in toluene, phenol, chlorobenzene and nitrobenzene.
Polynuclear aromatic hydrocarbons: Preparation and properties of naphthalene and anthracene – phenanthrene (structure only).

UNIT-V: ALKANES, ALKENES AND ALKYNES

Alkanes: Preparation, Sabatier-Sendersen's reaction, Wurtz reaction, Corey-House synthesis and Kolbe's synthesis, physical and chemical properties of alkanes, halogenations – mechanism of free radical substitution – reactivity of halogens towards free radical substitution.
Alkenes: Preparation, dehydrohalogenation of alkyl halides, dehalogenation of vicinal dihalides, dehydration of alcohols – Saytzeff's rule – Hofmann elimination – geometrical isomerism – electrophilic addition reactions – Markovnikov's rule – Kharasch effect – addition of H_2O, halogens and hypohalous acid – oxymercuration – demercuration – hydroboration – oxidation – ozonolysis – hydroxylation using $KMnO_4$.
Alkynes: Preparation, dehydrohalogenation of vicinal dihalides and dehalogenation of tetrahalides – chemical reactions, addition of water, catalytic reductions and oxidation with $KMnO_4$ – comparison of acidity of alkanes, alkenes and alkynes.

Text Books

1. Jain, M.K. and Sharma, S.C, *Modern Organic Chemistry,* 3rd Ed., Vishal Publishing Company, 2009.
2. Morrison, R.T, Boyd, R.N. and Bhattacharjee S.K, *Organic Chemistry*, 7th Ed., Pearson, 2010.

Reference Books

1. Bahl, A, and Bahl, B.S, *Advanced Organic Chemistry,* S.Chand & Company Ltd., New Delhi, 2012.
2. Finar, I.L, *Organic Chemistry*, Volume -1, 6th Ed., 2002.
3. Pine, S.H, *Organic Chemistry*, 5th Ed., McGraw Hill, 2007.

E - Resources

1. https://www.youtube.com/watch?v=PYZJXWBMqBE
2. https://www.slideshare.net/jeevachem4198/basic-effects-in-organic-chemistry
3. https://www.slideshare.net/kleppingerb/12-alcoholsphenolsthiolsethers-17920301
4. https://www.slideshare.net/khalilkhanjatoi/basic-introduction-of-benzene
5. https://www.slideshare.net/raiuniversity/b-scigeneral-chemistry-uiiia-aalkanealkene-and-alkynes

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – III: **Core Course Theory**		SEMESTER **I**
Course Title: **INORGANIC CHEMISTRY - I**		
Course Code: **07CC12**	Hours per week: **3**	Credits: **4**
CIA: **25 Marks**	ESE: **75 Marks**	Total: **100 Marks**

Preamble

Students are enabled to

- ✓ Revive the fundamental concepts of chemistry learned at school level with detailed explanation.
- ✓ Gain knowledge about the common themes running through ionic and covalent chemical bonding.
- ✓ Get idea behind the structure and bond type of simple inorganic molecules.
- ✓ Gain the knowledge of theory behind the volumetric analysis.

Course Learning Outcomes (CLO)

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

No.	Course Learning Outcomes	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Recall the fundamentals of atomic structure and apply this knowledge to predict the stability of atom.	K1, K2 & K3
CLO 2	Identify the elements in periodic table and summarize its physical and chemical characteristics and periodicity.	K1, K2 & K3
CLO 3	Determine the nature of bonding and predict the molecular structure using VSEPR and VBT.	K1, K2 & K3
CLO 4	Characterize the nature of bonding and explain the molecular orbital theory.	K1, K2 & K3
CLO 5	Illustrate the theory behind volumetric analysis.	K1, K2 & K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Mapping of CLO with PLO

	PLO 1	**PLO 2**	**PLO 3**	**PLO 4**	**PLO 5**	**PLO 6**	**PLO 7**
CLO 1	9	1	3	1	3	9	3
CLO 2	9	1	3	1	3	3	1
CLO 3	9	1	3	1	3	3	1
CLO 4	9	1	3	1	3	3	3
CLO 5	9	1	1	1	1	1	1
Weightage of the course	45	5	13	5	13	19	9

9-Strong 3-Medium 1-Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	9	3	9	3
CLO 2	9	9	3	9	3
CLO 3	9	9	3	9	3
CLO 4	9	9	3	9	3
CLO 5	9	9	3	9	3
Weightage of the course	45	45	15	45	15

9-Strong; 3-Medium; 1-Low

Syllabus

UNIT-I: ATOMIC STRUCTURE

Brief history of atomic structure – Bohr's model of the atom, postulates, derivation of Bohr's energy of electron in hydrogen atom, origin of hydrogen spectrum – Sommerfeld's extension of Bohr's theory – wave mechanics: de' Broglie equation, Heisenberg's uncertainty principle and its significance, Schrödinger's wave equation, significance of ψ and ψ^2 – quantum numbers and their significance – normalized and orthogonal wave functions – sign of wave functions – radial and angular wave functions for hydrogen atom – radial and angular distribution curves – shapes of *s*, *p*, *d* and *f* orbitals – Pauli's exclusion principle, Hund's rule of maximum multiplicity, Aufbau's principle.

UNIT-II: PERIODICITY OF ELEMENTS

s, *p*, *d*, *f* block elements, the long form of periodic table – detailed discussion of the following properties of the elements, with reference to *s* and *p*-block.

(a) Effective nuclear charge, shielding or screening effect, Slater rules, variation of effective nuclear charge in periodic table.

(b) Atomic radii (c) Ionic radii.(d) Covalent radii (e) Ionization enthalpy, Successive ionization enthalpies and factors affecting ionization energy. (f) Electron gain enthalpy, trends of electron gain enthalpy. (g) Electronegativity, determination of electronegativity by Pauling, Mullikan and Allred Rachow scales.

UNIT-III: CHEMICAL BONDING - I

Ionic Bond: General characteristics, Born-Landé equation (no derivation), lattice energy, Born-Haber cycle and its application.

Covalent bond: Lewis structure – Valence Shell Electron Pair Repulsion Theory (VSEPR): Shapes of simple molecules and ions containing lone-and bond-pairs of electrons, multiple bonding – sigma bond and pi-bond, valence bond theory (Heitler-London approach).

O**verlapping of orbitals:** s-s, s-p and p-p orbitals overlapping – hybridization contains s, p and s, p, d atomic orbitals, shapes of hybrid orbitals.

UNIT-IV: CHEMICAL BONDING – II

Molecular orbital theory: Molecular orbital diagrams of homonuclear and heteronuclear diatomic molecules, e.g., N_2, O_2, C_2, B_2, F_2, CO, NO – covalent character in ionic compounds, polarizing power, polarizability and polarization, Fajan's rules – Ionic character in covalent compounds: Bond moment and dipole moment, ionic character from dipole moment and electronegativities – comparison between VBT and MOT.

Metallic Bond: Free electron model, Semiconductors, Insulators.

Weak Chemical Forces: van'der Waals, ion-dipole, dipole-dipole, induced dipole dipole-induced dipole interactions, hydrogen bond, effects of hydrogen bonding on melting and boiling points, solubility.

UNIT-V: PRINCIPLES OF VOLUMETRIC ANALYSIS

General principle, Types of titrations, requirements for titrimetric analysis – concentration terms: molarity, molality formality, normality, wt%, ppm, milliequivalence and millimoles – problems – primary and secondary standards – criteria for primary standards – preparation of standard solutions, standardization of solutions – limitation of volumetric analysis – endpoint and equivalence point – neutralisation-titration curve – theory of indicators – choice of indicators – use of phenolphthalein and methyl orange.

Text Books

1. Lee, J.D., *Concise Inorganic Chemistry*, 5th Ed., Blackwell Science Ltd., 2006.
2. Puri, B.R., Sharma, L.R. and Kalia, K.C, *Principles of Inorganic Chemistry*, 33rd Ed., Vishal Publishing, 2017.

Reference Books

1. Cotton, F.A., Wilkinson, G. and Gus, P.L., *Basic Inorganic Chemistry*, 3rd Ed., John Wiley & Sons (Asia) Pvt. Ltd., 2007.
2. Douglas, B.E., McDaniel, D.H., Alexander, J.J. *Concepts and Models of Inorganic Chemistry*, 3rd Ed., John Wiley & Sons, 1999.

E - Resources

1. https://nptel.ac.in/courses/104/101/104101121/
2. https://nptel.ac.in/courses/104/101/104101090/
3. https://nptel.ac.in/content/storage2/courses/104103019/module1/lec1/1.html
4. https://nptel.ac.in/courses/104/103/104103069/
5. https://nptel.ac.in/courses/104/106/104106121/

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – III: **Core Practical**		SEMESTER **I**
Course Title: **VOLUMETRIC ANALYSIS AND ORGANIC ESTIMATION**		
Course Code: **07CP23**	Hours per week: **3**	Credits: -
CIA Marks: -	ESE Marks: -	Total Marks: -

Preamble

Students are enabled to

- ✓ acquire knowledge of hand on experiment on volumetric analysis, this leads them to develop the knowledge in the principles of concentration, primary and secondary standards.

Course Learning Outcomes (CLO)

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

CLO	CLO Statements	Knowledge Level
CLO1	Anticipate, recognize, and respond properly to potential hazards in laboratory procedures	K1, K2 & K3
CLO2	Perform accurate quantitative measurements	K1, K2 & K3
CLO3	Interpret experimental results and draw reasonable conclusions	K1, K2 & K3
CLO4	Keep accurate and complete experimental records	K1, K2 & K3
CLO5	Interpret experimental results and draw reasonable conclusions	K1, K2 & K3
CLO6	Communicate effectively through oral and written reports	K1, K2 & K3

K1-Remembering K2-Understanding K3-Applying

Syllabus

UNIT-I: VOLUMETRIC ANALYSIS

Principle: Volumetric estimation: Principe, standard solution, analyte, titrant, indicator, end point, equivalent point, primary standard and secondary standard, preparation of standard solution.

Concentration terms: Mole concept – molecular formula – molecular weight – equivalent weight – normality – molality – molarity – weight percentage – problems related to preparation of different concentrations of solutions – list of lab apparatus and their uses.

[A double titration involving the preparation of a primary standard, standardization of the link solution and estimation of the given analyte.]

UNIT-II: **ACIDIMETRY AND ALKALIMETRY**

1. Estimation of H_2SO_4 *vs.* NaOH using a standard oxalic acid.
2. Estimation of HCl *vs.* NaOH using a standard oxalic acid.

3. Estimation of NaOH *vs.* H_2SO_4 using a standard Na_2CO_3.
4. Estimation of Na_2CO_3 *vs.* HCl using a standard Na_2CO_3.

UNIT-III: **REDOX TITRATIONS**

Permanganometry

5. Estimation of oxalic acid *vs.* $KMnO_4$ using a standard oxalic acid.
6. Estimation of ferrous sulphate *vs.* $KMnO_4$ using a standard oxalic acid.
7. Estimation of Mohr's salt *vs.* $KMnO_4$ using a standard oxalic acid.

Dichrometry

8. Estimation of ferrous ion
9. Estimation of ferric ion using external indicator

UNIT-IV: IODOMETRY, IODIMETRY AND EDTA TITRATION

Iodometry and iodimetry

10. Estimation of potassium dichromate
11. Estimation of potassium permanganate
12. Estimation of copper

EDTA titration

13. Estimation of hardness of water using EDTA

UNIT-V: ORGANIC ESTIMATION

14. Estimation of phenol by brominating method
15. Estimation of aniline by brominating method

Text Book

1. Venkateswaran, V., Veerasamy, R. and Kulandaivelu, A.R, *Basic Principles of Practical Chemistry*, 2nd Ed., Sultan Chand & Sons, New Delhi, 2017.
2. Thomas, A.O, *B.Sc. Main Practical Chemistry*, Scientific Book Centre, Cannanore, 2003.

Reference Books

1. Gnanaprakasam, N.S and Ramamurthy, G. *Organic Chemistry Lab Manual*, S. Viswanathan, Pvt. Ltd, 2007.
2. Jeffery, G.H., Basset J and others, *Vogel's Textbook of Quantitative Chemical Analysis*, ELBS, 5th Ed., London, 1989.
3. Furniss B.S. et al, *Vogel's Textbook of Organic Chemistry*, ELBS, 5th Ed., London, 1989.

E - Resources

1. https://www.youtube.com/watch?v=KyZtyEF6kqk
2. https://www.youtube.com/watch?v=ka62KfMgRv8
3. https://www.youtube.com/watch?v=hxYorBeMhnc
4. https://www.youtube.com/watch?v=xOQ6tweyWuE
5. https://www.youtube.com/watch?v=bHkFSavcU5I

Distribution of marks

Max marks: 100

Internal	**: 40 marks**	**External**	**: 60 marks**
Attendance	: 5 marks	Record note book	: 30 marks
Laboratory performance		Simple procedure	: 10 marks
and model practical	: 20 marks	Estimation	: 10 marks
Viva-voce	: 5 marks	Viva-voce	: 10 marks
Observation note book	: 10 marks		
Total	: 40 marks	Total	: 60 marks

For Volumetric Estimation if the student have

Less than 2% Error - 30 marks
2-3% Error - **25 Marks**
3-4% Error - 20 marks
3-5% Error - 15 marks
Greater than 5% - 10 marks

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : **Allied Theory**		Semester – **I**
Course Title : **ALLIED PHYSICS – I**		
Course Code: **06AE01**	Hours Per Week : **4**	Credit: **4**
CIA: **25 Marks**	ESE: **75 Marks**	Total: **100 Marks**

Preamble

To enable the students to

- It deals with the concept of principles of wave motion
- Gives an idea about Elasticity, viscosity and surface tension
- It discusses the study of thermal physics
- Applying the concept of electricity
- Providing good foundation in optics

Course Learning Outcomes (CLO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Explain the basic concepts of acoustic studies	K1,K2 & K3
CLO 2	Understanding the properties of matter like elasticity, viscosity and surface tension	K1,K2 & K3
CLO 3	Outline theory of laws of thermodynamics	K1,K2 & K3
CLO 4	Understanding the basic concept of electricity and magnetism	K1,K2 & K3
CLO 5	Applying the methodology of optical activities.	K1,K2 & K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Syllabus

UNIT-I	**WAVES AND OSCILLATIONS** Simple Harmonic Motion – Composition of two Simple Harmonic Motions in a straight line- Composition of two Simple Harmonic Motions of equal time periods at right angles- - Melde's Experiment – Ultrasonics- production –application and uses- – Reverberation – Absorption coefficient - Acoustics of buildings – factors affecting the acoustics of buildings- Sound distribution in an auditorium	**(12 Hrs)**
UNIT-II	**PROPERTIES OF MATTER** **Elasticity:** Introduction- Different moduli of elasticity – Poisson's ratio-Energy stored in a stretched wire - Bending of beams – expression for the bending moment- Theory of Non-uniform bending – Torsion Pendulum – expression for the period of oscillation of a torsion pendulum. **Viscosity:** Streamline fLow and turbulent fLow – Coefficient of viscosity - Derivation of Poiseulle's formula. **Surface Tension:** Introduction- experimental determination of surface tension – Jaegar's method.	**(12 Hrs)**
UNIT- III	**THERMAL PHYSICS** Laws of thermodynamics – Zeroth law of thermodynamics –first law of thermodynamics - second law of thermodynamics- third law of thermodynamics – Heat engine – Entropy – Change of entropy in a carnots cycle.	**(12 Hrs)**

UNIT- IV	**ELECTRICITY AND MAGNETISM** Introduction – Magnetic effect of electric current – Oersted's experiment –BiotSavart law- Magnetic induction at a point on the axis of a circular coil- choke coil-Electric circuit – switches- fuses- circuit breaker – the relay	**(12 Hrs)**
UNIT- V	**GEOMETRICAL OPTICS** Introduction – image formation by refraction – Critical angle – Refraction through prism – direct vision spectroscope – coma – Spherical aberration in a lens – methods of minimizing spherical aberration – condition for minimum spherical aberration of two thin lenses separated by a distance - chromatic aberration in a lens- condition for achromatism of two lenses separated by a distance	**(12 Hrs)**

Mapping of CLO with PLO

	PLO 1	**PLO 2**	**PLO 3**	**PLO 4**	**PLO 5**	**PLO6**	**PLO7**
CLO 1	9	3	9	1	3	1	1
CLO 2	9	3	9	1	3	1	1
CLO 3	9	3	9	1	1	1	1
CLO 4	9	3	9	1	1	1	1
CLO 5	9	3	3	1	1	1	1

9 – Strong 3 – Medium 1 – Low

Mapping of CLO with PSO

CLO 1	9	9	9	3	3
CLO 2	9	9	9	3	3
CLO 3	9	9	9	3	9
CLO 4	9	3	9	3	9
CLO 5	9	3	9	3	9

9 – Strong 3 – Medium 1 – Low

Text Book

Allied Physics Paper I and II - R. Murugeshan, M.Shantha Kiruthiga Sivaprasath, S.Chand & Company Pvt. Ltd. New Delhi, Revised Edition, Reprint 2014.

Unit I: 1.1 to 1.3, 1.9, 1.11 to 1.19.
Unit II: 2.1 to 2.7, 2.12, 2.14, 2.15, 2.17, 2.24, 2.29
Unit III: 3.15 to 3.21
Unit IV: 4.1, 4.4 to 4.6, 4.15 to 4.20
Unit V: 5.1, 5.2, 5.4, 5.6, 5.14, 5.16, 5.18 to 5.20, 5.22, 5.27

Reference Books

1. Electricity and Magnetism - R. Murugeshan -Reprint with correction 2008
2. Principles of Electronics - V.K.Metha & Rohit Metha -Multicolour Illustrative edition – 2006- S. Chand & Company Ltd., New Delhi
3. Modern Physics-R. Murugeshan & Kiruthiga Sivaprasath- Multicolour Edition – 2007- S. Chand & Company Ltd., New Delhi

E-Resource

1. https://nptel.ac.in/courses/115/106/115106119/
2. https://www.youtube.com/watch?v=i0hkB8y7WhQ
3. https://nptel.ac.in/courses/122/107/122107035/
4. https://nptel.ac.in/courses/115/104/115104088/
5. https://www.youtube.com/watch?v=bxGgcgSbQBA

DEPARTMENT OF CHEMISTRY

Programme: B.Sc.and ,B.A Except Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – IV: **Generic Elective Course**		SEMESTER **I**
Course Title: **FOOD CHEMISTRY**		
Course Code: **07GE11**	Hours per week: **2**	Credits: **2**
CIA Marks: **25 Marks**	ESE Marks**:75 Marks**	Total Marks: **100 Marks**

Preamble

Students are enabled to

- ✓ Provide a strong foundation on concepts and theories of Food Chemistry.
- ✓ Helps the students to create an awareness regarding the food, nutrition and spices.
- ✓ Realize the importance of quality of food in day to day life

Course Learning Outcomes (CLO)

At the end of the course, the student should be able to:

No.	Course Learning Outcomes	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Identify and summarize food components, dietary/supplements and food sources of nutrients	K1, K2 & K3
CLO 2	Discuss the various spices involved in food chemistry	K1, K2 & K3
CLO 3	Identify and analyze various food adulterants	K1, K2 & K3
CLO 4	Describe and explain importance of preservation	K1, K2 & K3
CLO 5	Interpret the biochemistry of food and demonstrate the packaging processes of food	K1, K2 & K3

K1-Remembering K2-Understanding K3-Applying

Syllabus

UNIT-I: **INTRODUCTION**

Food and Health: source, classification and functions of food – biological importance of carbohydrates, protein, fat, vitamins and minerals – calorific value of food – nutritional value of carbohydrates – nutritional aspects of lipids –balanced diet – cooking methods – traditional methods – boiling, steaming, pressure cooking – microwave cooking.

UNIT-II: **SPICES** Introduction to spices – classification of spices – health benefits of Indian spices – role of spices in cookery – Ajwain (omum), – Aniseed (Somfu) – black pepper – cardamon – ginger – turmeric – garlic – onion – cumin – chillies – fennel – dill – nutmeg.

UNIT-III: **FOOD ADULTERATION**

Definition – types of adulteration – methods of detection and analysis of adulterants in foods: ghee or butter, milk, wheat, sugar, black pepper, rice, rawa, honey, coffee powder and pulses – food poisoning and its prevention – food laws and standards – food laboratories and their functions – consumer protection act – AGMARK.

UNIT-IV: **FOOD PRESERVATION**

Definition – food spoilage – classification – methods of food preservation and processing by heat, cold, radiation, drying and deep freezing.

UNIT-V: FOOD TECHNOLOGY

Concepts of biotechnology in food – alage as food – spirulina – organic foods – food irradiation – packaging of foods – classification of package.

Text Books

1. Srilakshmi, B. *Food Science*, 3rd Ed., New Age International (P) Limited, Publishers, 2002.
2. Bamji, M.S., Rao, N.P. and Reddy, V. *Text Book of Human Nutrition* 1996, 5th Ed., Oxford & IBH publishing Co. Pvt. Ltd.

Reference Books

1. Jayashree Ghosh, *Fundamental concepts of Applied Chemistry*, S. Chand & Co. Publisheres, 1998.
2. Partrasarathy, A. (Editor), *Chemistry of spices*, CAB International, Oxford shire, UK, 2008.
3. Singh, V.B. and Kirti Singh, *Spices*, New Age International (P) Limited, Publishers, 1996.
4. Jane Bowers. *Food Theory and Applications*, MacMillan Publishing Company, New Delhi.

E - Resources

1. https://www.indianspices.com/#
2. https://byjus.com/biology/food-adulteration/
3. https://www.finediningglovers.com/article/how-preserve-food-methods-and-techniques
4. https://www.highspeedtraining.co.uk/hub/food-preservation-methods/
5. https://www.ift.org/news-and-publications/food-technology-magazine

தமிழ்த்துறை, விவேகானந்த கல்லூரி, திருவேடகம் மேற்கு.

Programme : B.A., BSc., (CBCS and LOCF)

(For those students admitted during the Academic Year 2021 – 2022 and after)

பாடத்திட்டத்தின் கட்டமைப்பு (PROGRAMME STRUCTURE)

UG Language PART – I TAMIL		SEMESTER: II
Subject Title: **இடைக்கால இலக்கியமும் நாடகமும்**		
Course Code: P1LT21/P1CT21	**Hours per week: 18**	**Credit: 03**
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

Preamble

1. பக்தி இலக்கியத்தின் வாயிலாக சமயம் மற்றும் வழிபாட்டு நெறிகளை உணர்த்துதல்.
2. சிற்றிலக்கியங்களின் வாயிலாக குடிமக்களின் வாழ்வியல் நெறிமுறைகளை வெளிக்கொணர்தல்.
3. நாடக இலக்கியம் வாயிலாக மனித வாழ்க்கையின் எதார்த்த நிகழ்வுகளைப் புலப்படுத்துதல்.
4. கணினிச் சொற்களின் வகைமைகளை அறிவித்தல்.
5. சைவ - வைணவ, சிற்றிலக்கியம், நாடகம் - ஆகியவற்றின் வரலாற்றினைத் தெளிவுபடுத்துதல்.

Course Outcomes (COs)

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

NO	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	பக்தி இலக்கியங்களின் வாயிலாக வழிபாட்டு முறைகள், இறை நம்பிக்கைகள் குறித்ததன்மையினை வரையறை செய்வர்.	K_1, K_2
CLO 2	சிற்றிலக்கியங்களின் வாயிலாக குடிமக்களின் வாழ்வியல் குறித்த செய்திகளைக் கலந்துரையாடுவர்.	K_2, K_3
CLO 3	குறுநாடகங்களின் வாயிலாக மக்களின் எதார்த்த வாழ்வியல் முறைகளையும், நாடக உத்திமுறைகளையும் அறிவர்.	K_2, K_3
CLO 4	பேயர் - வினை, வினா - விடை, வேற்றுமை, தொகைகள் ஆகியன குறித்த தெளிவும், அவற்றை வகைப்படுத்தும் தன்மைகளையும் வெளிப்படுத்துவர்.	K_2
CLO 5	கணினியில் தமிழ் மொழியின் பயன்பாட்டுத் தன்மைகளையும், சைவம் - வைணவம், சிற்றிலக்கியம், நாடகம் போன்ற இலக்கியத்தின் தன்மைகளையும், அதனைப் படைத்த படைப்பாளர்களின் வரலாற்றினையும் விவரிப்பர்.	K_1, K_2, K_3

K_1-Knowledge **K_2-Understand** **K_3-Apply**

Mapping of CO with PO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO6	PLO7
CLO 1	9	3	3	9	9	3	9
CLO 2	9	3	9	9	9	3	9
CLO 3	9	1	3	9	9	3	9
CLO 4	9	-	3	9	9	-	9
CLO 5	9	-	3	3	3	-	9
	45	07	21	39	39	09	45

Note: Mapping Score Strong-9, Medium- 3 and Low-1

பாடத்திட்டம்(Syllabus)

அலகு - 1	சைவ இலக்கியம் - வைணவ இலக்கியம் ய. தேவாரம் - திருவேடகப்பதிகம் திருஞானசம்பந்தர் டி. திருவாசகம் - பிடித்த பத்து மாணிக்கவாசகர் உ. திருப்பாவை - 1,2,3,4,5,6,17,24,25,29 ஆகிய 10 பாசுரங்கள் ஆண்டாள் ன. பெருமாள் திருமொழி (ஊனேறு செல்வத்து உடல் பிறவி... 11பாடல்கள்) குலசேகரஆழ்வார்	(18மணிநேரம்)
அலகு - 2	சிற்றிலக்கியம் 1.முக்கூடற் பள்ளு (முக்கூடலின் சிறப்பு, முக்கூடல் வளம்) 2.2 நந்திக்கலம்பகம் (1.திறையிடுமி னன்றி மதில்விடுமி னுங்கள்.... 2. வானுறு மதியை யடைந்ததுன் வதனம்....) 2.3 கலிங்கத்துப்பரணி - செயங்கொண்டார் (1.போரின் பேரொலி 2.வீரர்களும் அரசர்களும்) 2.4 தமிழ்விடுதூது (4 கண்ணிகள்) 2.5 மீனாட்சியம்மைப் பிள்ளைத்தமிழ் - குமரகுருபரர் (அம்புலிப் பருவம்) 2.6 குற்றாலக்குறவஞ்சி-திரிகூடராசப்பக்கவிராயர் (1.வானரங்கள் கனிகொடுத்து மந்தியொடு.... 2. ஓடக் காண்பது பூம் புனல் வெள்ளம்...)	(18மணிநேரம்)
அலகு - 3	நாடக இலக்கியம் 1. 'வைகையில் வெள்ளம் வரும்' - சேதுபதி	(18மணிநேரம்)
அலகு - 4	தமிழ் இலக்கணம் - சொல் 4.1 பெயர்ச்சொல் - வினைச் சொல் 4.2 வினா - விடை வகைகள் 4.3 வேற்றுமைகள் 4.4 தொகைகள்	(18மணிநேரம்)
அலகு - 5	தமிழ் இலக்கிய வரலாறும் பயன்பாட்டுத்தமிழும் 5.1 பக்தி இலக்கியத்தின் தோற்றமும் வளர்ச்சியும். 5.2 சிற்றிலக்கியத்தின் தோற்றமும் வளர்ச்சியும். 5.3 நாடகத்தின் தோற்றமும் வளர்ச்சியும் 5.4 கணினித்தமிழ் அறிமுகம் - கணினி ஆங்கிலச்சொல்லுக்கு நிகரான தமிழ்ச் சொல் அறிதல்.	(18மணிநேரம்)

பாட நூல்கள்

1. செய்யுட் தொகுப்பு, தமிழ்த்துறை வெளியீடு. விவேகானந்த கல்லூரி, திருவேடகம் மேற்கு.
2. வைகையில் வெள்ளம் வரும்(குறு நாடகங்கள்) சொ.சேதுபதி, பாவை பப்ளிகேஷன்ஸ், 142, ஜானி ஜான் கான் சாலை, இராயப்பேட்டை, சென்னை **ன்** 600 014.

பார்வை நூல்

1. தமிழ் இலக்கிய வரலாறு முனைவர் கி.இராசா நியூ செஞ்சுரி புக் ஹவுஸ்(பி)லிட், 41-பி, சிட்கோ இண்டஸ்டிரியல் எஸ்டேட், அம்பத்தூர், சென்னை- 600 098.

கற்பிக்கும் முறைகள்(Pedagogy)

விரிவுரை கொடுத்தல்,கலந்துரையாடல், காட்சிப் பதிவுகளின் வழியாக புலப்படுத்துதல்.

கற்பிக்க உதவுதல் (Teaching Aids)

கரும்பலகை பயன்படுத்துதல், காட்சி திரைவழியாகப் புலப்படுத்துதல்.

DEPARTMENT SANSKRIT

Programme: B.A./ B.Sc. (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

PART – I**: Sanskrit**		SEMESTER **– II**
Course Title**: POETRY, GRAMMAR AND HISTORY OF LITERATURE – LYRICS**		
Course Code: **P1LS21**	Hours per week: **6**	Credits: **3**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble:

Sanskrit is offered as an alternative language under Part –I for B.A./ B.Sc students during first four semesters the above column explains the scheme of the II semester.

Course Outcomes (COs)

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

	Statement	**Knowledge Level**
CLO 1	Understand Sanskrit poetry literature	K1, K2
CLO 2	Comparing literature with modern life	K2
CLO 3	Classify and discuss the importance of Sanskrit literature	K2
CLO 4	Describe and defend history of early Sanskrit literature	K2
CLO 5	Practice Creativity and Demonstrate different aspects of life as portrayed in Sanskrit literature	K2, K3

K1-Knowledge **K2**-Understand **K3**-Apply

Mapping of CO with PO

	PLO 1	**PLO 2**	**PLO 3**	**PLO 4**	**PLO 5**	**PLO6**	**PLO7**
CLO 1	3	9	9	9	9	1	9
CLO 2	9	9	3	9	9	-	9
CLO 3	3	3	9	9	9	-	9
CLO 4	9	9	9	9	3	-	9
CLO 5	9	9	9	9	3	-	9
	33	**39**	**39**	**45**	**33**	**1**	**45**

Note: Mapping Score Strong-9, Medium- 3 and Low-1

Syllabus

Unit 1: Introduction to Sanskrit poetry literature such as Gnomic, Didactic and devotional. and its contents.

Unit 2: Kalividambanam- scholars - teachers- Astrologers.

Unit 3: Kalividambanam- Physicians - Relatives- Pseudo Monks.

Unit 4: Sabhāraňjanaśatakam -Wisdom and its acquisition

Unit 5: Sabhāraňjanaśatakam- Poetry

Text Book(s)

1. Kalividambanam and Sabhāraňjanaśatakam of NĪlakṇṭhadĪkṣita Translated into English by Dr. Srinivasa Sharma and Prof C.R. Anantaraman pub. Sri Sadguna Publication, Chidambaram- 2. Yr. 2014.
2. A Short History of Sanskrit Literature, by T.K. Ramachandra Aiyyar, published by R.S. Vadhyar & Sons, Kalpathi, Palakkad -678003

Reference Books

A History of Sanskrit Literature, compiled by Dr. S. Jagadisan, Published by AMG Publications, Madurai -625010. Year of publication 1996.

Pedagogy

Chalk & Talk, Group Discussion, PPT

Teaching Aids

Green Board, LCD Projector, Interactive White Board

DEPARTMENT OF ENGLISH

Programme: B.A., B.Sc., B.Com., & B.Com. (CA) (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 onwards)

PART – II **: English**		SEMESTER - **II**
Subject Title **: ENGLISH FOR ADVANCED COMMUNICATION SKILLS**		
Course Code: **P2LE21/P2CE21**	Hours per week: **6**	Credit: **3**
CIA Marks: **25**	ESE Marks: **75**	Total Marks: **100**

Preamble

The students are expected to inculcate English language proficiency and its socio-linguistic competency.

Course Outcome (CO):

On the successful completion of the course, the students would be able to:

No	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO1	Interpret philosophical thoughts and language mastery found in the poetry	K1, K2, K3
CLO2	Repeat listening, and reading proficiency through the prose discourses	K1, K2, K3
CLO3	Discuss the socio-linguistic and psychological behaviour of author, and characters found in the drama/play	K1, K2, K3
CLO4	Examine the properties of listening, speaking, reading, and writing activities to enhance English grammar usages	K1, K2, K3
CLO5	Exercise LSRW skills	K1, K2, K3

K1 – Remembering K2–Understanding K3 – Applying

Mapping of CO and PO

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
CLO1	9	9	9	3	9	9	9
CLO2	9	9	9	9	9	1	9
CLO3	9	9	9	9	9	3	9
CLO4	9	9	3	-	-	-	9
CLO5	9	9	9	3	9	-	9
	45	45	39	24	36	13	45

Note: Mapping Score Strong-9, Medium- 3 and Low-1

Syllabus

Unit-1 Poetry

1. Alfred, Lord Tennyson – *Ulysses*
2. Nissim Ezekiel – *Night of the Scorpion*
3. Robert Frost – *Stopping by Woods on a Snowy Evening*

Unit-2 Prose

1. Swami Vivekananda – *Sisters and Brothers of America*
2. Martin Luther King Jr. – *I Have a Dream*
3. Francis Bacon – *Of Friendship*

Unit-3 Drama

William Shakespeare – *The Merchant of Venice*

(For the three Continuous Internal Assessment [CIA] Tests)

Unit-4 Grammar

1. Auxiliary (Helping) and Modal Verbs
2. Tenses
3. Question Tags

Unit-5 Oral & Written Communication

1. **Listening** – Comprehension practice from Poetry, Prose, Drama /Online Voice Practice, observing/viewing E-content (with subtitles), Guest/Invited Lectures, Conference/Seminar Presentations & Tests, and BBC, CNN, DD National News Live, VOA etc
2. **Speaking** – In Group Discussion Forum, speak about Theatrical/Dramatic Enactment, Body- Language, Mock-Interview, Seminar Presentations on Classroom-Assignments, and Peer-Team-interactions/AIF in Class-room
3. **Reading** – Intonation practice and its enhancement from Poetry, Prose, Drama, News-Paper, and Individual-Assignments
4. **Writing** – *Writing Formal Letters/Résumé Preparation*, Transcoding (graphs, diagrams, Charts and data), and *Report Writing*.*

Text Books

1. Anderson et al. *Elements of Literature: Fourth Course Literature of the United States*. Florida: HRW Inc. 1993. (or) Vinay Harwadker, and A.K.Ramanujan, ed. *The Oxford Anthology of Modern Indian Poetry*. New Delhi: OUP, 1994. *The Norton Anthology English Literature*. New York/London: W.W.Norton, 2012. (or) Dr.M.Moovendhan, ed. *Wings of Poesy*. Chennai: Thamarai Publications, 2018. (or)
   <https://www.poemhunter.com/poem/night-of-the-scorpion/>
   <https://www.poetryfoundation.org/poems/44475/la-belle-dame-sans-merci-a-ballad>
   <https://poets.org/poem/stopping-woods-snowy-evening>
2. Swami Vivekananda. *Sisters and Brothers of America*, (Chicago address at the World Parliament of Religions, 11th Sep, 1893.) <http://www.advaitayoga.org/advaitayogaarticles/svchicagoadd.html>
3. Dr.P.C.James Daniel, ed. *Gateway to English: An Anthology of Prose*. Chennai: Harrows Publications, 2018.
4. William Shakespeare. *The Merchant of Venice*. Ed. John Russell Brown. London: Methuen & Co., 1905. <https://archive.org/details/in.ernet.dli.2015.126032/page/n7/mode/2up> (or) Peter Alexander. *William Shakespeare: The Complete Works*. London: The English Language Book Society and Collins, 1964.
5. Michael Swan and Catherine Walter. *How English Works: A Grammar Practice Book*. Oxford: OUP, 1997. (or) Wren and Martin. *High School English Grammar and Composition*. New Delhi: S.Chand& Company LTD.1935.
6. Owen Hargie, David Dickson, and Dennis Tourish. *Communication Skills for Effective Management*. New York: Palgrave Macmillan, 2004. (or)
7. British Council | LearnEnglish<https://learnenglish.britishcouncil.org/skills>
8. BBC News <https://www.bbc.com/news>
9. VOA Learning English <https://learningenglish.voanews.com/>
10. University Grants Commission (UGC), New Delhi <https://www.ugc.ac.in/subpage/EContent-URL.aspx>
11. British Council | LearnEnglish<https://www.youtube.com/channel/UCOtnu-KKoAbN47IuYMeDPOg> Cambridge Assessment English <https://www.cambridgeenglish.org/test-your-english/>
12. CLIL (Content & Language Integrated Learning) – Module by TANSCHE

NOTE: (Text: Prescribed chapters or pages will be given to the students by the department and the college)

Reference Books

1. Eileen Thompson et al. *Prentice Hall Literature*: *The English Tradition*. 2.Ed. New Jersey:

Prentice-Hall Inc., 1989. (or) John Pfordresher et al. *England in Literature*. Illinois: Scott, Foresman& Co., 1989. (or) Steuart H King, ed. *New Vistas in English Prose*. Bombay: Blackie & Sons Publishers,1980.
2. The Art Institute of Chicago**,** "Sisters and Brothers of America!" <https://www.artic.edu/articles/710/sisters-and-brothers-of-america>
3. Dr.A.Shanmugakani, ed. *Prose for Communication: An Anthology of Prose*. Madurai: Manimekala Publishing House, 2008.
4. William James Craig, ed. *The Complete Works of William Shakespeare*. London: Oxford University Press, 1914.
5. William Shakespeare. *The Merchant of Venice*. London: J.Tonson, 1734. <https://archive.org/details/merchantofvenice00shak_11/page/36/mode/2up>
6. George Yule. *Oxford Practice Grammar Advanced*. Oxford: OUP, 2006.
7. L.G.Alexander. *Longman English Grammar Practice for Intermediate Students*. Harlow (UK): Longman, 1990.
8. Roger Berry. *English Grammar: A Resource Book for Students*. London: Routledge, 2012.
9. K.V.Joseph. *A Textbook of English Grammar and Usage*. New Delhi: TATA McGraw Hill Education Private Limited, 2012.
10. Mary Ellen Guffey, and Richard Almonte. *Essentials of Business Communication*. Toronto: Nelson Education, 2007.

E Resources and References

Unit-1 Poetry

https://www.litcharts.com/poetry/alfred-lord-tennyson/ulysses
https://www.poetryfoundation.org/poems/45392/ulysses
https://owlcation.com/humanities/Analysis-of-Poem-The-Night-of-the-Scorpion-by-Nissim-Ezekiel
https://literaryyog.com/night-scorpion-nissim-ezekiel/
https://www.poetryfoundation.org/poems/42891/stopping-by-woods-on-a-snowy-evening
https://studymoose.com/analysis-of-stopping-by-woods-on-a-snowy-evening-by-robert-frost-essay

Unit-2 Prose

https://thejeshgn.com/wiki/great-speeches/sisters-and-brothers-of-america-swami-vivekananda/
https://www.ukessays.com/essays/english-language/speech-analysis-mrtin-luther-kings-i-have-a-dream-speech-7887.php
https://litpriest.com/essays/of-friendship-summary-analysis-francis-bacon/

Unit-3 Drama

https://www.shakespeare.org.uk/explore-shakespeare/shakespedia/shakespeares-plays/merchant-venice/
https://www.rsc.org.uk/the-merchant-of-venice/about-the-play/famous-quotes
https://www.litcharts.com/lit/the-merchant-of-venice/characters
https://www.slideshare.net/ciaffaroni/the-merchant-of-venice-62390271

Unit-4 Grammar

https://www.gingersoftware.com/content/grammar-rules/verbs/auxiliary-or-helping-verbs/
https://www.englisch-hilfen.de/en/grammar/english_tenses.htm
https://www.grammar.cl/Intermediate/Question_Tags.htm

Unit-5 Oral & Written Communication

https://content.byui.edu/file/b8b83119-9acc-4a7b-bc84-efacf9043998/1/Writing-2-5-2.html
https://www.towson.edu/careercenter/students/careerskills/communication.html
https://www.slideshare.net/shahbaazahmed15/bc-communication

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – III: **Core Course Theory**		SEMESTER **II**
Course Title: **ORGANIC CHEMISTRY - II**		
Course Code: **07CC21**	Hours per week: **4**	Credits: **4**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

Students are enabled to

- Understand the chemistry of alkyl and aryl halides
- Acquired knowledge on amino, quaternary salts, nitro, diazonium and carbonyl compounds
- Get idea about the basics of stereochemistry

Course Learning Outcomes (CLO)

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

No.	**Course Learning outcome**	**Knowledge Level (according to Bloom's Taxonomy)**
CLO1	Relate, outline and identify the reaction mechanism of alkyl and aryl halides	K1, K2 & K3
CLO2	Explain the preparation and make use of the properties of aliphatic and aromatic nitro compounds and diazonium salts in organic chemistry	K1, K2 & K3
CLO3	Demonstrate the preparation and describe the properties of aliphatic and aromatic amines and quaternary ammonium salts	K1, K2 & K3
CLO4	Interpret the preparation and discuss the properties of carbonyl compounds	K1, K2 & K3
CLO5	Define the basic terminology in stereochemistry and explain and apply Cahn Ingold Prelog (CIP) rules to identify the configurations of organic molecules	K1, K2 & K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Mapping of CLO with PLO

	PLO 1	**PLO 2**	**PLO 3**	**PLO 4**	**PLO 5**	**PLO 6**	**PLO 7**
CLO 1	9	1	1	1	3	1	3
CLO 2	9	1	1	1	3	1	3
CLO 3	9	1	1	1	3	1	3
CLO 4	9	1	1	1	3	1	3
CLO 5	9	1	9	1	3	1	3
Weightage of the course	45	5	13	5	15	5	15

9-Strong 3-Medium 1-Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	9	9	1	3
CLO 2	9	9	9	1	3
CLO 3	9	9	9	1	3
CLO 4	9	9	9	1	3
CLO 5	9	9	9	1	3
Weightage of the course	45	45	45	5	15

9-Strong; 3-Medium; 1-Low

Syllabus

UNIT-I: ALKYL AND ARYL HALIDES

Haloalkanes: Introduction **-** ethylchloride **-** preparation using alcohols, phosphorous halides and thionyl chloride – physical and chemical properties – mechanism and stereochemical aspects of S_N1 and S_N2 – mechanism of elimination reactions (E_1 and E_2).

Vinyl chloride: Preparation from vicinal and geminal dihalides – chemical properties – elimination and polymerization reactions.

Allyl iodide: Preparation from allyl alcohols and glycerols **–** chemical properties.

Halobenzenes: Chlorobenzene – preparation – chemical properties – nucleophilic and electrophilic aromatic substitution reactions.

Benzyl chloride: Preparation – chemical properties – nucleophilic displacement and reduction reactions.

UNIT-II: ALIPHATIC AND AROMATIC NITRO COMPOUNDS AND DIAZONIUM SALTS

Aliphatic nitro compounds: Nitromethane – general methods of preparation – physical properties – chemical properties: reaction with nitrous acids, hydrolysis and reduction.

Aromatic nitro compounds: Nitrobenzene – preparation – reduction of nitrobenzene in acidic, neutral and alkaline medium – electrolytic reduction – selective reduction of nitro groups – electrophilic and nucleophilic substitution – chemical tests for nitro group.

Diazonium salts: Benzenediazonium chloride **–** preparation – Sandmeyer reactions, Gomberg-Bachmann reaction – Gattermann coupling reaction.

UNIT-III: ALIPHATIC AND AROMATIC AMINES

Aliphatic amines: Preparation – reduction of nitro compounds, Ritter reaction, ammonolysis of halides, reductive amination and Gabriel synthesis – basicity of amines, comparison of basicity of 1^o, 2^o and 3^o amines in vapour and solution phases – Hinsberg test.

Aromatic amines: Preparation of aniline **–** basicity of aniline – effect of substituent on basicity – ortho effect **–** mechanism of Schotten Baumann and carbylamine reaction.

Quaternary ammonium salts: Preparation – exhaustive methylation and Hoffmann elimination.

UNIT-IV: ALIPHATIC AND AROMATIC ALDEHYDES AND KETONES

General methods of preparation, reactivity of aldehydes versus ketones, reaction with HCN, $NaHSO_3$, ROH, iodoform test – aldol condensation, crossed aldol condensation, Claisen condensation, Perkin condensation, Benzoin condensation, Reformatsky reaction, Knoevenagal reaction, Clemmensen reduction, Wolff-Kishner reduction – chemical tests to distinguish ketone and aldehyde – chemical tests to distinguish acetaldehyde and benzaldehyde.

UNIT-V: STEREOCHEMISTRY

Elements of symmetry – asymmetry – chirality **-** optical isomerism – conditions for optical activity – enantiomers and diastereomers – geometrical isomerism – D and L notations – Cahn-Ingold-Prelog rules – E and Z nomenclature – R and S notations – projection formulae – Sawhorse, Fischer and Newmann projection – erythro and threo representations – racemisation – resolution – methods of resolution

(mechanical and biochemical method) – asymmetric synthesis – Walden inversion – optical activity of biphenyls, allenes and spiranes.

Text Books

1. Jain, M.K. and Sharma, S.C, *Modern Organic Chemistry*, 3rd Ed., Vishal Publishing Company, 2009.
2. Morrison, R.T., Boyd, R.N. and Bhattacharjee S.K. *Organic Chemistry*, 7th Ed., Pearson, 2010.

Reference Books

1. Finar, I.L. *Organic Chemistry, Volume 2: Stereochemistry and the Chemistry Natural Products*, 5th Ed., Pearson, 2002.
2. Bruice, P.Y. *Organic Chemistry*, 7th Ed., Pearson, 2013.
3. Bahl, A. and Bahl, B.S, *Advanced Organic Chemistry*, S. Chand & Company Ltd, New Delhi, 2012.
4. Smith, M.B. and March, J. *Advanced Organic Chemistry: Reactions, Mechanisms, and Structure*, 6th Ed., Wiley, 2007
5. Kalsi, P.S. *Stereochemistry: Conformation and Mechanism*, 9th Ed., New Age International Publisher, 2017.
6. Eliel, E.L. and Wilen, S.H. *Stereochemistry of Organic Compounds*, 1st Ed., John Wiley and Sons, 1994.

E - Resources

1. https://www.youtube.com/watch?v=2RP0_Dao4wE
2. https://www.youtube.com/watch?v=UbEOn-wlupw
3. https://www.youtube.com/watch?v=MEAI7yk0JR4
4. https://www.slideshare.net/ganeshmote1/aldehyde-and-ketone-129851131
5. https://www.youtube.com/watch?v=5RlvRCjLT4Y

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – III: **Core Course Theory**		SEMESTER **II**
Course Title: **PHYSICAL CHEMISTRY - I**		
Course Code: **07CC22**	Hours per week: **3**	Credits: **4**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

Students are enabled to

- ✓ Recognize and relate the properties of ideal and real gases.
- ✓ Learn the characteristics and types of solids.
- ✓ Identify the different types of adsorption.
- ✓ Correlate the type of colloids with its properties.

Course Learning Outcomes (CLO)

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

No.	Course Learning Outcomes	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Define and explain gas laws and summarize properties of gaseous molecule.	K1, K2 & K3
CLO 2	Demonstrate the structure crystal and explain application of X-ray diffraction in determining crystal structure	K1, K2 & K3
CLO 3	Familiar with crystal structure of inorganic solid, discuss the defects in crystal and summarize the properties of liquid crystal.	K1, K2 & K3
CLO 4	Discuss the phenomenon of adsorption and its applications and summarize nature of characteristics of catalysis and its types	K1, K2 & K3
CLO 5	Interpret the nature of colloids and illustrate the chemistry of colloids	K1, K2 & K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7
CLO 1	9	1	3	1	1	1	1
CLO 2	9	1	3	1	1	1	1
CLO 3	9	1	3	1	1	1	1
CLO 4	9	1	3	1	1	1	1
CLO 5	9	1	3	1	1	1	1
Weightage of the course	45	5	15	5	5	5	5

9-Strong 3-Medium 1-Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	9	3	1	3
CLO 2	9	9	3	1	3
CLO 3	9	9	3	1	3
CLO 4	9	9	3	1	3
CLO 5	9	9	3	1	3
Weightage of the course	45	45	15	5	15

9-Strong; 3-Medium; 1-Low

Syllabus

UNIT-I: GASEOUS STATE

Postulates of kinetic molecular theory of gas – derivation of kinetic gas equation – derivation of gas laws from kinetic gas equation – Boyle's law, Charles law, Avogadro's law, Graham's law of diffusion, Dalton's law of partial pressure – Maxwell's distribution law of molecular speeds (without derivation) – Effect of temperature on distribution of molecular velocities – Types of molecular velocities – most probable, average and root mean square velocity – collision parameter – collision diameter, collision cross-section, collision number, collision frequency and mean free path – degrees of freedom of gaseous molecules – principle of equipartition of energy.

UNIT-III: SOLIDSTATE-I

Crystalline solid and amorphous solid – polymorphism, allotropy – interfacial angle, unit cell, crystal lattice – symmetry in crystal systems –Types of cubic system: simple cubic (SC), face centered cubic (FCC) and body centered cubic (BCC) – packing efficiency of SC, FCC, BCC and hcp – seven crystal systems – Bravais lattices – Laws of crystallography: Law of constancy of interfacial angle, law of rational indices, law of constancy of symmetry – Miller Indices – Weiss indices – Derivation of Bragg's equation – problems involving Bragg's equation – applications of X-rays to the study of crystal structures: powder method and rotating crystal method.

UNIT-IV: SOLID STATE-II

Band theory of solids: Conductors, insulators, n and p-type semiconductors

Imperfections in crystal: Point defect – Schottkey, Frenkel defects – metal excess defects, metal deficiency defects – Line defects.

Types of crystals: Molecular crystal: Ammonia and water – covalent crystal: Diamond and graphite – Ionic crystals: sodium chloride, cesium chloride, zinc blende – Metallic crystal: Electron sea model – quasi crystal.

Liquid Crystals: Classification, smectic, nematic, cholesteric, disc and polymeric liquid crystal – molecular arrangements.

UNIT-IV: SURFACE CHEMISTRY

Surface chemistry: Adsorption *vs.* absorption – types of adsorption – physisorption and chemisorption – characteristics, factors influencing adsorption – adsorption isotherms – adsorption isobars – Freundlich and Langmuir adsorption isotherm – Brunauer–Emmett–Teller (BET) theory of adsorption (derivation not necessary) – applications of adsorption.

Catalysis: Definition – characteristics of catalysis – promoters and poisons, acid-base catalysis – autocatalysis – enzyme catalysis – Michaelis-Menten equation – theories of catalysis – intermediate compound formation theory – modern adsorption theory – Applications of catalysis.

UNIT-V: COLLOIDAL STATE

Introduction: Colloids, suspensions and solutions – classifications of colloidal systems – purification – kinetic properties – Brownian movement – optical properties – Tyndall effect – electrical properties – Helmholtz and diffuse double layers, zeta potential, electrophoresis and electro-osmosis– stability of colloids – applications of colloids – Coagulation: Methods of coagulation – Hardy-Schulze law – protective

colloids – gold number – emulsion – types of emulsions and its preparation – emulsifier – Gels: Classification, preparation and properties.

Text Books

1. Puri, B.R., Sharma, L.R., and Pathania, M.S., *Principles of Physical Chemistry*, 46th Ed., Vishal Publications, 2013.
2. Glasstone, S. *Text Book of Physical Chemistry*, 7th Ed., Macmillan, 2012.

Reference Books

1. Azaroff, L. I*ntroduction to solids*, Tata Mcgraw Hill publishing company, New Delhi, 1995.
2. ArunBahl, Bhal, B.S., and Tuli, G.D. *Essentials of Physical chemistry*, S. Chand Publishing Company, New Delhi, 2014.
3. Castellan, G.W. *Physical Chemistry*, 4th Ed., Narosa, 2004.
4. Kapoor, K. L. *A Text book of Physical Chemistry*, 4th Ed., McGraw Hill Education, 2017.
5. Barrow, G.M. *Physical Chemistry*, 5th Ed., McGraw Hill Education, 2006.
6. Glasstone, S. *Thermodynamics for chemists*, EWP, 2008
7. Maron, S.H. and Prutton, C.F. *Principles of Physical Chemistry*, 4th Ed., Oxford & IBH publishing co.Pvt.Ltd., New Delhi, 1972.
8. Atkins, P.W. *Physical Chemistry*, 8th Ed., Oxford University, New York.

E - Resources

1. https://nptel.ac.in/courses/104/105/104105093/
2. https://nptel.ac.in/courses/104/108/104108098/
3. https://nptel.ac.in/courses/112/103/112103016/
4. https://nptel.ac.in/courses/104/104/104104101/
5. https://nptel.ac.in/courses/115/105/115105099/

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – III: **Core Practical**		SEMESTER **II**
Course Title: **VOLUMETRIC ANALYSIS AND ORGANIC ESTIMATION**		
Course Code: **07CP23**	Hours per week: **2**	Credits:
CIA Marks: **40 Marks**	ESE Marks: **60 Marks**	Total Marks: **100 Marks**

Preamble

Students are enabled to acquire knowledge of hand on experiment on volumetric analysis, this leads them to develop the knowledge in the principles of concentration, primary and secondary standards.

Course Learning Outcomes (CLO)

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

CLO	CLO Statements	Knowledge Level
CLO1	Anticipate, recognize, and respond properly to potential hazards in laboratory procedures	K1, K2 & K3
CLO2	Perform accurate quantitative measurements	K1, K2 & K3
CLO3	Interpret experimental results and draw reasonable conclusions	K1, K2 & K3
CLO4	Keep accurate and complete experimental records	K1, K2 & K3
CLO5	Interpret experimental results and draw reasonable conclusions	K1, K2 & K3
CLO6	Communicate effectively through oral and written reports	K1, K2 & K3

K_1-Remembering **K_2-**Understanding **K_3-**Applying

Syllabus

UNIT-I: VOLUMETRIC ANALYSIS

Principle: Volumetric estimation: Principe, standard solution, analyte, titrant, indicator, end point, equivalent point, primary standard and secondary standard, preparation of standard solution.

Concentration terms: Mole concept – molecular formula – molecular weight – equivalent weight – normality – molality – molarity – weight percentage – problems related to preparation of different concentrations of solutions – list of lab apparatus and their uses.

[A double titration involving the preparation of a primary standard, standardization of the link solution and estimation of the given analyte.]

UNIT-II: **ACIDIMETRY AND ALKALIMETRY**

1. Estimation of H_2SO_4 *vs.* NaOH using a standard oxalic acid.
2. Estimation of HCl *vs.* NaOH using a standard oxalic acid.
3. Estimation of NaOH *vs.* H_2SO_4 using a standard Na_2CO_3.
4. Estimation of Na_2CO_3 *vs.* HCl using a standard Na_2CO_3.

UNIT-III: **REDOX TITRATIONS**

Permanganometry

16. Estimation of oxalic acid *vs.* $KMnO_4$ using a standard oxalic acid.
17. Estimation of ferrous sulphate *vs.* $KMnO_4$ using a standard oxalic acid.
18. Estimation of Mohr's salt *vs.* $KMnO_4$ using a standard oxalic acid.

Dichrometry

19. Estimation of ferrous ion
20. Estimation of ferric ion using external indicator

UNIT-IV: IODOMETRY, IODIMETRY AND EDTA TITRATION

Iodometry and iodimetry

21. Estimation of potassium dichromate
22. Estimation of potassium permanganate
23. Estimation of copper

EDTA titration

24. Estimation of hardness of water using EDTA

UNIT-V: ORGANIC ESTIMATION

13. Estimation of phenol by brominating method
14. Estimation of aniline by brominating method

Text Book

1. Venkateswaran, V., Veerasamy, R. and Kulandaivelu, A.R. *Basic Principles of Practical Chemistry*, 2nd Ed., Sultan Chand & Sons, New Delhi, 2017.
2. Thomas, A.O. *B.Sc. Main Practical Chemistry*, Scientific Book Centre, Cannanore, 2003.
3. Jeffery, G.H., Basset, J. and others, *Vogel's Textbook of Quantitative Chemical Analysis*, ELBS, 5th Ed., London, 1989.

Reference Books

1. Gnanaprakasam, N.S. and Ramamurthy, G. *Organic Chemistry Lab Manual*, S.Viswanathan Pvt. Ltd, 2007.
2. Pass, G. and Sutcliffe, H. *Practical Inorganic Chemistry*, 2nd Ed., Chapman & Hall Ltd, London, 1979.

E - Resources

1. https://www.youtube.com/watch?v=KyZtyEF6kqk
2. https://www.youtube.com/watch?v=ka62KfMgRv8
3. https://www.youtube.com/watch?v=hxYorBeMhnc
4. https://www.youtube.com/watch?v=xOQ6tweyWuE
5. https://www.youtube.com/watch?v=bHkFSavcU5I

Distribution of marks

Max marks: 100

Internal	**: 40 marks**	**External**	**: 60 marks**
Attendance	: 5 marks	Estimation	: 30 marks
Laboratory performance and model practical	: 20 marks	Simple procedure Record note book	: 10 marks : 10 marks
Viva-voce	: 5 marks	Viva-voce	: 10 marks
Observation note book	: 10 marks		
Total	: 40 marks	Total	: 60 marks

For Volumetric Estimation if the student have

Less than 2% Error - 30 marks
2-3% Error - **25 Marks**
3-4% Error - 20 marks
3-5% Error - 15 marks
Greater than 5% - 10 marks

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)
(For those students admitted during the Academic Year 2021-22 and after)

Part III : **Allied Theory**		Semester – **II**
Course Title : **ALLIED PHYSICS – II**		
Course Code: **06AE02**	Hours Per Week : **4**	Credit: **4**
CIA Marks : **25**	ESE Marks : **75**	Total Marks : **100**

Preamble

To enable the students to

- Learn the basic concepts of Physical Optics
- Understanding the fundamental concepts of Atomic Physics
- Learn the basics of Nuclear Physics and its applications
- Learn the principles of relativity
- Understanding the fundamentals of digital electronics

Course learning Outcomes (CLO)

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

No.	Course learning Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Differentiate various wave phenomenon of light such as interference, diffraction and polarization	K1,K2 & K3
CLO 2	Understanding the concept of spin and its implication in classification of elements	K1,K2 & K3
CLO 3	Distinguish between Nuclear Fission and Fusion and their applications	K1,K2 & K3
CLO 4	Understanding the significance of Lorentz transformation and Mass energy equivalence	K1,K2 & K3
CLO 5	Distinguish between Junction Diode and Zener Diode and explain various logic gates	K1,K2 & K3

K1- Remembering **K2-Understanding** **K3-Applying**

Syllabus

UNIT-I	**PHYSICAL OPTICS** Interference – Introduction – interference in thin films –production of colors in thin films – diffraction – introduction – plane transmission diffraction grating – polarization – introduction – double refraction – specific rotator power - lauret's half shade polarimeter –difference between interference and diffraction.	**(12 Hrs)**
UNIT-II	**ATOMIC PHYSICS** Vector atom model – Quantum numbers associated with the vector atom model – the Pauli's exclusion principle – magnetic dipole moment due to spin – the stern and gerlach experiment.	**(12 Hrs)**
UNIT- III	**NUCLEAR PHYSICS** Models of nuclear structure – mass defect – binding energy – ionization chamber - nuclear fission-energy released in fission-atom bomb – Nuclear reactor – Nuclear fusion – Distinction between fission and fusion.	**(12 Hrs)**

UNIT- IV	**ELEMENTS OF RELATIVITY** Frame of reference - Galilean Transformation Equations – Postulates of Special theory of Relativity – The Lorentz Transformation Equations - derivation – Length Contraction – Time Dilation –Mass Energy Equivalence	**(12 Hrs)**

UNIT- V	**ELECTRONICS** Light Emitting Diode (LED) – Zener Diode- experiment to study the characteristics of the zener diode – zener diode as voltage regulator – Logic Gates – AND gate – OR gate- the NOT gate – the NAND gate –NAND gate is a universal gate- the NOR gate – NOR gate is universal gate – Boolean algebra – Postulates and theorem of Boolean algebra - De Morgan's theorem.	**(12 Hrs)**

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO6	PLO7
CLO 1	9	3	9	1	3	1	1
CLO 2	9	3	9	1	3	1	1
CLO 3	9	3	9	1	1	1	1
CLO 4	9	3	9	1	1	1	1
CLO 5	9	3	3	1	1	1	1

9 – Strong 3 – Medium 1 – Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	9	9	3	3
CLO 2	9	9	3	3	3
CLO 3	9	3	3	1	3
CLO 4	9	3	3	1	1
CLO 5	3	3	3	1	1

9 – Strong 3 – Medium 1 – Low

Text Book

Allied Physics Paper I and II - R. Murugeshan, M.Shantha Kiruthiga Sivaprasath, S.Chand & Company Pvt. Ltd. New Delhi, Revised Edition, Reprint 2014.
Unit I: 6.2 to 6.4, 6.8, 6.10, 6.12, 6.14, 6.19, 6.20
Unit II: 7.1, 7.2, 7.4, 7.7, 7.8
Unit III: 8.1, 8.3, 8.4, 8.6, 8.8, 8.9, 8.12, 8.13, 8.14
Unit IV: 10.1 to 10.4, 10.11 to 10.21
Unit V: 9.1 to 9.7, 9.9

Reference Books

1. Electricity and Magnetism - R. Murugeshan -Reprint with correction 2008
2. Principles of Electronics - V.K.Metha & Rohit Metha -Multicolour Illustrative edition – 2006- S. Chand & Company Ltd., New Delhi
3. Modern Physics-R. Murugeshan & Kiruthiga Sivaprasath- Multicolour Edition – 2007- S. Chand & Company Ltd., New Delhi

E-Resource

1. https://youtu.be/mFE1EBsPEas
2. https://www.physicsclassroom.com/class/waves/Lesson-3/Interference-of-Waves
3. https://youtu.be/74sFaO2i_-A
4. https://youtu.be/1U6Nzcv9Vws
5. https://byjus.com/physics/mass-energy-equivalence/
6. https://www.electronics-tutorials.ws/diode/diode_8.html
7. https://www.digikey.in/en/maker/blogs/zener-diode-basic-operation-and-applications

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

Part III : **Ability Enchancement Course**		Semester – **II**
Course Title : **ALLIED PHYSICS PRACTICAL**		
Course Code: **06AP03**	Hours Per Week : **2**	Credit: **2**
CIA Marks : **40**	ESE Marks : **60**	Total Marks : **100**

Preamble

To enable the students

- To develop the practical skills by applying the concept of physics and electronic experiment.

Syllabus

1	Non-Uniform Bending – Pin and Microscope Method
2	Uniform Bending – Optic Lever, Scale and Microscope Method
3	Non-Uniform Bending – Optic lever, Scale and Microscope Method
4	Uniform Bending – Pin and Microscope Method
5	Compound Pendulum- Acceleration due to gravity
6	Torsional Pendulum - Rigidity modulus and Moment of Inertia
7	Sonometer – Verification of Laws (1^{st} law & 2^{nd} law)
8	Viscosity by Stoke's method
9	Newton's rings – Determination of Radius of curvature
10	Air wedge – Thickness of a wire
11	Spectrometer – Refractive Index
12	Spectrometer – Grating -Normal incidence
13	Carey Foster Bridge - Resistance and Specific resistance
14	Diode Characteristics & Zener Diode Characteristics
15	Logic Gates – AND, OR, NOT

Text Books

1. Allied Physics Paper I and II - R. Murugeshan, M.Shantha Kiruthiga Sivaprasath, S.Chand &Company Pvt. Ltd. New Delhi, Revised Edition, Reprint 2014.
2. Mechanics Properties of Matter Practical I- R. Murugeshan, 2002.

E-Resource

1. https://youtu.be/rkiMpF4r2Jk
2. https://youtu.be/3uZ_Boyt_AI
3. https://youtu.be/P-eJIXZimmQ
4. https://youtu.be/GTnPEtksTEc
5. https://youtu.be/b9FdsgepDD0
6. https://youtu.be/PU-SeNfIRcs
7. https://youtu.be/cDlzrrsfs3E

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. and ,B.A Except Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – IV: **Generic Elective Course**		SEMESTER **II**
Course Title: **CHEMISTRY IN MEDICINE**		
Course Code: **07GE21**	Hours per week: **2**	Credits: **2**
CIA Marks: **25 Marks**	ESE Marks**:75 Marks**	Total Marks: **100 Marks**

Preamble

Students are enabled to,

- ✓ Have knowledge of first aid and the important rules.
- ✓ Know the common chemicals in medicine
- ✓ Have awareness of some common diseases and the drugs used
- ✓ Understand the role of Anaesthetics in human

Course Learning Outcomes (CLO)

On the successful completion of the course, students will be able to:

No.	Course Learning Outcomes	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Demonstrate and illustrate processes of first aid and suggset the remedy for poisons	K1, K2 & K3
CLO 2	Define the terms involved in pharmaceutical chemistry and discuss some selected common diseases	K1, K2 & K3
CLO 3	List out the medicinal uses of some selected inorganic compounds.	K1, K2 & K3
CLO 4	Classify and define the various types of anaesthetics	K1, K2 & K3
CLO 5	Create awareness and summarize the importance of Indian medicinal plants	K1, K2 & K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Syllabus

UNIT-I: **FIRST AID**

First Aid for accidents-important rules – first aid kit, First aid for cuts, bruises, bleeding, fractures, burns, bleeding, fractures, burns, fainting and poisonous bites – Common poisons: acid poisoning, antidote – alkali poisoning, antidote – poisoning by disinfectant, symptoms, antidote – alkaloid poisoning, symptoms, antidote – alcohol poisoning, symptoms, antidote – mercury poisoning, antidote – salicylate poisoning, antidote.

UNIT-II: **CAUSES OF COMMON DISEASE AND TREATMENT BY DRUGS**

Common diseases – Infective disease – Insect-borne, air – Borne and water borne – Hereditary disease terminology – Drug, pharmacology, pharmacognesy, pharmacodynamics and pharmacokinetics.

UNIT-III: **CHEMICALS IN HEALTH**

Compounds of aluminium – phosphorus – arsenic – iron – mercury – biological significance of sodium, potassium, calcium, iodine, copper and zinc. (preparations and chemical equations not required).

UNIT-IV: **ANAESTHETICS**

Definition – classification – local and general – volatile, nitrous oxide, ether, chloroform, cyclopropane, uses and disadvantages – nonvolatile intravenous – thiopental sodium, methohexitone, local anesthetics – cocaine, benzocaine Procaine, amethocaine, uses and disadvantages.

UNIT-V: INDIAN MEDICINAL PLANTS

Hibisous rosa sinesis – adathoda vasica – neem – tulsi – thoothuvalai – azadirachta indica – kizhanelli – phyllanths niruri – solanum trolobatum – ocimum sanctum – grasses – green.

Text Book

1. Jayashree Ghosh, *Fundamental concepts of Applied Chemistry*, S. Chand & Co. Publisher, 1998.
2. Gareth Thomas, *Medicinal Chemistry: An introduction*, John wiley & sons, Ltd, 2004.

Reference Books

1. Lakshmi, S. *Pharmaceutical Chemistry*, S. Chand & Sons, New Delhi, 1995.
2. Wolff, M.E. *Burger's Medicinal Chemistry and Drug Discovery*, John Wiley publications. 2005.

E - Resources

1. https://onlinecourses.nptel.ac.in/noc21_cy05/preview
2. https://nhcps.com/lesson/cpr-first-aid-first-aid-basics/
3. https://www.redcross.org/take-a-class/first-aid/performing-first-aid/what-is-first-aid
4. https://www.medicinenet.com/diseases_and_conditions/article.htm
5. https://www.nmpb.nic.in/content/medicinal-plants-fact-sheet

விவேகானந்த கல்லூரி, திருவேடகம் மேற்கு**-625 243**

தமிழ்த்துறை

Programme: B.A., B.Sc. (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021 - 2022and after)

PART – I **TAMIL**		SEMESTER : **III**
Course Title : **: காப்பிய இலக்கியமும் உரைநடை இலக்கியமும்**		
Course Code **: P1LT31**	Hours per week **: 6**	Credits **: 3**
CIA : **25 Marks**	ESE : **75 Marks**	Total: **100 Marks**

முன்னுரை

1. வாழ்க்கையின் உறுதிப்பொருள்களான அறம், பொருள், இன்பம் வீடுபேறு ஆகியனவற்றை உணர்த்துதல்.
2. இறைவழிபாட்டு சிந்தனைகளை வளர்த்தல்.
3. உரைநடை இலக்கியத்தின் வாயிலாக தனிமனித ஒழுக்க நிலைகளை எடுத்துக்காட்டல்.
4. மரபுக்கவிதைகளின் வகைமைகளை அறிதல்.
5. காப்பியம் மற்றும் உரைநடை இலக்கியத்தின் வரலாற்றினை அறிவித்தல்.

பாடதிட்டத்தின் முடிவுகள்

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

NO.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	காப்பிய இலக்கியங்களின் வாயிலாக அறம், பொருள், இன்பம், வீடுபேறு என்ற வாழ்க்கையின் உறுதிப்பொருட்கள், எவ்வுயிரையும் தம்முயிர்போல மதித்தல், பிறர் மனை நோக்கா நிலை, பகைமை பாராட்டாத தன்மை, ஆணவம் இல்லா வாழ்க்கை போன்றவைகளை வரையறை செய்த தன்மைகளை உணர்த்துதல்.	K1, K2
CLO 2	மரபு இலக்கணங்களான அணிகள், பாவகைகளின் வாயிலாக மாணவர்களின் இலக்கியச்சுவை உணர்வினை வளர்த்து, கற்பனைத் திறன்களை அறிவித்தல்.	K2, K3
CLO 3	உரைநடை இலக்கியங்களின் வாயிலாக இறைவழிபாட்டுச் சிந்தனைகளை தனிமனித வாழ்க்கை நிகழ்வுகளின் வழி வெளிப்படுத்தி, உலக இயல்புகளை மொழிந்து, பரம்பொருளை அடையக்கூடிய வழிவகைகளையும், சமரச சன்மார்க்க நெறிகளையும் தெளிவுறுத்துதல்.	K2, K3
CLO 4	புராண, இதிகாசங்களின் வழி அக்காலகட்ட மக்களின் சமூக நிலைகளைக் கலந்துரையாட செய்தல்.	K2
CLO 5	காப்பியம் மற்றும் உரைநடை இலக்கியம் தோன்றிய காலகட்ட வரலாற்றினை விவரித்தல். கணினிக்கு தமிழ் அறிமுகமான நிலைகள், அதற்குப் பயன்படுத்தக் கூடிய கணினித் தமிழ்ச்சொற்கள் ஆகியன குறித்து விவரித்தல்	K1, K2, K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Mapping of CLO and PLO

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
CLO1	9	9	9	9	9	3	9
CLO2	9	9	9	9	9	3	9
CLO3	9	9	9	9	9	3	9
CLO4	9	3	3	3	9	-	9
CLO5	9	3	9	9	9	-	9
	45	**33**	**39**	**39**	**45**	**09**	**45**

Note: Mapping Score Strong-9, Medium- 3 and Low-1

பாடத்திட்டம்

அலகு - 1	**காப்பிய இலக்கியம்** **1.** சிலப்பதிகாரம் - (கனாத்திறம் உரைத்த காதை) **2.** மணிமேகலை (ஆதிரை பிச்சையிட்ட காதை) **3.** சீவகசிந்தாமணி (குணமாலையார் இலம்பகம்)	**18மணிநேரம்**
அலகு - 2	**இதிகாச இலக்கியம்** 1. கம்பராமாயணம் (குகப்படலம்) 2. மகாபாரதம் (கண்ணன் தூதுச் சருக்கம்) 3. ஸ்ரீகந்த புராணம் - தேவகாண்டம் (தெய்வானை, வள்ளி திருமணம்)	
அலகு - 3	**உரைநடை இலக்கியம்** 1. சித்பவானந்த சிந்தனைகள்	**18மணிநேரம்**
அலகு - 4	**தமிழ் இலக்கணம்** 1.அணிகள் - உவமை - உருவகம் - பிறிது மொழிதல் - தற்குறிப்பேற்றம் - வஞ்சப்புகழ்ச்சி அணி 2.பாவகைகள் - வெண்பா - ஆசிரியப்பா 3.மடல் வரைதல் - விண்ணப்பம் - புகார்க் கடிதம் - பாராட்டுக் கடிதம்	**18மணிநேரம்**
அலகு - 5	**தமிழ் இலக்கிய வரலாறும் பயன்பாட்டுத் தமிழும்** 1. காப்பிய இலக்கிய வரலாறு 2. உரைநடை இலக்கிய வரலாறு 3. செய்தித்தாள் தொடங்கும் வழிமுறைகள் செய்தித்தாளின் நிர்வாக அமைப்பு - பேட்டி	**18மணிநேரம்**

பாட நூல்கள்

1. தமிழ்ச் செய்யுட் தொகுப்பு - தமிழ்த்துறை வெளியீடு
2. நாடகம் - வைகையில் வெள்ளம் வரும்- சதுபதி. பாவை பப்ளிகேஷன்ஸ்- சென்னை – 14

பார்வை நூல்கள்

1.தமிழ் இலக்கிய வரலாறு - பேரா.முனைவர் பாக்யமேரி,
நியூ செஞ்சுரி புக் ஹவுஸ்(பி)லிட்,41-பி, சிட்கோ இண்டஸ்டிரியல் எஸ்டேட்,
அம்பத்தூர், சென்னை- 600 098.
2.தமிழ் இலக்கிய வரலாறு- மு.வரதராசனார்
சாகித்திய அக்காதெமி,தலைமை அலுவலகம்,ரவீந்திர பவன்,
35,பெரோஸ்ஷா சாலை,புதுதில்லி.

E-Resourcs

1. https://www.youtube.com/watch?v=JRkZ1W4V7e4
2. https://www.youtube.com/watch?v=svvgz4Bt3Vo
3. https://www.youtube.com/watch?v=PSG4fuuHruo
4. https://www.youtube.com/watch?v=yFGkSYyhsRA
5. https://www.tamildigitallibrary.in/admin/assets/book/TVA_BOK_0002569_%E0%AE%B5%E0%AE%BF%E0%AE%B2%E0%AF%8D%E0%AE%B2%E0%AE%BF%E0%AE%AA%E0%AF%81%E0%AE%A4%E0%AF%8D%E0%AE%A4%E0%AF%82%E0%AE%B0%E0%AE%BE%E0%AE%B0%E0%AF%8D_%E0%AE%AA%E0%AE%BE%E0%AE%B0%E0%AE%A4%E0%AE%AE%E0%AF%8D.pdf
6. https://www.youtube.com/watch?v=Oa7RKkVyVHA
7. http://www.shakthibharathi.com/uploads/%E0%AE%95%E0%AE%BE%E0%AE%AA%E0%AF%8D%E0%AE%AA%E0%AE%BF%E0%AE%AF%20%E0%AE%87%E0%AE%B2%E0%AE%95%E0%AF%8D%E0%AE%95%E0%AE%BF%E0%AE%AF%20%E0%AE%B5%E0%AE%B0%E0%AE%B2%E0%AE%BE%E0%AE%B1%E0%AF%81.pdf

8. https://www.gunathamizh.com/2020/05/blog-post_30.html

கற்பிக்கும் முறைகள்

விரிவுரை கொடுத்தல், கலந்துரையாடல், காட்சிப் பதிவுகளின் வழியாக புலப்படுத்துதல்.

கற்பிக்க உதவுதல்

கரும்பலகை பயன்படுத்துதல், காட்சி திரைவழியாகப் புலப்படுத்துதல்.

DEPARTMENT SANSKRIT

Programme: B.A./ B.Sc. (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

PART – I **: Sanskrit**		SEMESTER **– III**
Course Title **: PROSE, POETICS AND HISTORY OF SANSKRIT LITERATURE –III**		
Course Code: **P1LS31**	Hours per week: **6**	Credits**: 3**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble:

Sanskrit is offered as an alternative language under Part –I for B.A./ B.Sc students during first four semesters the above column explains the scheme of the III semester.

Course Learning Outcomes (COs)

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

Number	Statement	Knowledge Level
CLO1	Understand the important aspects of prose literature	K2
CLO2	Discriminate spirituality in Literature	K2
CLO3	Basic knowledge of Sanskrit poetics	K1
CLO4	Describe and defend history of early Sanskrit literature	K2
CLO5	Practice Creativity and Demonstrate various culture of world	K2, K3

K1-Knowledge **K2-**Understand **K3-**Apply

Mapping of CLO and PLO

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO 6	PLO 7
CLO1	9	9	9	3	9	-	9
CLO2	9	9	9	9	3	-	3
CLO3	3	3	9	9	9	1	3
CLO4	9	9	9	9	9	-	9
CLO5	9	9	9	9	3	-	3
	39	39	45	39	33	1	27

Strong -9 Medium -3 Low -1

Syllabus

Unit 1: Prose -Gurubhakti, poetics –Upamā, Ullekhā. History of Sanskrit Literature – Gadya Kāvyas- introduction to Gadya Kāvyas- structure of Gadya Kāvyas- Kathā and Ākhyāyikā

Unit 2: Prose –Śukānasopadeśa, poetics –Rūpaka, Apahnuti. History of Sanskrit Literature – Daśakumāracaritam of Daṇḍin, Vāsavadatta of Subandhu. Popular tales

Unit 3: Prose - Samsargajādasagunābhavanti, poetics –Utprekṣā, Atiśayokti. History of Sanskrit Literature- Kādambarī of Bāṇabhaṭṭa- structure of Kādambarī. Historical Kāvyas- Harṣacaritam of Bāṇabhaṭṭa.

Unit 4: Prose - Pañcatantra (introduction), poetics –Dīpaka, Arthāntaranyāsa. History of Sanskrit Literature- works of Vākpati, Bilhaṇa, Kalhaṇa, Vāmananabhaṭṭabāṇa.

Unit 5: Prose –Vāsudevadautyam, poetics – Śleṣa, Vyatireka. History of Sanskrit Literature- History of Campū-literature – works of Trivikramabhaṭṭa, Somadeva, Bhoja, Abhinavakālidāsa, Anantabhaṭṭa, Cidambarakavi, Rājāśarabhoji, NĪlakaṅṭhadīkṣita, Veṅkaṭādri.

Text Book(s)

1. Sāhityarasakaṇa, compiled by Dr. S. Jagadisan, Published by AMG Publications, Madurai - 625010. Year of publication 1996.
2. A History of Sanskrit Literature, compiled by Dr. S. Jagadisan, Published by AMG Publications, Madurai -625010. Year of publication 1996.

Reference Books

1. A Short History of Sanskrit Literature, by T.K. Ramachandra Aiyyar, published by R.S. Vadhyar & Sons, Kalpathi, Palakkad -678003
2. A History of Sanskrit Literature, by A. Berriedale Keith, published by Mothilal Banarsidass Publishers Private Limited, Delhi, 2017.

Pedagogy

Chalk & Talk, Group Discussion, PPT

Teaching Aids

Green Board, LCD Projector, Interactive White Board

DEPARTMENT OF ENGLISH

Programme: B.A., & B.Sc., (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 onwards)

PART – II **: English**		SEMESTER **– III**
Subject Title **: ENGLISH FOR ACADEMIC EXCELLENCE AND SUCCESS**		
Course Code: **P2LE31/P2CE31**	Hours per week: **6**	Credit: **3**
CIA Marks: **25**	ESE Marks: **75**	Total Marks: **100**

Preamble:

The students are expected to inculcate English language proficiency and its socio-linguistic competency.

Course Learning Outcome (CO):

On the successful completion of the course, the students would be able to:

No	Course learning Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO1	Develop comprehension skills of poetic diction/usage through the poetry	K1, K2, K3
CLO2	**Appraise various authors' socio-linguistic values through the prose discourses**	K1, K2, K3
CLO3	Critique the views of the author, and characters from their discourses found in the novel	K1, K2, K3
CLO4	Examine the properties of listening, speaking, reading, and writing activities to enhance English grammar usages	K1, K2, K3
CLO5	Exercise LSRW skills	K1, K2, K3

K1-Remembering K2– Understanding K3 –Applying

Mapping of CLO and PLO

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
CLO1	9	9	9	3	9	3	9
CLO2	9	9	9	9	9	-	9
CLO3	9	9	9	9	9	3	9
CLO4	9	9	3	-	-	-	9
CLO5	9	9	9	3	3	-	9
	45	**45**	**39**	**24**	**30**	**06**	**45**

Strong-9 Medium -3 Low -1

Syllabus

Unit-1 Poetry

1. *The Soul's Prayer* – Sarojini Naidu
2. *La Belle Dame Sans Merci* – John Keats
3. *The Lotus* – Toru Dutt

Unit-2 Prose

1. *Women Not the Weaker Sex* – Mahatma Gandhi
2. *The Lady, or the Tiger?* – Frank R.Stockton
3. *Educating the Adult* (Chapter-I) *The Indian National Education* – Swami Chidbhavananda

Unit-3 Novel

Oliver Twist – Charles Dickens [Abridged]

(For the three Continuous Internal Assessment [CIA] Tests)

Unit-4 Grammar

1. Active Voice and Passive Voice
2. Direct Speech and Indirect Speech

3. Sentence Connectors and Linkers

Unit-5 Oral & Written Communication

1. **Listening** – Comprehension practice from Poetry, Prose, Novel/Online Voice Practice, observing/viewing E-content (with subtitles), Guest/Invited Lectures, Conference/Seminar Presentations & Tests, and DD National News Live, BBC, CNN, VOA etc
2. **Speaking** – In Group Discussion Forum, participate in the Turn Taking, and Conversation Management, Debating, Defending/Mock Viva-Voice, Seminar Presentations on Classroom-Assignments, and Peer-Team-interactions/AIF in Class-room
3. **Reading** – Different Reading Strategies in Poetry, Prose, Novel, Newspaper etc
4. **Writing** – *Dialogue/Conversation Writing*, Advertisement Writing, and *Creative Writing (autobiography, article etc,) for publication in Mass Media.**

Text Books

1. Vinay Harwadker, and A.K.Ramanujan, ed. *The Oxford Anthology of Modern Indian Poetry*. New Delhi:OUP, 1994. (or)
   The Norton Anthology English Literature. New York/London: W.W.Norton, 2012. (or)
   Dr.M.Moovendhan, ed. *Wings of Poesy*. Chennai: Thamarai Publications, 2018 (or)
2. <https://www.poemhunter.com/poem/the-soul-s-prayer/>
3. <https://en.wikisource.org/wiki/The_Bengali_Book_of_English_Verse/The_Lotus_(Toru_Dutt)>
4. <https://www.poetryfoundation.org/poems/45392/ulysses>
5. Swami Chidbhavananda. *The Indian National Education*. Tirupparaithurai: Sri Ramakrishna Tapovanam, 2017.
   <http://www.rktapovanam.org/book_details.php?book_id=MjE=>
6. Dr.P.C. James Daniel, ed. *Gateway to English: An Anthology of Prose*. Chennai: Harrows Publications, 2018.
7. Abhijit Acharijee, and Rakesh Ramamoorthy, ed. *Frontiers of Communication: An Anthology of Short Stories and Prose*. Chennai: Cambridge University Press, 2018.
8. Charles Dickens. *Oliver Twist.* Chennai: Nestling Books, 2018. (or)
9. Charles Dickens. *Oliver Twist* (*the Parish Boy's Progress).* London: Richard Bentley, 1839. https://ia800204.us.archive.org/34/items/olivertwist01dickrich/olivertwist01dickrich.pdf
10. Michael Swan and Catherine Walter. *How English Works: A Grammar Practice Book*. Oxford: OUP, 1997. (or) Wren and Martin. *High School English Grammar and Composition*. New Delhi: S.Chand & Company LTD.1935.
11. Owen Hargie, David Dickson, and Dennis Tourish. *Communication Skills for Effective Management*. New York: Palgrave Macmillan, 2004. (or)
12. British Council | LearnEnglish<https://learnenglish.britishcouncil.org/skills>
13. BBC News <https://www.bbc.com/news>VOA LearningEnglish
14. <https://learningenglish.voanews.com/>
15. University Grants Commission (UGC), New Delhi <https://www.ugc.ac.in/subpage/EContent-URL.aspx> British Council | LearnEnglish<https://www.youtube.com/channel/UCOtnu-KKoAbN47IuYMeDPOg> Cambridge Assessment English<https://www.cambridgeenglish.org/test-your-english/>
16. CLIL (Content & Language Integrated Learning) – Module by TANSCHE
    NOTE: *(Text: Prescribed chapters or pages will be given to the students by the department and the college)*

Reference Books

1. Eileen Thompson et al. *Prentice Hall Literature*: *The English Tradition*. 2.Ed. New Jersey: Prentice-Hall Inc., 1989. (or) John Pfordresher et al. *England in Literature*. Illinois: Scott, Foresman& Co., 1989.
2. Swami Chidbhavananda. *Vedanta Society*.<https://sfvedanta.org/authors/swami-chidbhavananda/>
3. Dr.A.Shanmugakani, ed. *Prose for Communication: An Anthology of Prose*. Madurai: Manimekala Publishing House, 2008.

4. Charles Dickens. *Oliver Twist.* London: Wordsworth Classic, 1992.
5. J. C.Nesfield. *Manual of English Grammar and Composition*. London: Macmillan, 1908.
6. John Eastwood. *Oxford Practice Grammar*. Oxford: OUP, 1945.
7. Dennis Freeborn. *A Course Book in English Grammar*. London: Macmillan, 1987.
8. K.V.Joseph. *A Textbook of English Grammar and Usage*. New Delhi: TATA McGraw Hill Education Private Limited, 2012.
9. J. Thomson, and A. V. Martinet. *A Practical English Grammar*. New Delhi: OUP, 1986.
10. Mary Ellen Guffey, and Richard Almonte. *Essentials of Business Communication*. Toronto: Nelson Education, 2007.
11. Edgar Thorpe, and Showick Thorpe. *Objective English for Competitive Examinations.* New Delhi: Pearson India Education, 2017.
12. Mary Ellen Guffey, and Richard Almonte. *Essentials of Business Communication*. Toronto: Nelson Education, 2007.

E Resources and References

Unit-1 Poetry

https://www.sajeepedia.com/naidus-the-souls-prayer/
https://www.criticalbuzzz.co.in/critical-analysis-of-the-souls-prayer-by-sarojini-naidu/
https://www.poetryfoundation.org/articles/69748/john-keats-la-belle-dame-sans-merci
https://www.cliffsnotes.com/literature/k/keats-poems/summary-and-analysis/la-belle-dame-sans-merci-original-version
https://www.literaturewise.in/mdl/mod/page/view.php?id=142
https://www.slideshare.net/stmaryspg2014/the-lotus-toru-dutt

Unit-2 Prose

https://degmateng.wordpress.com/2017/03/31/unit-2-prose-ls-1-women-not-the-weaker-sex-m-k-gandhi/
https://www.mkgandhi.org/momgandhi/chap60.htm
https://www.eastoftheweb.com/short-stories/UBooks/LadyTige.shtml
https://www.supersummary.com/the-lady-or-the-tiger/summary
https://www.slideshare.net/BharathiRaja6/part2-english-educating-the-adult-chapteri-taken-from-indian-national-education-written-by-srimath-swami-chidbhavananda

Unit-3 Novel

https://www.booksummary.net/oliver-twist-charles-dickens/
https://www.cliffsnotes.com/literature/o/oliver-twist/character-list
https://www.studypool.com/studyGuides/Oliver_Twist/Themes#:~:text=Oliver%20Twist%20is%20a%20story,all%20the%20obstacles%20between%20them.

Unit-4 Grammar

https://www.edudose.com/english/active-and-passive-voice-rules/
https://www.perfect-english-grammar.com/reported-speech.html
https://linguapress.com/grammar/conjunctions.htm

Unit-5 Oral & Written Communication

https://content.byui.edu/file/b8b83119-9acc-4a7b-bc84-efacf9043998/1/Writing-2-5-2.html
https://www.towson.edu/careercenter/students/careerskills/communication.html
https://www.slideshare.net/shahbaazahmed15/bc-communication

PART – III: **Core CourseTheory**		SEMESTER **III**
Course Title: **INORGANIC CHEMISTRY - II**		
Course Code: **07CC31**	Hours per week: **3**	Credits: **4**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

Students are enabled to

- ✓ Understand the basic concepts of nuclear chemistry
- ✓ Compare the various concepts of acids and bases and illustrate the reactions of non-aqueous solvents
- ✓ Know the balancing of chemical equations.

Course Learning Outcomes (CLO)

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

No.	Course learning Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Explain the composition and stability of the nucleus and types of nuclear reactions.	K1, K2 & K3
CLO 2	Discuss and summarize the natural and artificial radioactivity and their applications	K1, K2 & K3
CLO 3	Define, compare and contrast the various concepts of acids and bases and illustrate the reactions of non-aqueous solvents	K1, K2 & K3
CLO 4	Recall the basic chemistry of hydrogen, heavy water and demonstrate the properties s block elements	K1, K2 & K3
CLO 5	Calculate the oxidation number and predict the balancing of chemical equations	K1, K2 & K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Mapping of CLO with PLO

	PLO 1	**PLO 2**	**PLO 3**	**PLO 4**	**PLO 5**	**PLO 6**	**PLO 7**
CLO 1	9	1	1	1	1	3	1
CLO 2	9	1	1	1	1	3	1
CLO 3	9	1	1	1	1	3	1
CLO 4	9	1	1	1	1	3	1
CLO 5	9	1	1	1	1	3	1
Weightage of the course	45	5	5	5	5	15	5

9-Strong 3-Medium 1-Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	9	9	1	3
CLO 2	9	9	9	1	3
CLO 3	9	9	9	1	3
CLO 4	9	9	9	1	3
CLO 5	9	9	9	1	3
Weightage of the course	45	45	45	5	15

9-Strong; 3-Medium; 1-Low

Syllabus

UNIT-I: NUCLEAR CHEMISTRY – I

Introduction –composition of nucleus and nuclear forces –nuclear stability – mass defect –binding energy – packing fraction –n/p ratio –magic numbers –nuclear models – liquid drop –shell and collective model – isotopes –detection and separation –deviation of atomic weights from whole numbers –isobars, isotones and isomers –radioactive decay and equilibrium –nuclear isomerism –internal conversion – nuclear Q-value – threshold energy –cross sections, types of reactions –fission and fusion –modes of radioactive decay.

UNIT-II: NUCLEAR CHEMISTRY – II

Natural and induced radioactivity –radioactive decay –half-life period – radioactive displacement law – radioactive series – Radioactive techniques –Geiger Muller and ionization counters – natural radioactivity – detection and measurement of radioactivity –radioactive series including neptunium series – group displacement law – rate of disintegration and half-life period – average life period – artificial radioactivity – induced radioactivity – uses of radioisotopes – hazards of radiations – nuclear energy – nuclear reactors – nuclear fission and fusion – fission products and fission yields – spallation –photonuclear and thermo nuclear reactions – energy source of the sun and stars – carbon dating – rock dating – radioactive waste disposal– applications of nuclear science in agriculture, biology and medicine – atomic power projects in India.

UNIT-III: ACID, BASES & NON-AQUEOUS SOLVENTS

Acids and bases: Arrhenius – Bronsted-Lowry (conjugate acid and base) – Lux-Flood – Lewis – Cady & Elsey – Usanovich concepts – hard and soft acids and bases – HSAB principle.

Non-aqueous solvents: Classification of solvents – reactions in non-aqueous solvents with reference to liquid NH_3 and liquid SO_2.

UNIT-IV: HYDROGEN AND s-BLOCK ELEMENTS

Hydrogen: Isotopes of hydrogen – ortho and para hydrogens – preparation and properties of ortho and para hydrogens – hydrides and its classification (ionic, molecular and interstitial) – preparation, properties and uses of heavy water.

s-block elements: Reducing property of alkali metals and alkaline earth metals – colours imparted to the flame by s-block elements – general chemical properties of s-block elements – diagonal relationship between Li and Mg – diagonal relationship between Be and Al.

UNIT-V: REDOX REACTIONS

Oxidation number and oxidation state – general rules for calculating oxidation number – distinction between oxidation number and valency or covalency of an element – oxidation and reduction – redox reactions and half reactions – oxidizing agent and reducing agent – calculation of equivalent weight of oxidizing agent and reducing agent ($KMnO_4$, $K_2Cr_2O_7$, I_2, $CuSO_4$, $Na_2S_2O_3$ and KI) – disproportionation reaction – Balancing of redox reactions by ion electron method and oxidation number method. Balancing of following reactions.

(a) $MnO_4^- + C_2O_4^{2-} \rightarrow Mn^{2+} + CO_2$ (in acidic medium),
(b) $K_2Cr_2O_7 + H_2SO_4 + FeSO_4 \rightarrow K_2SO_4 + Cr_2(SO_4)_3 + Fe_2(SO_4)_3$,
(c) $Fe^{2+} + MnO_4^- + H_+ \rightarrow Mn^{2+} + Fe^{3+} + H_2O$,
(d) $Cl_2 + SO_2 + H_2O \rightarrow Cl^- + SO_4^{2-} + H^+$.
Importance of redox reactions - redox reactions involved in voltaic cell and dry cell.

Text Books

1. Puri, B.R., Sharma, L.R. and Kalia, K.C. *Principles of Inorganic Chemistry*, 33rd Ed., Vishal Publishing, 2017.
2. Soni, P.L. and Katyal, M. *Text book of inorganic chemistry*, 20th Ed., Sultan Chand & Sons, 2015.

Reference Books

1. Cotton, F.A., Wilkinson, G. and Gus, P.L. *Basic Inorganic Chemistry*, 3rd Ed., John Wiley & Sons (Asia) Pvt. Ltd., 2007.
2. Lee, J.D, *Concise Inorganic Chemistry*, 5th Ed., Blackwell Science Ltd., 2006.
3. Douglas, B.E., McDaniel, D.H. and Alexander, J.J. *Concepts and Models of Inorganic Chemistry*, 3rd Ed., John Wiley & Sons, 1999.
4. Madan, R.D. *Advanced Inorganic Chemistry*, 1st Ed., Sultan Chand & Sons, 1998.

E - Resources

1. https://nptel.ac.in/courses/115/104/115104043/
2. https://nptel.ac.in/courses/115/102/115102017/
3. https://nptel.ac.in/courses/103/106/103106101/
4. https://nptel.ac.in/courses/104/103/104103069/
5. https://nptel.ac.in/courses/104/101/104101090/
6. http://www.chemistry.wustl.edu/~coursedev/Online%20tutorials/Redox.htm

DEPARTMENT OF CHEMISTRY

Programme : B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – III: **Core Course Theory**		SEMESTER **III**
Course Title: **PHYSICAL CHEMISTRY-II**		
Course Code: **07CC32**	Hours per week: **4**	Credits: **4**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

Students are enabled to

- ✓ Describe the laws of thermodynamics
- ✓ Discuss the fundamental aspects of chemical and ionic equilibrium
- ✓ Learn the fundamentals of photochemistry
- ✓ Learn the relation between structure of the molecule with its physical properties

Course Learning Outcomes (CLO)

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

No.	Course Learning Outcomes	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Interpret the basics of first law of thermodynamics & its applications and explain the laws of thermochemistry	K1, K2 & K3
CLO 2	Define and illustrate the second and third laws of thermodynamics, the concept of entropy, the concept of Gibbs free energy and their applications	K1 & K2
CLO 3	Explain the basic concepts of thermodynamic equilibria.	K1, K2 & K3
CLO 4	Define and demonstrate the laws of photochemistry and their applications.	K1 & K2
CLO 5	Relate and apply concept physical properties and determine the structure of molecules.	K2 & K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7
CLO 1	9	1	1	1	3	3	1
CLO 2	9	1	1	1	3	3	1
CLO 3	9	1	1	1	3	3	1
CLO 4	9	1	1	1	3	3	1
CLO 5	9	1	3	1	3	9	3
Weightage of the course	45	5	7	5	15	21	7

9-Strong 3-Medium 1-Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	9	3	1	3
CLO 2	9	9	3	1	3
CLO 3	9	9	3	1	3
CLO 4	9	9	3	1	3
CLO 5	9	9	3	1	3
Weightage of the course	45	45	15	5	15

9-Strong; 3-Medium; 1-Low

Syllabus

UNIT-I: FIRST LAW OF THERMODYNAMICS AND THERMOCHEMISTRY

Introduction: System, surroundings, types of systems – extensive and intensive properties – state functions and path functions – types of processes – Zeroth law of thermodynamics – internal energy – enthalpy – heat capacities at constant volume (C_v) and at constant pressure (C_p) – relationship between C_p and C_v.

First law of thermodynamics: Reversible process and maximum work – calculation of work, heat, internal energy change and enthalpy change for the expansion of an ideal gas under reversible isothermal and adiabatic condition – Joule-Thomson effect – derivation of the expression for Joule-Thomson coefficient – inversion temperature.

Thermochemistry: Standard states – Hess's law and its applications – Kirchoff's equation.

UNIT-II: SECOND LAW AND THIRD LAW OF THERMODYNAMICS

Second law of thermodynamics: Need of second law – carnot cycle – entropy – second law of thermodynamics – entropy change in isothermal expansion of an ideal gas – entropy change in reversible and irreversible processes – entropy change in changes of phases – physical significance of entropy – standard entropies – physical significance of entropy – Gibbs-Helmholtz equation – chemical potential – Gibbs-Duhem equation – Clausius-Clapeyron equation

Third law of thermodynamics: Nernst heat theorem – determination of absolute entropy – experimental verification of third law – entropies of real gases – entropy change in a chemical reaction – Boltzmann entropy equation – residual entropy.

UNIT-III: CHEMICAL EQUILIBRIUM

Reversible reactions – nature and characteristics of chemical equilibrium – law of mass action equilibrium constant - equilibrium constant expression in terms of partial pressures – relationship betweenKp and Kc – calculations involving Kp – units of equilibrium constant – thermodynamic derivation of law of chemical equilibrium – temperature dependence of equilibrium constant van't Hoff equation – homogeneous and heterogeneous equilibria – Le Chatelier's principle: Manufacture of ammonia by Haber process, manufacture of sulphuric acid by Contact process, manufacture of nitric acid by Birkel and-Eyde process.

UNIT-IV: **PHOTOCHEMISTRY**

Introduction – thermal reaction *vs.* photochemical reaction, Grotthuss–Draper law, Stark-Einstein law, Beer-Lambert law – quantum yield – primary process and secondary process – Jablonski diagram – fluorescence, phosphorescene – photochemical rate law – kinetics of photochemical reactions: HCl, and HBr – photosensitization and quenching – photosynthesis – chemiluminescence – bioluminescence.

UNIT-V: PHYSICAL PROPERTIES AND CHEMICAL CONSTITUTION

Surface tension and chemical constitution: Parachor in elucidating structure – Viscosity and chemical constitution: Dunstan rule, molar viscosity, Rhecohor – Dipole moment: determination of dipole moment, molecular structure and ionic character – Optical activity and chemical constitution – Magnetic properties: paramagnetic and diamagnetic substances.

Text Books

1. Puri, B.R., Sharma, L.R., and Pathania, M.S. *Principles of Physical Chemistry*, 46th Ed., Vishal Publications, 2013.
2. Bahl, A., Bhal, B.S. and Tuli, G.D. *Essentials of Physical chemistry*, S.Chand Publishing Company, New Delhi, 2014.

Reference Books

1. Glasstone, S. *Text Book of Physical Chemistry*, 7th Ed., Macmillan, 2012.
2. Castellan, G.W. *Physical Chemistry*, 4th Ed., Narosa, 2004.
3. Rohatgi-Mukherjee, K.K. *Fundamentals of Photochemistry*, New age international, 2018.
4. Kapoor, K. L. *A Text book of Physical Chemistry*, 4th Ed., McGraw Hill Education, 2017.
5. Barrow, G.M. *Physical Chemistry*, 5th Ed., McGraw Hill Education, 2006.
6. Glasstone, S. *Thermodynamics for chemists*, EWP, 2008.
7. Maron, S.H. and Prutton, C.F. *Principles of Physical Chemistry*, 4th Ed., Oxford & IBH publishing Co. Pvt. Ltd., New Delhi, 1972.
8. Laideler, K.J. and Meiser, J.M. *Physical Chemistry*, 3rd Ed., International, 1999.

E - Resources

1. https://nptel.ac.in/courses/103/105/103105127/
2. https://nptel.ac.in/courses/103/101/103101004/
3. https://nptel.ac.in/courses/103/107/103107208/
4. https://nptel.ac.in/courses/104/106/104106107/
5. https://nptel.ac.in/courses/103/106/105106204/

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – III: **Core Practical**		SEMESTER **III**
Course Title: **ORGANIC ANALYSIS AND PREPARATION**		
Course Code: **07CP43**	Hours per week: **3**	Credits: **-**
CIA Marks: -	ESE Marks: -	Total Marks: -

Preamble

Students are enabled to

- ✓ Carry out the qualitative analysis of an organic substance, to exhibit the derivative for functional group and to perform the preparation of organic compounds

Course learning Outcomes

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

CLO	CLO Statement	Knowledge level
CLO1	Anticipate, recognize, and respond properly to potential hazards in laboratory procedures	K1, K2 & K3
CLO2	Perform accurate qualitative analysis and prepare organic compounds	K1, K2 & K3
CLO3	Interpret experimental results and draw reasonable conclusions	K1, K2 & K3
CLO4	Keep accurate and complete experimental records	K1, K2 & K3
CLO5	Interpret experimental results and draw reasonable conclusions	K1, K2 & K3
CLO6	Communicate effectively through oral and written reports	K1, K2 & K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Syllabus

UNIT-I: ANALYTICAL CHEMISTRY

Introduction, Chemical analysis, qualitative and quantitative analysis - Sampling procedure, sampling in different physical state –gases, liquids, solids, sample storage, handling of chemicals & equipment, hazards, safety measures, laboratory hygiene & safety.

UNIT-II: SEPARATION AND PURIFICATION TECHNIQUES

Crystallization, Precipitation, solvent extraction, extraction by chemically active solvents, Continuous extraction, Soxhlet extraction.

Recrystallization, Sublimation, Distillation -Fraction distillation, Steam Distillation, Azeotropic distillation & Vacuum distillation.

UNIT-III: SYSTEMATIC ANALYSIS -ORGANIC COMPOUNDS

a) Tests for special elements: nitrogen, halogens and sulphur
b) Tests for saturation / unsaturation
c) Tests for aliphatic and aromatic character
d) Organic compounds containing one functional group and characterization - phenol, aldehyde, ketone, carboxylic acid, dicarboxylic acid (aliphatic and aromatic), ester, primary amine, halogen in nucleus and side chain, carbohydrates, diamides (urea and thiourea), amides, anilides and nitro compounds.
e) Preparation of solid derivative by modification of functional groups as possible.
Systematic Analysis using preliminary, identification and confirmatory tests and derivative preparation with chemical equations for all positive tests expected.

(Minimum ten compounds to be analyzed)

UNIT-IV: ORGANIC PREPARATION (Single stage preparation)

1. **Hydrolysis:** Salicylic acid from methyl salicylate
2. **Oxidation:** Benzoic acid from Benzaldehyde

3. **Bromination:** 2, 4, 6, tribromophenol from phenol
4. **Nitration:***m*-Dinitrobenzene from Nitrobenzene
5. **Acetylation**: Acetanilide from aniline
6. **Benzoylation**: Benzanilide from Aniline
7. **Osazone** formation from glucose

UNIT-V

Determination of Melting / Boiling points of organic compounds.

Text Books

1. Venkateswaran, V., Veerasamy, R. and Kulandaivelu, A.R. *Basic Principles of Practical Chemistry*, 2nd Ed., Sultan Chand & Sons, New Delhi, 2017.
2. Gnanaprakasam, N.S. and Ramamurthy, G. *Organic Chemistry Lab Manual*, S. Viswanathan, Pvt.Ltd, 2007.

Reference Books

1. Thomas, A.O. *Practical Chemistry*, 7th Ed., Scientific Book Centre, Kannur, 1999.
2. Furniss, B.S., Hannaford, A.J., Smith, P.W.G. and Tatchell, A.R. *Vogel's Textbook of Practical Organic Chemistry*, 5th Ed., Longman Scientific & Technical, 1989.
3. Mann, F.G. and Saunders, B.C., *Practical Organic Chemistry*, 4th Ed., Pearson Education, 2009.
4. Ahluwalia, V.K. and Dhingra, S. *Comprehensive Practical Organic Chemistry: Qualitative Analysis*, Universities Press, 2000.

E - Resources

1. https://www.youtube.com/watch?v=YTH9RU-xzqM
2. https://www.youtube.com/watch?v=FUo428guKt0
3. https://www.youtube.com/watch?v=n4esSHxz_J8
4. https://www.youtube.com/watch?v=FuqNEIfsE-Q
5. https://www.youtube.com/watch?v=g5nfiFMCkbQ

Distribution of marks

Max marks: 100

Internal	**: 40 marks**	**External**	**: 60 marks**
Attendance	: 5 marks	Organic analysis	: 30 marks
Laboratory performance and model practical	: 20 marks	Organic preparation	: 10 marks
		Record note book	: 10 marks
Viva-voce	: 5 marks	Viva-voce	: 10 marks
Observation note book	: 10 marks		
Total	: 40 marks	Total	: 60 marks

Organic preparation (10 marks)	
Procedure	: 2 marks
Crude sample	: 6 marks
Recrystallized sample	: 2 marks

Organic analysis (30 Marks)	
Procedure	: 10 marks
Elements present	: 4 marks
Aliphatic or aromatic	: 3 marks
Saturated or unsaturated	: 3 marks
Functional group	: 7 marks
Derivative	: 3 marks

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021 - 22 and after)

PART – III**: Ability Enhancement Course**		SEMESTER **- III**
Course Title**: ANIMAL ORGANISATION**		
Course Code: **09AE01**	Hours per week: **4**	Credits: **4**
CIA: **25 Marks**	ESE: **75 Marks**	Total: **100 Marks**

Preamble

Students are enable to gain basic knowledge on taxanomical methods, outline classification of animals, morphological, anatomical and functional features of representative animals.

Course Learning Outcomes (CLO)

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

No.	Course Learning Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Inculcate knowledge on animal classification and taxonomical methods with suitable examples.	K1
CLO 2	Understand the structure ingestion and egestion of bioprocesses in feeding and respiration of representative animals.	K2
CLO 3	Make awareness on movement of fluids, body and structural in invertebrates and chordates representatives.	K2
CLO 4	Observe a structure and functional aspects of nervous system, receptors in earthworm, insects and human.	K2
CLO 5	Trace the structure and processes of excretion, reproduction in selected invertebrates and chordates.	K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Mapping of CLO with PLO

	PLO 1	**PLO 2**	**PLO 3**	**PLO 4**	**PLO 5**	**PLO6**	**PLO7**
CLO 1	9	3	-	3	9	9	3
CLO 2	9	1	3	3	3	9	3
CLO 3	9	1	9	3	9	3	3
CLO 4	9	1	9	3	3	3	3
CLO 5	9	1	9	9	9	9	3
	45	7	30	21	33	33	15

Mapping of CLO with PSO

Department	**Botany**					**Chemistry**				
PSO/CLO	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**
CLO 1	1	3	1	9	2	3	-	1	1	-
CLO 2	1	1	-	3	1	3	-	-	-	-
CLO 3	-	3	2	3	1	1	1	-	1	-
CLO 4	-	1	3	2	1	-	-	-	-	-
CLO 5	-	1	1	3	1	-	-	1	-	-
	2	**9**	**6**	**20**	**6**	**8**	**3**	**2**	**2**	**-**

Note: Mapping Score Strong-9, Medium- 3 and Low-1

Syllabus

UNIT-I:	1. Principles of taxonomy – Binomial nomenclature - Animal Organisation – body types – protozoa – metazoa – types of coelom – types of symmetry 2. Outline classification of Invertebrates and the salient features of the Phyla with examples. Outline classification of Chordates upto classes giving examples	**(12 Hrs)**
UNIT-II:	1. Feeding and digestion in Amoeba and Frog. 2. Respiration in Amoeba, Cockroach, Gills in Fish and Lungs in bird.	**(12 Hrs)**
UNIT- III:	1. Circulatory system in Earthworm and Calotes. 2. Locomotion in Amoeba and Earthworm: Flight mechanism in Pigeon.	**(12 Hrs)**
UNIT- IV:	1. Nervous system of Earthworm and Frog. 2. Receptors – photoreceptors of insects and man. Human ear.	**(12 Hrs)**
UNIT- V:	1. Excretion in Amoeba, Earthworm and Frog. 2. Reproductive system of Rabbit.	**(12 Hrs)**

Text Books

1. A Text Book of Invertebrates –2004. Nair *et al.,* Saras Publications.
2. A Text Book of Chordates – 2004. Thangamani, *et.a.l.,* Saras Publications

Reference Books

1. A Manual of Zoology, Vol. I- Invertebrata, 1982. Ekambaranatha Ayyar and Ananthakrishnan.
2. A Manual of Zoology, Vol. II – Chordata – 1982. Ekambaranatha Ayyar and Ananthakrishnan.

E - Resources

1. https://www.slideshare.net/badshah77/zoologic-al-nomenclatures-5
2. https://www.slideshare.net/badshah77/ist-lecture-1
3. https://www.slideserve.com/remington/principles-of-taxonomy
4. https://www.slideshare.net/alice91827/nutrition-in-amoeba-46887840
5. https://www.slideshare.net/sabidasamad93/nutrition-in-amoeba-53683796
6. https://www.slideshare.net/ayesahn1951/paramecium-61896792
7. https://www.microscopemaster.com/paramecium.html
8. https://www.slideshare.net/manishdash1/flight-adaptation-and-mechanism-of-flight-in-birds
9. https://www.biologydiscussion.com/zoology/birds/flight-mechanism-in-pigeons-discussed-birds/41214
10. https://microbiologynotes.com/nervous-system-of-earthworm/
11. https://www.studyandscore.com/studymaterial-detail/earthworm-nervous-system-and-sense-organs
12. https://www.biologydiscussion.com/invertebrate-zoology/protozoa/euglena-viridis-habitat-structure-and-locomotion-protozoa/28141

Pedagogy

Chalk & Talk, PPT Presentation

Teaching Aids

Green Board, & Interactive White Board

DEPARTMENT OF MATHEMATICS

Programme: B.Sc. MATHEMATICS **(**Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021 - 22 and after)

PART – III **: Ability Enhancement Course**		SEMESTER **- III**
Course Title **: MATHEMATICS – I**		
Course Code: **05AE01**	Hours per week: 6	Credits: 4
CIA: 25 Marks	ESE: 75 Marks	Total: 100 Marks

Preamble

To enable the students to acquire the basic knowledge in application of mathematics in differentiation and integration.

Course Learning Outcomes (CLO)

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

No.	Course Learning Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	understand the expression of trigonometric functions and its hyperbolic functions.	K_1, K_2
CLO 2	acquire knowledge in solving problems in differential equations up to second order.	K_2, K_3
CLO 3	acquire knowledge in solving problems in integral equations up to triple integral.	K_2, K_3
CLO 4	understand the concepts involved in vector operators and its related problems.	K_2
CLO 5	acquire knowledge in vector integration on basic theorems and its related problems.	K_2, K_3

K1-Remebering **K_2-Understanding** **K_3-Applying**

Syllabus

UNIT-I	**Trigonometry** Expression for sin nθ, cos nθ & tan nθ - Expression for $\sin^n \theta$ and $\cos^n \theta$ - Expansion of Sinθ, Cosθ and Tanθ in powers of θ - Hyperbolic functions and inverse hyperbolic functions.	**(18 Hrs)**
UNIT-II	**Differential Calculus** Differentiation Methods - successive differentiation (up to second order derivative only, omit Leibritz theorem)	**(18 Hrs)**
UNIT- III	**Integral calculus** Properties of definite integrals – Reduction formula for $\int \sin^n x dx$, $\int \cos^n x dx$ and $\int \sin^m x \cos^n x dx$ only - Double and triple integrals (simple problems).	**(18 Hrs)**
UNIT- IV	**Vector Differentiation** Differentiation of vectors - Gradient of a vector -Directional derivative and its maximum value – Divergence and curl of a vector – solenoidal and irrotational vectors (Simple problems only).	**(18 Hrs)**
UNIT- V	**Vector Integration** Line and Surface Integrals - Green's theorem, Stoke's theorem and Gauss Divergence theorem (Statements only - without proof) - Verifications (simple problems).	**(18 Hrs)**

Text Books

1. Ancillary Mathematics Paper- I (MKU 2006-2007) by Dr. S. Arumugam & Issac Publisher: New Gamma Publishing House, Palayamkottai edition 2007.
2. Ancillary Mathematics Paper- II (Revised) by Dr. S. Arumugam & Issac Publisher: New Gamma

Publishing House, Palayamkottai edition 2004.

3. Calculus by Dr. S. Arumugam & Issac Publisher: New Gamma Publishing House, Palayamkottai edition 2011.

Unit	Text Books	Chapters
1	1	Chapter 4
2	3	Chapter 2 (2.3-2.11)
3	1	Chapter 3 (3.1-3.3, 3.5, 3.6)
4	2	Chapter 1
5	2	Chapter 2

Reference Book

Ancillary Mathematics by T.K Manikavasagam Pillay & Others Viswanathan printers and publishers) Pvt. Ltd. Chennai.

Mapping of CLO with PLO

CLO – PLO Mapping for Course Code: 05AE01

05AE01	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
CLO1	9	-	3	3	3	3	3
CLO2	9	-	3	3	3	3	3
CLO3	9	-	3	3	3	3	3
CLO4	9	-	3	3	3	3	3
CLO5	9	-	3	3	3	3	3
Weightage of the course	45	-	15	15	15	15	15
Weighted percentage of Course contribution to PLOs	3	0	2	2	2	4	1

Mapping of CLO with PSO

CLO – PSO Mapping for Course Code: 05AE01

05AE01	PSO1	PSO2	PSO3	PSO4	PSO5
CLO1	9	3	9	3	9
CLO2	9	3	9	3	9
CLO3	9	3	9	9	3
CLO4	9	9	3	9	3
CLO5	9	3	9	3	9
Weightage of the course	45	21	39	27	33
Weighted percentage of Course contribution to PSOs	6	2	4	5	4

Online Resources

1. Expansion of Trigonometry Ratio: https://youtu.be/6Rw-GMEjQ8shttps://youtu.be/giAjpfwC2LE
2. https://youtu.be/2VMiwNcg0ek
3. Inverse Trigonometry Ratio: https://youtu.be/YXWKpgmLgHk
4. https://youtu.be/w9sjzaXEGVw
5. https://youtu.be/ADpxUQMCSng
6. Hyperbolic function: https://youtu.be/PtKQKc629v8
7. Differential calculus: https://youtu.be/A6Ad7VnSlZE
8. https://youtu.be/UwmWTxAXMk4 , https://youtu.be/n2HDbExJWBU , https://youtu.be/om8OkTVrSbU
9. Integral calculus: https://youtu.be/iDSc2o-wE4I
10. Vector Integration: https://youtu.be/K37VbB5Ukxk
11. Vector differentiation: https://youtu.be/FfJtVvQtqTM
12. Gauss divergence theorem: https://youtu.be/kox4HHL43oM
13. Stock's Theorem: https://youtu.be/MZnymin9i3s
14. Green's Theorem: https://youtu.be/6fJE3vvjB8o

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – IV: **Skill Based Theory**		SEMESTER **III**
Course Title: **MEDICINAL & PHARMACEUTICAL CHEMISTRY**		
Course Code: **07SE31**	Hours per week: **2**	Credits: **2**
CIA Marks: **25 Marks**	ESE Marks**:75 Marks**	Total Marks: **100 Marks**

Preamble

This course is offered for the II-year students to provide a strong foundation on concepts and theories of Medicinal & Pharmaceutical Chemistry. It also helps the students to understand the concept.

Course Learning Outcomes (CLO)

At the end of the course, the student should be able to:

No.	Course Learning Outcomes	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Familiarize and demonstrate the basics involved in first aid.	K1, K2 & K3
CLO 2	List out the physiological principles underlying pathogenesis and treatment of disease.	K1, K2 & K3
CLO 3	Define and classify the various types of anaesthetics	K1, K2 & K3
CLO 4	Define, classify and summarize therapeutic uses of analgeiscs	K1, K2 & K3
CLO 5	Describe the importance of antiseptics and disinfectants	K1, K2 & K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Syllabus

UNIT-I: FIRST AID

Introduction to first aid and for the unconscious, casualty, blood loss and shock, burns, fractures, head injury, sports injuries – handling and transporting casualties.

UNIT-II: DRUG TERMINOLOGY AND CLASSIFICATION

Terminologies used in pharmacology, pharmacognosy, pharmacophore, pharmacodynamics, pharmacopoeia – antimetabolites – chemotherapy and drug action.

Classification of drugs: biological and chemical classification – drug administration.

UNIT-III: ANAESTHETICS

Definition, characteristics, mode of action, classification – advantage and disadvantages of vinyl ether, cyclopropane, chloroform, haloethane, trichloroethylene.

Intravenous Anaesthetics

Thiopental sodium advantages and disadvantages – cocaine and benzocaine (structure and therapeutic use only).

UNIT-IV: ANALGESIC

Narcotic analgesic: Morphine, pethidine and methadone. (therapeutic uses and structure only).

Non-narcotic analgesic: Aspirin, paracetamol, naproxen and ibuprofen (therapeutic uses and structure only).

UNIT-V: ANTISEPTICS AND DISINFECTANTS

Definition, cresol, lysol, thymol, dettol, chloramine, chloramine, furacin, cetrimide, bleaching powder, thiomersol and brilliant green (uses and structure only) - distinction between disinfectants and antiseptics.

Text Book

1. Jayashree Ghosh, *A Text book of Pharmaceutical Chemistry*, S. Chand & Co., New Delhi, 2009.
2. Lakshmi, S. *Pharmaceutical Chemistry*, S. Chand & Sons, New Delhi, 1995.

Reference Books

1. Ashutoshkar, S. *Medicinal Chemistry*, New Age International Publisher, New Delhi, 3rd Ed., 2006.
2. William, D.A., Lemke, T. L. and others. *Foye's Principles of Medicinal Chemistry*, Lippincott Wiliams & Wilkins Publisher, 5th Ed., 2000.

3. Kadam, S. S., Mahadik, K.R and Bothara, K.G. *Principles of Medicinal Chemistry*, Vol.2 NiraliPrakashan, Pune.
4. Craig, C.R. and Stitzel, R.E. *Modern Pharmacology with Clinical Applications*, 6th Ed., Lippincott Williams and Wilkins, New York, 1992.
5. Patrick, G. L. *Introduction to Medicinal Chemistry*, Oxford University Press, UK, 2013.

E - Resources

1. https://www.youtube.com/watch?v=h6zSS7NmSd4
2. https://www.youtube.com/watch?v=lWAuyXdmV6g
3. https://www.youtube.com/watch?v=fq3wrdZJ1vE
4. https://www.youtube.com/watch?v=GJ73z2OiCec
5. https://www.youtube.com/watch?v=fqS9nBeZZtg

விவேகானந்த கல்லூரி, திருவேடகம் மேற்கு-625 243
தமிழ்த்துறை

Programme: B.A., B.Sc. (Under CBCS and LOCF)
(For those students admitted during the Academic Year 2021 - 2022and after)

PART – I **TAMIL**		SEMESTER : **IV**
Course Title : **சங்க இலக்கியமும் நீதி இலக்கியமும்**		
Course Code **: P1LT41**	Hours per week **: 6**	Credits **: 03**
CIA : **25 Marks**	ESE : **75 Marks**	Total: **100 Marks**

முன்னுரை

1. பண்டைத் தமிழர்களில் ஒரு சமூகம் சார்ந்த வாழ்க்கை முறையினை உணர்த்துதல்.
2. தனிமனித வாழ்க்கைகளின் வழி களவு- கற்பு ஒழுக்க நெறிமுறைகளை வெளிப்படுத்துதல்.
3. வாழ்வில் கடைபிடிக்க வேண்டிய நீதிநெறிகளைப் புகட்டுதல்.
4. அகம், புறம் சார்ந்த வாழ்க்கைக்கான இலக்கண வரம்புகளை தெளிவுபடுத்துதல்.
5. சங்கஇலக்கிய மற்றும் நீதிஇலக்கிய காலகட்டங்களின் வரலாற்றினை விவரித்தல்.

பாடத்திட்டத்தின் முடிவுகள்

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

NO.	Course Learning Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	பண்டைத் தமிழர்களில் ஒரு சமூகம் சார்ந்த ஒழுக்கங்கள் குறித்த நிலையினை வரையறை செய்தல்.	K1, K2
CLO 2	ஐந்திணை மக்களின் அகஒழுக்கங்கள் குறித்த செய்திகளை கலந்துரையாடுதல்.	K2, K3
CLO 3	சங்க இலக்கியம் மற்றும் நீதி இலக்கிய காலகட்டங்களில் வாழ்ந்த மக்கள் மற்றும் அவர்களின் வாழ்க்கையினை பதிவுசெய்த படைப்பாளர்கள் ஆகியோரின் வரலாற்றினை விவரித்தல்.	K2, K3
CLO 4	பழங்கால மக்களின் அகம், புறம் தொடர்பான வாழ்க்கை நிகழ்வுகளின் மரபுநிலைகள் குறித்த திறன்களை அறிவித்தல்.	K2
CLO 5	வாக்கியங்களைக் கண்டறிதல், சொற்களை ஒழுங்குபடுத்துதல், ஆங்கிலத்திற்கு நிகரான தமிழ்ச்சொற்களை கண்டறிதல், வழுவுச்சொற்களை நீக்குதல் போன்ற ஒரு மொழியின் பயன்பாட்டுத் தன்மையை தெளிவுறுத்தல்.	K1, K2, K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Mapping of CLO with PLO

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7

CLO1	9	3	9	9	9	9	9
CLO2	9	9	9	9	9	3	9
CLO3	9	9	9	9	9	9	9
CLO4	9	3	3	9	9	9	9
CLO5	9	3	9	9	9	3	9
	45	**27**	**39**	**45**	**45**	**33**	**45**

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

பாடத்திட்டம்

அலகு - 1	தமிழ்ச் சங்க இலக்கியம் (பத்துப்பாட்டு) 1. முல்லைப்பாட்டு	**(18 மணிநேரம்)**
அலகு - 2	தமிழ்ச் சங்க இலக்கியம் (எட்டுத்தொகை) 1.நற்றிணை - (3பாடல்கள்) 2.குறுந்தொகை - (5பாடல்கள்) 3.கலித்தொகை - (2பாடல்கள்) 4.அகநானூறு - (2பாடல்கள்) 5.புறநானூறு - (3பாடல்கள்)	**(18 மணிநேரம்)**
அலகு - 3	தமிழ் நீதி இலக்கியம் 1. திருக்குறள் (செய்நன்றி அறிதல், காலம் அறிதல், குறிப்பு அறிதல்) 2. பழமொழி நானூறு (கல்வி அதிகாரம்) 3. கொன்றை வேந்தன் (10 பாடல்கள்) 4. மூதுரை (10 பாடல்கள்)	**(18 மணிநேரம்)**
அலகு - 4	தமிழ் இலக்கணம் - பொருள் 1. அகப்பொருள் (அகத்திணைகள் - முதல், கரு, உரிப்பொருள்) 2. புறப்பொருள் (புறத்திணைகள் - வெட்சி முதல் பெருந்திணை வரையுள்ள 12திணைகள்) 3. மரபியல் (பெயர் மரபுகள் - ஆண்பால்பெயர், பெண்பால்பெயர், இளமைப்பெயர்)	**(18 மணிநேரம்)**
அலகு - 5	தமிழ் இலக்கிய வரலாறும் பயன்பாட்டுத்தமிழும் 1. சங்க இலக்கிய வரலாறு 2. நீதி இலக்கிய வரலாறு 3. புத்தக மதிப்புரை, தமிழ்த் திரைப்பட விமர்சனம், கவிதை படைத்தல்.	**(18 மணிநேரம்)**

பாட நூல்கள்

1.தமிழ் செய்யுட் தொகுப்பு (தமிழ்த்துறை வெளியீடு)

பார்வை நூல்கள்

1. தமிழ் இலக்கிய வரலாறு - சி.சேதுராமன்,பாவை பப்ளிகேஷன்ஸ்,16(142)ஜானிஜான்கான் சாலை,இராயப்பேட்டை, சென்னை - 600014.
2. தமிழ் இலக்கிய வரலாறு - முனைவர்பாக்யமேரி, நியூ செஞ்சுரி புக் ஹவுஸ்(பி)லிட்,41-பி, சிட்கோ இண்டஸ்டிரியல் எஸ்டேட்,அம்பத்தூர், சென்னை- 600 098.

E-Resourse

1. http://www.tamilvu.org/library/nationalized/pdf/17-kagovindan/mullaippattuoruvilakkam.pdf
2. https://www.keetru.com/index.php/2014-03-08-04-35-27/2014-03-08-12-18-14/2826-2010-01-29-08-13-35
3. https://www.youtube.com/watch?v=rDIzpWkbzn8
4. https://www.youtube.com/watch?v=ZHNH_jlgznc
5. https://www.youtube.com/watch?v=fQxJBfGOxgk
6. https://www.youtube.com/watch?v=fiK782BcyhY

DEPARTMENT OF SANSKRIT

Programme: B.A./ B.Sc. (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021-22 and after)

PART – I **: Sanskrit**		SEMESTER – IV
Course Title: **DRAMA AND HISTORY OF LITERATURE – DRAMAS**		
Course Code: **P1LS41**	Hours per week: **6**	Credits: **3**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble:

Sanskrit is offered as an alternative language under Part –I for B.A./ B.Sc students during first four semesters the above column explains the scheme of the IV semester.

Course Learning Outcomes (CLOs)

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

Number	Statement	Knowledge Level
CLO 1	Understand Sanskrit drama literature	K1, K2
CLO 2	Compare drama with modern life	K2
CLO 3	Classify and discuss the importance of Sanskrit drama literature	K2
CLO 4	Describe and defend history of early Sanskrit literature	K2
CLO 5	Practice Creativity and Demonstrate different aspects of spoken Sanskrit	K2, K3

K1-Knowledge **K2**-Understand **K3**-Apply

Mapping of CO with PO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO6	PLO7
CLO 1	9	9	9	9	3	-	3
CLO 2	9	9	3	9	3	3	3
CLO 3	9	9	3	9	9	-	3
CLO 4	3	9	9	9	9	-	3
CLO 5	9	9	9	9	9	3	3
	39	45	33	45	33	6	15

Note: Mapping Score Strong-9, Medium- 3 and Low-1

Syllabus

Unit 1: Introduction to Sanskrit drama literature, introduction and scope of spoken Sanskrit.

Unit 2: Characteristics features of Sanskrit dramas and Varieties of Sanskrit dramas, spoken Sanskrit for personal use.

Unit 3: Abhijñānaśākuntalam Act –IV, up to arrival of sage Kaṇva to hermitage, Dramas of Bhāsa, spoken Sanskrit for Educational purpose

Unit 4: Abhijñānaśākuntalam Act –IV,advice of sage Kaṇva to Śakuntala, Dramas of Kālidāsa, Moral and social aspects of dramas of Kālidāsa, spoken Sanskrit for commercial purpose.

Unit 5: Abhijñānaśākuntalam Act –IV, up to the end of Act –IV, Dramas of Bhavahūti, Moral and social aspects of dramas of Bhavahūti and other dramas,

Text Book(s)

1. Abhijñānaśākuntalam of Kālidāsa, ed. And translated in to English by M.R. Kale, pub. By Motilal Banarasidas, Delhi 2010.
2. A History of Sanskrit Literature, compiled by Dr. S. Jagadisan, Published by AMG Publications, Madurai -625010. Year of publication 1996.

Reference Books

1. A Short History of Sanskrit Literature, by T.K. Ramachandra Aiyyar, published by R.S. Vadhyar & Sons, Kalpathi, Palakkad -678003.

2. A History of Sanskrit Literature, by A. Berriedale Keith, published by Mothilal Banarsidass Publishers Private Limited, Delhi, 2017.

Pedagogy

Chalk & Talk, Group Discussion, PPT

Teaching Aids

Green Board, LCD Projector, Interactive White Board

DEPARTMENT OF ENGLISH

(For the students of the Academic Year 2021-22 onwards)

Programme: B.A., & B.Sc.,

PART – II **: English**		SEMESTER–**IV**
Course Title: English for Environmental Communication Skills		
Course Code: **P2LE41/ P2CE41**	Hours per week: **6**	Credit: **3**
CIA Marks: **25**	ESE Marks: **75**	Total Marks: **100**

Preamble:

The students are expected to inculcate English language proficiency and its socio-linguistic competency along with environmental consciousness.

Course Learning Outcome (CLO):

On the successful completion of the course, the students would be able to:

	Course Learning Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Appraise various authors' socio-linguistic and environmental values through the prose discourses	K1, K2, K3
CLO 2	Develop comprehension skills of poetic diction/usage through the poetry which are concerned with nature	K1, K2, K3
CLO 3	Discuss the socio-linguistic and Environmental observation of author, and other natural elements found in the Environmental Writing	K1, K2, K3
CLO 4	Examine the functions of English language and its grammar in transactions	K1, K2, K3
CLO 5	Execute and exercise LSRW skills in everyday interactions	K1, K2, K3

K1-Remembering K2 – Understanding K3 –Applying

Mapping of CLO with PLO

	PLO 1	**PLO 2**	**PLO 3**	**PLO 4**	**PLO 5**	**PLO6**	**PLO7**
CLO 1	9	9	9	9	9	9	9
CLO 2	9	9	9	9	9	9	9
CLO 3	9	9	9	9	9	9	9
CLO 4	9	9	3	-	-	-	9
CLO 5	9	9	3	-	3	1	9
	45	45	33	27	30	28	45

Note: Mapping Score Strong-9, Medium- 3 and Low-1

Syllabus

Unit-1 Prose

1. The Teacher (Chapter-IV)
2. The Student (Chapter-V)
3. University Education on the Gurukula Pattern (Chapter-VI)

Swami Chidbhavananda – *The Indian National Education* (Text)

Unit-2 Drama

William Shakespeare-*The Tempest*

(for the three Continuous Internal Assessment [CIA] Tests)

Unit-3 Soft-Skills for Capacity Building

1. Interpersonal skills (Greetings and Leave-taking etc.)
2. Group Discussion for placement/career
3. Interview Skills for placement/career

Unit-4 English for Competitive Examinations

1. Spotting Errors (Articles &Tenses)
2. Analogy and One-Word Substitution
3. Synonyms and Antonyms

Unit-5 Oral & Written Communication

1. **Listening** – Comprehension practice from Prose, Drama etc /Online Voice Practice, observing/viewing E-content (with subtitles), Guest/Invited Lectures, Conference/Seminar Presentations & Tests, and DD National News Live, BBC, CNN, VOA etc
2. **Speaking** – In Group Discussion Forum, speak about Negotiation, Role-Play, Seminar Presentations on Classroom-Assignments, and Peer-Team-interactions/AIF in Class-room
3. **Reading** – Extensive Reading of Prose, (Film with subtitles), and Individual-Classroom-Assignments
4. **Writing** – *Writing and editing Public Speech like Welcome Address/Vote of Thanks,* Introducing a Speaker/Keynote Speech/Address, *Master of Ceremony/Anchoring etc*.*

Text Books

1. Swami Chidbhavananda. *The Indian National Education*. Tirupparaithurai: Sri Ramakrishna Tapovanam,2017. <http://www.rktapovanam.org/book_details.php?book_id=MjE=>
2. William Shakespeare. The Tempest. Ed.Morton Luce. London: Methuen & Co,1919.
3. Cary J Green. *Leadership and Soft Skills for Students*. Indiana: Dog Ear Publishing. 2015. (or) Bruce Tulgan. *Bridging the Soft Skills Gap: How to Teach the Missing Basics to Today's Young Talent*: New Jersey: John Wiley & Sons Inc., 2015. (or) Owen Hargie, David Dickson, and Dennis Tourish. *Communication Skills for Effective Management*. New York: Palgrave Macmillan, 2004. (or) Dale Carnegie. *The Art of Public Speaking.* Massachusetts: Wyatt North Publishing, 2013.
4. Hari Mohan Prasad, and Uma Rani Sinha. *Objective English for Competitive Examinations.* New Delhi: McGrawHill Education, 2016. (or)
   British Council | LearnEnglish<https://learnenglish.britishcouncil.org/skills>
5. BBC News <https://www.bbc.com/news> VOA Learning English <https://learningenglish.voanews.com/>
   University Grants Commission (UGC), New Delhi <https://www.ugc.ac.in/subpage/EContent-URL.aspx> British Council | LearnEnglish<https://www.youtube.com/channel/UCOtnu-KKoAbN47IuYMeDPOg> Cambridge Assessment English <https://www.cambridgeenglish.org/test-your-english/>
6. CLIL (Content & Language Integrated Learning) – Module by TANSCHE
   NOTE: *(Text: Prescribed chapters or pages will be given to the students by the department and the college)*

Reference Books

1. Swami Chidbhavananda. *Vedanta Society*.<https://sfvedanta.org/authors/swami-chidbhavananda/>
2. Raman, Meenakshi and Sangeeta Sharma. *Technical Communication: Principles and Practice.* New Delhi, OUP, 2011.
3. Stephen E Lucal. *The Art of Public Speaking*. New York: McGraw-Hill Education, 2015.
4. Elaine Walker and Steve Elsworth. *Grammar Practice for Elementary Students*. Harlow (UK): Pearson, 2000.
5. Mary Ellen Guffey, and Richard Almonte. *Essentials of Business Communication*. Toronto: Nelson Education, 2007.
6. K.V.Joseph. *A Textbook of English Grammar and Usage*. New Delhi: TATA McGraw Hill Education Private Limited, 2012.
7. Edgar Thorpe, and Showick Thorpe. *Objective English for Competitive Examinations.* New Delhi: Pearson India Education, 2017.

E Resources and References

Unit-1 Prose

https://www.slideshare.net/BharathiRaja6/the-teacher-taken-from-indian-national-education-by-srimath-swami-chidbhavananda
https://www.slideshare.net/BharathiRaja6/the-student-theory-on-students-role-in-gurukulam
https://www.slideshare.net/BharathiRaja6/part2-english-university-education-on-the-gurukula-pattern-taken-from-indian-national-education-by-srimath-swami-chidbhavananda-drsbharathiraja-assistant-professor-headic-department-of-english-vivekananda-college8870518474

Unit-2 Drama

William Shakespeare-The Tempest

(for the three Continuous Internal Assessment [CIA] Tests)

Unit-3 Soft-Skills for Capacity Building

http://ignou.ac.in/userfiles/Unit%201.pdf
GREETINGS AND INTRODUCTION - IGNOU
http://egyankosh.ac.in/bitstream/123456789/60752/1/Unit-1.pdf
http://bankatswamicollege.org/sites/default/files/upload/study%20material1.pdf
https://www.reed.co.uk/career-advice/group-interview-tips-dos-and-donts/
https://www.teachingenglish.org.uk/article/group-discussion-skills
https://www.interview-skills.co.uk/free-information/interview-guide/group-tasks-discussions
https://www.mheducation.co.in/placement-interviews-skills-for-success-9789351340140-india
https://www.prospects.ac.uk/careers-advice/interview-tips/how-to-prepare-for-an-interview

Unit-4 English for Competitive Examinations

https://www.tgct.gov.in/tgportal/staffcollege/DR%20ACTOs%2017.01.2020%20to%2018.02.2020/February%20-%202020%20%20PDF's/05.02.2020,%204.%20Smt.Suma%20Bindu%20Madam,%20Asst.Professor%20and%20Trainer%20@CELT%20(O.U),%20SPOTTING%20ERRORS%202.pdf
http://www.grammarinenglish.com/spottingerrors/
https://www.jagranjosh.com/articles/important-one-word-substitution-questions-for-ssc-cgl-exam-1531479845-1
https://www.englishclub.com/vocabulary/synonyms-antonyms.htm

Unit-5 Oral & Written Communication

https://content.byui.edu/file/b8b83119-9acc-4a7b-bc84-efacf9043998/1/Writing-2-5-2.html
https://www.towson.edu/careercenter/students/careerskills/communication.html
https://www.slideshare.net/shahbaazahmed15/bc-communication

DEPARTMENT OF CHEMISTRY

Programme : B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – III: **Core Course Theory**		SEMESTER **IV**
Course Title: **ORGANIC CHEMISTRY - III**		
Course Code: **07CC41**	Hours per week: **3**	Credits: **4**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

Students are enabled to

- ✓ Have knowledge on carboxylic acids and their derivatives and active methylene
- ✓ Understand the chemistry of heterocyclic compounds
- ✓ Acquire the detailed knowledge on naming reactions, reagents and conformational analysis

Course Learning Outcomes (CLO)

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

No.	**Course outcome(s)**	**Knowledge Level (according to Bloom's Taxonomy)**
CLO1	Out line and summarize the preparation, properties of carboxylic acids	K1, K2 & K3
CLO2	Demonstrate the preparation and properties of carboxylic acid derivatives and discuss the synthetic utility of active methylene compounds	K1, K2 & K3
CLO3	Explain the preparation, properties and chemical reactions of ether, thioethers, cyclic ethers and epoxides	K1, K2 & K3
CLO4	Identify and outline the suitable mechanisms of naming reactions and reagents	K1, K2 & K3
CLO5	Find out the various conformations cyclic and acyclic compounds	K1, K2 & K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Mapping of CLO with PLO

	PLO 1	**PLO 2**	**PLO 3**	**PLO 4**	**PLO 5**	**PLO 6**	**PLO 7**
CLO 1	9	1	3	1	1	3	1
CLO 2	9	1	3	1	1	3	1
CLO 3	9	1	3	1	1	3	1
CLO 4	9	1	3	1	1	3	1
CLO 5	9	1	3	1	1	3	1
Weightage of the course	45	5	15	5	5	15	5

9-Strong 3-Medium 1-Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	9	3	1	1
CLO 2	9	9	3	1	1
CLO 3	9	9	3	1	1
CLO 4	9	9	3	1	1
CLO 5	9	9	3	1	1
Weightage of the course	45	45	15	5	5

9-Strong; 3-Medium; 1-Low

Syllabus

UNIT-I: MONOCARBOXYLIC AND DICARBOXYLIC ACIDS (ALIPHATIC AND AROMATIC)

Monocarboxylic: Preparation, effect of substituents on acidity, conversion into acid chlorides, amides, esters and acid anhydrides, reduction of acids to alcohols, Hunsdiecker, and HVZ reaction.

Dicarboxylic acids: Action of heat on dicarboxylic acids, Blanc's rule, hydroxy acids – glycolic acid, action of heat on α, β and γ-hydroxy acids.

UNIT-II: CARBOXYLIC ACID DERIVATIVES AND ACTIVE METHYLENE COMPOUNDS

Functional derivatives of carboxylic acids: Preparation of acid chlorides, anhydrides, amides and esters from acids, nucleophilic acyl substitution, nucleophilic substitution: alkyl *vs.* acyl, acid and alkaline hydrolysis of esters, trans-esterification.

Active methylene compounds: Acidity of methylene hydrogens **–** preparation and synthetic uses of acetoacetic ester – decarboxylation of keto acids, Keto–enol tautomerism – preparation and synthetic uses of malonic ester.

UNIT-III: ETHERS, THIOETHERS AND EPOXIDES

Ethers: Preparation-dehydration of alcohol and Williamson's synthesis, physical and chemical properties of dimethyl ether, formation of oxonium salts, autooxidation, cleavage of ethers with HI – cyclic ethers – tetrahydrofuran.

Aromatic ethers- Preparation and properties of anisole and phenetole – crown ether, [18]-crown-6, applications – phase transfer catalyst.

Thioethers: Preparations and properties of mustard gas.

Epoxides: Preparation and physical properties – acid and base catalysed ring opening of unsymmetrical epoxides.

UNIT-IV: NAMING REACTIONS AND ORGANIC REAGENTS

Naming Reactions: Birch reduction, Chichibabin reaction, Simmons-Smith reaction, Reimer-Tiemann reaction, Michael reaction, Darzens reaction, Wittig reaction, McMurry reaction, Bayer-Villeger oxidation and Diels-Alder reaction.

Organic Reagents: Synthetic utility of NBS, OsO_4, $KMnO_4$, $LiAlH_4$, $NaBH_4$ and SeO_2

UNIT-V: CONFORMATIONAL ANALYSIS CYCLIC AND ACYCLIC COMPOUNDS

Conformers, dihedral angle, torsional strain – conformational analysis of ethane, ethylene glycol, chlorohydrin and n-butane including energy diagrams – butane gauche interaction – stability of ring compounds – assumptions of Baeyer strain theory and its limitations – Sache and Mohr theory – axial and equatorial bonds in cyclohexane – ring flipping – conformations of cyclohexane – conformations of mono and disubstituted (1,2-1,3 and 1,4) cyclohexanes – 1,3-diaxial interaction – conformations of cyclohexanone – conformations of cis and trans decalins.

Text Books

1. Jain, M.K, and Sharma, S.C. *Modern Organic Chemistry*, 3rd Ed., Vishal Publishing Company, 2009.
2. Tewari, N. *Advanced Organic Reaction Mechanism*, 2011.
3. Sanyal, S.N. *Reactions, Rearrangements and Reagents*, 2013.

Reference Books

1. Morrison, R.T., Boyd, R.N. and Bhattacharjee, S.K. *Organic Chemistry*, 7th Ed., Pearson, 2010.
2. Bahl, A. and Bahl, B.S. *Advanced Organic Chemistry*, S. Chand & Company Ltd, New Delhi, 2012.
3. Finar, I.L. *Organic Chemistry*, Vol. II, ELBS, 5th Ed., 1974.
4. Ahluwalia, V.K, and Parashar, R.K. *Organic Reaction Mechanisms*, 4th Ed., Narosa Publications, 2010.
5. Kalsi, P.S. *Organic Reactions and their Mechanisms*, 4th Ed., New Age International Publisher, 2017.
6. Kalsi, P.S. *Stereochemistry, Conformation and Mechanism*, 10th Ed., New Age International Publisher, 2018.

E - Resources

1. https://www.slideshare.net/ganeshmote1/carboxylic-acid-135571274
2. https://www.slideshare.net/kleppingerb/14-carboxylicacidsandderivatives
3. https://www.youtube.com/watch?v=BxRLJhHjqMc
4. https://www.slideshare.net/kandarp22/organic-reactions-and-mechanisms
5. https://personal.utdallas.edu/~biewerm/8-conformational.pdf

DEPARTMENT OF CHEMISTRY

Programme : B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – III: **Core Course Theory**		SEMESTER **IV**
Course Title: **INORGANIC CHEMISTRY-III**		
Course Code: **07CC42**	Hours per week: **4**	Credits: **4**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

Students are enabled to

- ✓ Understand the basics of chemistry of main group elements, d-block and f-block elements.
- ✓ Learn the various concepts involved in the chemistry of metallurgy.

Course Learning Outcomes (CLO)

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

No.	Course Learning Outcomes	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Compare, contrast and discuss the basic properties p-block elements and its compounds of carbon and boron families	K1, K2 & K3
CLO2	Explain the basic properties of nitrogen and oxygen families and illustrate the preparation, properties and structures of their compounds	K1, K2 & K3
CLO 3	Explain and summarize the basics of chemistry of halogens and noble gas	K1, K2 & K3
CLO 4	Describe and compare the basic properties of transition and inner transition elements	K1, K2 & K3
CLO 5	Outline the various principles and methods involved in metallurgy	K1, K2 & K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7
CLO 1	9	1	1	1	3	3	1
CLO 2	9	1	1	1	3	3	1
CLO 3	9	1	1	1	3	3	1
CLO 4	9	1	1	1	3	3	1
CLO 5	9	1	3	1	1	1	1
Weightage of the course	45	5	7	5	13	13	5

9-Strong 3-Medium 1-Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	9	3	1	1
CLO 2	9	9	3	1	1
CLO 3	9	9	3	1	1
CLO 4	9	9	3	1	1
CLO 5	9	9	3	1	1
Weightage of the course	45	45	15	5	5

9-Strong; 3-Medium; 1-Low

Syllabus

UNIT-I: p – BLOCK ELEMENTS-I

Variation of valency of p-block elements in a period, variation of atomic radius, ionization energy, electron affinity, electronegativity in a group and in a period – diagonal relationship between B and Si – similarity and dissimilarity between B and Al.

Boron group: Preparation, properties, structure and bonding of diborane-relative strength of BF_3, BCl_3, BBr_3 and BI_3 as Lewis acids.

Carbon group: Allotropy of carbon, structure of diamond, graphite and fullerene – carbides: classification and uses – structure and classification of silicates.

UNIT-II: p – BLOCK ELEMENTS-II

Nitrogen group: Difference between nitrogen and the rest of the family members –preparation, properties, structure and uses of hydrazine and hydroxylamine – preparation and structure of ammonia, nitrogen dioxide, nitrous oxide, nitric acid, ortho, pyro and meta phosphoric acid – preparation and uses of sodium bismuthate, urea, triple superphosphate and potassium nitrate.

Oxygen group: Comparative study – preparation, properties, structure and uses of ozone, hydrogen peroxide and sulphuric acid.

UNIT-III: HALOGENS AND CHEMISTRY OF NOBLE GAS

Halogens: Basic properties of halogens – anomalous behavior of fluorine – Interhalogen compounds: preparation, properties and structure of ClF, BrF_3, IF_5 and IF_7 – pseudohalogens.

Chemistry of noble gas: Separation of noble gases by Dewar's charcoal method – unreactive nature of noble gas – geometry and shape of xenon compounds (XeF_2, XeF_4, XeF_6, $XeOF_2$ and XeO_3).

UNIT-IV: d and f- BLOCK ELEMENTS

d-block elements: General characteristics, electronic configurations, oxidation states, reducing property, catalytic property and complex formation ability of d-block elements.

f-block elements: Electronic configuration, oxidation states, complex formation ability and uses of lanthanides and actinides – lanthanide contraction, causes and its consequences – comparison of lanthanides and actinides – comparison of d and f- block elements

UNIT-V: METALLURGY

Introduction of metallurgy – ore dressing or concentration – froth flotation, magnetic separation, chemical separation, roasting, calcinations – thermodynamic principle of metallurgy – reduction of mineral to the metal by electrolytic reduction, chemical reduction (smelting), auto reduction – Refining of metals: zone refining, electrolytic refining, vapour phase refining, Van Arkel method, chromatography and ion exchange method – extraction of titanium, vanadium, uranium and thorium.

Text Books

1. Puri, B.R., Sharma, L.R. and Kalia, K.C. *Principles of Inorganic Chemistry*, 33rd Ed., Vishal Publishing, 2017.
2. Soni, P.L. and Katyal, M. *Text book of inorganic chemistry*,12th Ed., Sultan Chand & Sons, 2015.

Reference Books

1. Cotton, F.A., Wilkinson, G. and Gus, P.L. *Basic Inorganic Chemistry*, 3rd Ed., John Wiley & Sons (Asia) Ptv. Ltd., 2007.
2. Lee, J.D., *Concise Inorganic Chemistry*, 5th Ed., Blackwell Science Ltd., 2006.

E - Resources

1. https://nptel.ac.in/courses/104/101/104101090/
2. https://web.iitd.ac.in/~elias/links/CML%20514%20introduction%20july%202018.pdf
3. https://soe.unipune.ac.in/studymaterial/ashwiniWadegaonkarSelf/421%20unit%204.pdf
4. https://www.youtube.com/watch?v=S6TEcml4fCA
5. https://nptel.ac.in/courses/104/101/104101121/

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – III: **Core Practical**		SEMESTER **IV**
Course Title: **ORGANIC ANALYSIS AND PREPARATION**		
Course Code: **07CP43**	Hours per week: **3**	Credits: **4**
CIA Marks: **40 Marks**	ESE Marks: **60 Marks**	Total Marks: **100 Marks**

Preamble

Students are enabled to

- ✓ Carry out the qualitative analysis of an organic substance, to exhibit the derivative for functional group and to perform the preparation of organic compounds

Course learning Outcomes

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

CLO	CLO Statement	Knowledge level
CLO1	Anticipate, recognize, and respond properly to potential hazards in laboratory procedures	K1, K2 & K3
CLO2	Perform accurate qualitative analysis and prepare organic compounds	K1, K2 & K3
CLO3	Interpret experimental results and draw reasonable conclusions	K1, K2 & K3
CLO4	Keep accurate and complete experimental records	K1, K2 & K3
CLO5	Interpret experimental results and draw reasonable conclusions	K1, K2 & K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Syllabus

UNIT-I: ANALYTICAL CHEMISTRY

Introduction, Chemical analysis, qualitative and quantitative analysis - Sampling procedure, sampling in different physical state –gases, liquids, solids, sample storage, handling of chemicals & equipment, hazards, safety measures, laboratory hygiene & safety.

UNIT-II: SEPARATION AND PURIFICATION TECHNIQUES

Crystallization, Precipitation, solvent extraction, extraction by chemically active solvents, Continuous extraction, Soxhlet extraction.

Recrystallization, Sublimation, Distillation -Fraction distillation, Steam Distillation, Azeotropic distillation & Vacuum distillation.

UNIT-III: SYSTEMATIC ANALYSIS -ORGANIC COMPOUNDS

a) Tests for special elements: nitrogen, halogens and sulphur
b) Tests for saturation / unsaturation
c) Tests for aliphatic and aromatic character
d) Organic compounds containing one functional group and characterization - phenol, aldehyde, ketone, carboxylic acid, dicarboxylic acid (aliphatic and aromatic), ester, primary amine, halogen in nucleus and side chain, carbohydrates, diamides (urea and thiourea), amides, anilides and nitro compounds.
e) Preparation of solid derivative by modification of functional groups as possible.
Systematic Analysis using preliminary, identification and confirmatory tests and derivative preparation with chemical equations for all positive tests expected.

(Minimum ten compounds to be analyzed)

UNIT-IV: ORGANIC PREPARATION (Single stage preparation)

1. **Hydrolysis:** Salicylic acid from methyl salicylate
2. **Oxidation:** Benzoic acid from Benzaldehyde
3. **Bromination:** 2, 4, 6, tribromophenol from phenol
4. **Nitration:***m*-Dinitrobenzene from Nitrobenzene

5. **Acetylation**: Acetanilide from aniline
6. **Benzoylation**: Benzanilide from Aniline
7. **Osazone** formation from glucose

UNIT-V

Determination of Melting / Boiling points of organic compounds.

Text Books

1. Venkateswaran, V., Veerasamy, R. and Kulandaivelu, A.R. *Basic Principles of Practical Chemistry*, 2nd Ed., Sultan Chand & Sons, New Delhi, 2017.
2. Gnanaprakasam, N.S and Ramamurthy, G. *Organic Chemistry Lab Manual*, S.Viswanathan, Pvt.Ltd, 2007.

Reference Books

1. Thomas, A.O. *Practical Chemistry*, 7th Ed., Scientific Book Centre, Kannur, 1999.
2. Furniss, B.S., Hannaford, A.J., Smith, P.W.G. and Tatchell, A.R.*Vogel's Textbook of Practical Organic Chemistry*, 5th Ed., Longman Scientific & Technical, 1989.
3. Mann, F.G., Saunders, B.C., *Practical Organic Chemistry*, 4th Ed., Pearson Education, 2009.
4. Ahluwalia, V.K., Dhingra, S., *Comprehensive Practical Organic Chemistry: Qualitative Analysis*, Universities Press, 2000.

E - Resources

1. https://www.youtube.com/watch?v=YTH9RU-xzqM
2. https://www.youtube.com/watch?v=FUo428guKt0
3. https://www.youtube.com/watch?v=n4esSHxz_J8
4. https://www.youtube.com/watch?v=FuqNEIfsE-Q
5. https://www.youtube.com/watch?v=g5nfiFMCkbQ

Distribution of marks

Max marks: 100

Internal	**: 40 marks**	**External**	**: 60 marks**
Attendance	: 5 marks	Organic analysis	: 30 marks
Laboratory performance and model practical	: 20 marks	Organic preparation	: 10 marks
		Record note book	: 10 marks
Viva-voce	: 5 marks	Viva-voce	: 10 marks
Observation note book	: 10 marks		
Total	: 40 marks	Total	: 60 marks

Organic preparation (10 marks)		**Organic analysis (30 Marks)**	
Procedure	: 2 marks	Procedure	: 10 marks
Crude sample	: 6 marks	Elements present	: 4 marks
Recrystallized sample	: 2 marks	Aliphatic or aromatic	: 3 marks
		Saturated or unsaturated	: 3 marks
		Functional group	: 7 marks
		Derivative	: 3 marks

DEPARTMENT OF MATHEMATICS

Programme: B.Sc. MATHEMATICS **(**Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021 - 22 and after)

PART – III **: Ability Enhancement Course**		SEMESTER **- IV**
Course Title **: MATHEMATICS – II**		
Course Code:**05AE02**	Hours per week: 3	Credits: 3
CIA: 25 Marks	ESE: 75 Marks	Total: 100 Marks

Preamble

To enable the students to acquire the basic knowledge in solving differential equations and its applications.

Course Learning Outcomes (CLO)

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

No.	Course Learning Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	understand the formation of differential equations and its different forms.	K_1, K_2
CLO 2	acquire knowledge in solving problems in differential equations of first order.	K_2, K_3
CLO 3	acquire knowledge in solving problems in differential equations of higher order.	K_2, K_3
CLO 4	understand the concepts involved in differential equations of homogeneous forms.	K_2, K_3
CLO 5	acquire knowledge in solving problems in simultaneous differential equations and total differential equations.	K_2, K_3

K1-Remebering **K_2-Understanding** **K_3-Applying**

Syllabus

UNIT-I	Formation of differential equation – Differential equation of first order and first Degree – variables separable, Homogeneous equations - Nonhomogeneous equations of first degree.	**(9 Hrs)**
UNIT-II	Exact differential equations – Integrating Factors – Methods of finding Integrating Factors (Theorems without proof) - Linear equations – Bernouilli's equations.	**(9 Hrs)**
UNIT- III	Linear equations of higher order - Second order differential equation with constant coefficients – Methods of finding complementary function - Methods of finding particular integrals for the type e^{ax}, cos ax, sin ax, x^m, $e^{ax}V$.	**(9 Hrs)**
UNIT- IV	Homogenous linear equation with variable coefficients – Method of Solving a linear equation with variable coefficients by variation of parameters.	**(9 Hrs)**
UNIT- V	Simultaneous linear differential equations – Total differential equations.	**(9Hrs)**

Text Book

Differential equations and Applications by Dr.S. Arumugam & Issac. Publisher: New Gamma Publishing House, Palayamkottai – 2011 edition.

Unit	Chapters
1	Chapter 1 (1.1 – 1.2)

2	Chapter 1 (1.3 – 1.6)
3	Chapter 2 (2.1 – 2.3)
4	Chapter 2 (2.4 – 2.5)
5	Chapter 2 (2.6 – 2.7)

Reference Book

Ancillary Mathematics by T.K Manikavasagam Pillay & Others Viswanathan printers and publishers) Pvt Ltd. Chennai.

Mapping of CLO with PLO

CLO – PLO Mapping for Course Code: 05AE02

05AE02	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
CLO1	9	-	3	9	3	3	3
CLO2	9	-	3	9	3	3	3
CLO3	9	-	3	9	3	3	3
CLO4	9	-	3	9	3	3	3
CLO5	9	-	3	9	3	3	3
Weightage of the course	45	-	15	45	15	15	15
Weighted percentage of Course contribution to PLOs	3	0	2	5	2	4	1

Mapping of CLO with PSO

CLO – PSO Mapping for Course Code: 05AE02

05AE02	PSO1	PSO2	PSO3	PSO4	PSO5
CLO1	9	9	9	3	3
CLO2	3	3	3	3	3
CLO3	9	3	3	3	9
CLO4	9	3	3	3	3
CLO5	9	3	3	3	3
Weightage of the course	39	21	21	15	21
Weighted percentage of Course contribution to PSOs	5	2	2	3	2

Online Resources

1. https://www.youtube.com/watch?v=BxUrBQm8IC0 – Introduction of first order linear differential equations
2. https://www.youtube.com/watch?v=GSmCiYbX2xM – Exact D.E
3. https://www.youtube.com/watch?v=hNCE3AxbWj0 – Bernoulli's Equation
4. https://www.youtube.com/watch?v=UFWAu8Ptth0 – Second order LDE
5. https://www.youtube.com/watch?v=yTDx0Rzviak – Second order LDE with variable coefficients

DEPARTMENT OF MATHEMATICS

Programme: B.Sc. MATHEMATICS **(**Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021 - 22 and after)

PART – III **: Ability Enhancement Course**		SEMESTER **- IV**
Course Title **: MATHEMATICS – III**		
Course Code: **05AE03**	Hours per week: 3	Credits: 3
CIA: 25 Marks	ESE: 75 Marks	Total: 100 Marks

Preamble

To enable the students to acquire the basic knowledge in partial differentiation and its applications.

Course Learning Outcomes (CLO)

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

No.	Course Learning Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	understand the partial differential equations and solving its first order problems.	K_1, K_2
CLO 2	acquire knowledge in solving problems in different types of partial differential equations.	K_2, K_3
CLO 3	acquire knowledge in Laplace transforms and its applications.	K_2, K_3
CLO 4	acquire knowledge in Inverse Laplace transforms and its applications.	K_2, K_3
CLO 5	acquire knowledge in Fourier series, Odd and Even functions and its related problems.	K_2, K_3

K1-Remebering **K_2-Understanding** **K_3-Applying**

Syllabus

UNIT-I	Partial differential equations –formation– by elimination of arbitrary constants and arbitrary functions – first order partial differential equations – classification of integrals – solving first order p.d.e in Lagrange's form.	**(9 Hrs)**
UNIT-II	Solving p.d.e of some standard forms – Type I: $f(p,q)=0$ – Type II: $z=px+qy+f(p,q)$ – Type III: $f(z,p,q)=0$ - Type IV: $f_1(x,p)=f_2(y,q)$.	**(9 Hrs)**
UNIT- III	Laplace Transform: definition – Laplace transforms of $x^n, e^{ax}, \cos ax, \sin ax, \cosh ax \sinh ax$ finding Laplace transforms of $f'(x),\ f(ax), xf(x)$ and $\frac{f(x)}{x}$	**(9 Hrs)**
UNIT- IV	Inverse Laplace Transforms – solution of differential equations using Laplace Transform- linear equations with constant coefficients and variable coefficients – simultaneous equations.	**(9 Hrs)**
UNIT- V	Fourier series – Fourier series for odd and even functions - half range Fourier cosine and sine series – Fourier series in a general interval.	**(9 Hrs)**

Text Books

1. Differential Equations and applications by Dr.S. Arumugam & Issac Publisher: New Gamma Publishing House, Palayamkottai (Reprint 2011).
2. Ancillary Mathematics (Paper III-MKU) by Dr.S. Arumugam & Issac. Publisher: New Gamma Publishing House, Palayamkottai (2004 Edition).

Unit	Text Books	Chapters
1	1	Chapter 4 (Section: 4.1-4.3)
2		Chapter 4 (Section: 4.4)
3		Chapter 3 (Section: 3.1)
4		Chapter 3 (Section: 3.2)
5	2	Chapter 9

Reference Book

Ancillary Mathematics by T.K Manikavasagam Pillay & Others Viswanathan printers and publishers) Pvt. Ltd. Chennai.

Mapping of CLO with PLO

CLO – PLO Mapping for Course Code: 05AE03

05AE03	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
CLO1	9	-	-	-	-	-	3
CLO2	9	-	-	-	-	-	3
CLO3	9	-	-	-	-	-	3
CLO4	9	-	-	-	-	-	3
CLO5	9	-	-	-	-	-	3
Weightage of the course	45	-	-	-	-	-	15
Weighted percentage of Course contribution to PLOs	3	0	0	0	0	0	1

Mapping of CLO with PSO

CLO – PSO Mapping for Course Code: 05AE03

05AE03	PSO1	PSO2	PSO3	PSO4	PSO5
CLO1	3	9	9	3	3
CLO2	3	9	9	3	3
CLO3	3	9	9	3	3
CLO4	3	9	9	3	3
CLO5	3	9	9	3	3
Weightage of the course	15	45	45	15	15
Weighted percentage of Course contribution to PSOs	2	4	4	3	2

Online Resources

1. PDE: https://youtu.be/u4yBWpmB6z4 https://youtu.be/OCLw11a0LTM
2. Lagrange's form: https://youtu.be/41U-i1Q7se0 https://youtu.be/QLLOI382tZw
3. Types of PDE: https://youtu.be/ongICvz1BsQ https://youtu.be/vSdrKPNIIRE
4. Laplace Transform: https://youtu.be/luJMl37-nso https://youtu.be/EDVJotmT584
5. Inverse Laplace transform: https://youtu.be/_P519nGupO8 https://youtu.be/HuHgbEuUBSo
6. Fourier Transform: https://youtu.be/-E_WkcdszKU https://youtu.be/GtXmS5YH7XM
7. https://youtu.be/lkAvgVUvYvY

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – IV: **Skill Based Theory**		SEMESTER **IV**
Course Title: **WATER ANALYSIS**		
Course Code: **07SE41**	Hours per week: **2**	Credits: **2**
CIA Marks: **25 Marks**	ESE Marks**:75 Marks**	Total Marks: **100 Marks**

Preamble

Students are enabled to

- ✓ Develop theoretical aquatic chemistry basics and use the principles for the analysis of water quality.
- ✓ Analyze how aquatic chemistry principles can be applied in natural water resources and in treatment of drinking water and wastewater.

Course Learning Outcomes (CLO)

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

No.	Course Learning Outcomes	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Define the basic water quality terms; explain the main physical, chemical and biological parameter of water.	K1, K2 & K3
CLO 2	Design and demonstrate the basic water treatment processes.	K1, K2 & K3
CLO 3	Develop innovative methods to produce soft water for industrial use and potable water at cheaper cost.	K1, K2 & K3
CLO 4	Apply the theoretical knowledge and techniques in restoration and cleaning of river	K1, K2 & K3
CLO 5	Develop the skill in experimental and data interpretation.	K1, K2 & K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Syllabus

UNIT-I

Introduction – characteristics of water: alkalinity, hardness – unit of hardness – total solids – oxidation – transparency – silica content. Water quality parameters: physical, chemical and biological – water quality standards for drinking water: BIS and WHO.

UNIT-II

Purification of water for drinking purpose: Sedimentation, filtration and disinfection – Osmosis – water softening methods: Clark's process, modified lime soda process, Ion exchange process, demineralization of water.

UNIT-III

Desalination of brackish water: Electrodialysis, reverse osmosis, removal of Ca, Mn and silicic acid – determination of hardness of water using EDTA – express hardness as calcium carbonate – problems to determine temporary & permanent hardness.

UNIT-IV

Restoration and management: Importance of lakes and rivers – stresses on the Indian rivers and their effects – rain water harvesting – water recycling. Ganga action plan: Objectives implementation and drawbacks – water prevention and control of pollution Act 1974.

UNIT-V

Water analysis (Hands on training): determination of hardness (permanent and temporary), chloride, alkalinity, TSS, TDS, pH and electrical conductivity.

Text Book

Sharma, B. K. *Industrial chemistry (including chemical - engineering),* Goel publishing house, Meerut and 2000.

Reference Book

WHO, *International standards for drinking water*, World Health Organization, Geneva, 1992.

E - Resources

1. https://nmcg.nic.in/gangaactionplan1.aspx.
2. https://www.youtube.com/watch?v=wMO7QVm3aaE
3. https://www.youtube.com/watch?v=CsAr8zUmkPU
4. https://www.youtube.com/watch?v=86oPl9wKhHs
5. https://www.youtube.com/watch?v=ajYJvUray9w

DEPARTMENT OF CHEMISTRY

Programme : B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – III: **Core Course Theory**		SEMESTER **V**
Course Title: **ORGANIC CHEMISTRY - IV**		
Course Code: **07CC51**	Hours per week: **5**	Credits: **4**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

Students are enabled to

- ✓ Understand the chemistry of carbohydrates, terpenoids, alkaloids, steroids, amino acids, peptides, chemotherapy and dyes
- ✓ Outline the mechanism of molecular rearrangement
- ✓ Acquire the detailed knowledge on organic photochemistry and pericyclic reactions

Course Learning Outcomes (CLO)

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

No.	**Course outcome(s)**	**Knowledge Level (according to Bloom's Taxonomy)**
CLO1	Classify carbohydrates and explain its chemical properties	K1, K2 & K3
CLO2	Define and explain the basic chemical properties of terpenoids, alkaloids and steroids	K1, K2 & K3
CLO3	Interpret and discuss the chemistry of amino acids, peptides, chemotherapy and dyes	K1, K2 & K3
CLO4	Outline and identify the mechanism of molecular rearrangement.	K1, K2 & K3
CLO5	Define and illustrate the organic photochemical and pericyclic reactions	K1, K2 & K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Mapping of CLO with PLO

	PLO 1	**PLO 2**	**PLO 3**	**PLO 4**	**PLO 5**	**PLO 6**	**PLO 7**
CLO 1	9	1	3	3	3	1	3
CLO 2	9	1	3	3	3	1	3
CLO 3	9	1	3	3	3	1	3
CLO 4	9	1	3	3	3	1	3

CLO 5	9	1	3	3	3	9	3
Weightage of the course	45	5	15	15	15	13	15

9-Strong 3-Medium 1-Low

Mapping of CLO with PSO

	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**
CLO 1	9	9	3	1	1
CLO 2	9	9	3	1	1
CLO 3	9	9	3	1	1
CLO 4	9	9	3	1	1
CLO 5	9	9	3	1	1
Weightage of the course	45	45	15	5	5

9-Strong 3-Medium 1-Low

Syllabus

UNIT-I: CARBOHYDRATES

Classification – configuration of aldotriose and aldopentose – Monosaccharides: manufacture, structure elucidation (open chain and cyclic structures) and chemical properties of glucose and fructose – Kiliani–Fischer synthesis – Ruff degradation, Wohl degradation – anomers, epimers, mutarotation, interconversion of glucose to fructose and vice versa – Disaccharides: Preparation, structure and properties of sucrose, maltose, cellobiose and lactose – polysaccharide: Structure and properties starch, cellulose and cellulose.

UNIT-II: TERPENOIDS, ALKALOIDS AND STEROIDS

Terpenoids: Isoprene rule, classification, general properties, synthesis of myrcene, citral, menthol, zingiberene and camphor (structural elucidation is not required).

Alkaloids: General characteristics – classifications – properties – synthesis of piperine, coniine, nicotine and cocaine (structural elucidation is not required).

Steroids: Structure and functions of cholesterol, testosterone, progesterone, estrogen and thyroxin (synthesis and structural elucidation is not required).

UNIT-III: AMINO ACIDS, PEPTIDES, CHEMOTHERAPY AND DYES

Amino acids: Classifications-essential and non-essential, Gabriel-phthalimide and Strecker synthesis, colour tests of amino acids, zwitter ion and isoelectric point – polypeptides**.**

Chemotherapy: Preparations and uses of sulpha drugs, sulphanilamide, sulphapyridine and sulphathiazole.

Dyes: Introduction - requirements and classifications of dye – preparations and applications of Martius yellow, naphthol green Y, methyl orange and congo red.

UNIT IV: MOLECULAR REARRANGEMENT

Mechanism of Hofmann, Curtius, Lossen, Schmidt, Wolf, Benzidine, benzilic acid, Wagner-Meerwin, Beckmann, Pinacol-pinacolone, Dienone-phenol, Favorski, Fries and Claisen rearrangements.

UNIT-V: ORGANIC PHOTOCHEMISTRY AND PERICYCLIC REACTIONS

Organic photochemistry: Introduction - photochemical processes – cis-trans isomerization in alkenes - photosensitisation of butadiene – Norrish type I and type II reactions – Paterno-Buchi reaction – Barton reaction – di-pi methane rearrangement

Pericyclic reactions: Introduction- characteristic features – types of pericyclic reactions – electrocyclic, cycloaddition and sigmatropic reactions (elementary idea only) – Diels-Alder reaction – Cope rearrangement.

Text Books

1. Jain, M.K, and Sharma, S.C, *Modern Organic Chemistry,* 3rd Ed., Vishal Publishing Company, 2009.
2. Mukheriji, M, and Singh, S.P, *Reaction Mechanism in Organic Chemistry*, Macmillan India Ltd, 3rd Ed., 1998.

Reference Books

1. Finar, I.L, *Organic Chemistry, Volume 2: Stereochemistry and the Chemistry Natural Products*, *5*th Ed., Pearson, 2002.
2. Agarwal, O.P, *Organic Chemistry Natural Products*, Vol. I, 2014.
3. Bahl, A. and Bahl, B.S. *Advanced Organic Chemistry*, S. Chand & Company Ltd, New Delhi, 2012.

E - Resources

1. https://www.slideshare.net/sachithGamage/chemistry-of-carbohydrates-72294228
2. https://www.youtube.com/watch?v=IOny0SKh24Q
3. https://www.youtube.com/watch?v=jA7oGGIklYE
4. https://slideplayer.com/slide/1674340/
5. https://www.slideshare.net/ravi944/pericyclic-reactions-142896051

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – III: **Core Course Theory**		SEMESTER **V**
Course Title: **PHYSICAL CHEMISTRY - III**		
Course Code: **07CC52**	Hours per week: **5**	Credits: **4**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

Students are enabled to

- ✓ Grasp the knowledge about electrolytic conductance and EMF cells
- ✓ Study the applications of electrochemistry in various measurements
- ✓ Acquire theoretical vision to determine symmetry and point group of molecules

Course Learning Outcomes (CLO)

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

No.	Course Learning Outcome(s)	Knowledge Level (according to Bloom's Taxonomy)
CLO1	Define and explain the terms involved in electrolytic conductance	K1, K2 & K3
CLO2	Interpret the theory of electrochemical cells and correlate them with thermodynamic phenomenon	K1, K2 & K3
CLO3	Narrate the vital uses of EMF measurements in everyday life	K1, K2 & K3
CLO4	Identify and demonstrate the symmetry operation, order and group	K1, K2 & K3
CLO5	State and discuss the theory behind phase rule	K1, K2 & K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7
CLO 1	9	1	3	1	3	3	3
CLO 2	9	1	3	1	3	3	3
CLO 3	9	1	3	1	3	3	3
CLO 4	9	1	3	1	3	3	3
CLO 5	9	1	3	1	3	3	3
Weightage of the course	45	5	15	5	15	15	15

9-Strong 3-Medium 1-Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5

CLO 1	9	9	3	1	1
CLO 2	9	9	3	1	1
CLO 3	9	9	3	1	1
CLO 4	9	9	3	1	1
CLO 5	9	9	3	1	1
Weightage of the course	45	45	15	5	5

9-Strong; 3-Medium; 1-Low

Syllabus

UNIT-I: ELECTROLYTIC CONDUCTANCE

Conductance: Electrolytic, specific, equivalent and molar conductance, variation with dilution – cell constant – ionic mobility, Grothus type mechanism – determination of transport number by Hittorf's method and moving boundary method – Kohlrausch's law and its applications – effect of temperature and viscosity on conductance, Walden's rule – Applications of conductance measurements: Determination of degree of dissociation, ionic and solubility products, conductometric and precipitation titrations – Ostwald's dilution law – Debye-Huckel theory of strong electrolytes – Onsager equation (derivation not required).

UNIT-II: ELECTROCHEMICAL CELLS

Galvanic cells – Reversible electrode types: Metal-metal ion, gas, calomel, redox electrodes –single electrode potential, its sign – Thermodynamics: Relation between electrical and chemical energies, determination of ΔH, ΔG, ΔS and equilibrium constant from EMF data –effect of electrolyte concentration on cell and electrode potential: Nernst equation – electrochemical series: standard electrode potential, cell representation and its potential determination – convention regarding sign of EMF – calculation of cell EMF –electrode and electrolyte concentration cells – liquid junction potential.

UNIT-III: APPLICATIONS OF EMF MEASUREMENTS

Determination of activity co-efficients, transport number, valency of ions, solubility product constant, pH using hydrogen, quinhydrone and glass electrodes – Potentiometric titrations: Acid-Base, redox and precipitation titrations – irreversible electrode process – overvoltage, its applications: electrodeposition of metals, corrosion and inhibition – Cells: Primary and secondary cells – Weston cadmium cell, lead storage cell – fuel cells (basic concept only).

UNIT-IV: GROUP THEORY

Introduction – symmetry element, symmetry operation, group postulates – Types of groups: Abelian, non-abelian and cyclic groups – order of a group, sub-group, multiplication table, similarity transformation and class – point group of CH_4, $[PtCl_4]^{2-}$, H_2, HF, HCN, C_2H_2, H_2O, NH_3, C_6H_6, and allene – multiplication table for C_{2v}, $C_{3v}$and C_{2h} point groups.

UNIT-V: PHASE RULE

Introduction – phase – components – degree of freedom – conditions for equilibrium between various phases – thermal equilibrium, mechanical equilibrium, chemical equilibrium – Gibbs phase rule and its derivation – one component systems: water system, sulphur system – two component systems: Lead-silver system, potassium iodide – water system.

Text Books

1. Puri, B.R., Sharma, L.R. and Pathania, M.S. *Principles of Physical Chemistry*, Vishal publishing Company, New Delhi, 47th Edition
2. Bahl, A., Bahl, B.S. and Tuli, G.D. *Essentials of Physical Chemistry*, S. Chand Publishing company, New Delhi, 2010.

Reference Books

1. Atkins, P.W and Paula, J.D. *Physical Chemistry*, 10th Ed., Oxford University Press, 2014.
2. Crow, D.R. *Principles and applications of Electrochemistry,* Chapman and Hall.1988
3. Bockris, J. O'M. and Reddy, A.K.N. *Electrochemistry, Vol I and II*, Rosetta edition, 2002.
4. Mortimer, R.G. *Physical Chemistry*, 3rd Ed., Elsevier: NOIDA, UP, 2009.
5. Gurdeep Raj Chhatwal, *Advanced Physical Chemistry,* S. Chand Publishing Company, New Delhi, 2008.
6. Cotton, F.A, *Chemical Applications of Group Theory*, 2nd Ed., Wiley eastern Limited, 1997.
7. Raman, K.V. *Group Theory and its Applications to Chemistry*, Tata McgrawHill, Company Limited, New Delhi 1990.

E - Resources

1. https://nptel.ac.in/courses/103/108/103108162/
2. https://byjus.com/chemistry/electrochemical-cell/
3. https://onlinecourses.nptel.ac.in/noc20_cy13/preview
4. https://nptel.ac.in/content/storage2/courses/112108150/pdf/PPTs/MTS_07_m.pdf
5. https://nptel.ac.in/courses/112/104/112104248/

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – III: **Core Practical**		SEMESTER **V**
Course Title: **PRACTICAL PHYSICAL CHEMISTRY**		
Course Code: **07CP53**	Hours per week: **5**	Credits: **4**
CIA Marks: **40 Marks**	ESE Marks: **60 Marks**	Total Marks: **100 Marks**

Preamble

Students are enabled to

- ✓ To get analytical skills and utilize them to plan and execute experimental projects.

Course Learning Outcomes (CLO)

The students have gained knowledge to

CLO	CLO Statement	Knowledge Level
CLO1	Summarize the concept of Phase equilibria and phase Diagrams, cell constant and potentiometric acid -base titration	K1, K2 & K3
CLO2	Determine the enthalpy of neutralization and calculated the enthalpy of hydration of salt	K1, K2 & K3
CLO3	Explain the theory behind one and two component systems	K1, K2 & K3
CLO4	Demonstrate the applications of EMF measurements in determining thermodynamic properties	K1, K2 & K3
CLO5	Demonstrate the applications of potentiometric titations	K1, K2 & K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Syllabus

UNIT-I: INTRODUCTION

Basic concepts of volumetric titration thermochemistry, surface chemistry, colligative properties Phase rule, electrochemistry and chemical kinetics

UNIT-II

1. Thermochemistry: Determination of enthalpy of solution by solubility method.
2. Rast method: Determination of K_f and molecular weight by macro and micro method.
3. Determination of transition temperature of hydrated salt.

4. Phase diagram: Two component system -Simple eutectic system

UNIT-III

5. Determination of the rate constant of acid hydrolysis of an ester.
6. Determination of critical solution temperature of phenol-water system.

UNIT-IV: COUNDUCTIVITY EXPERIMENTS

7. Determination of cell constant.
8. Determination of relative strength of acid by conductance measurements.
9. Determination of equivalent conductance of a strong electrolyte.
10. Determination of critical micelle concentration (CMC).

UNIT-V: POTENTIOMETRIC EXPERIMENTS

11. Potentiometric acid -base titration.
12. Determination of pH using quinhydrone electrode.
13. Potentiometeric redox titration (FAS Vs $KMnO_4$)

Text Books

1. Venkatesan, V., Veeraswamy, R. and Kulandaivelu, A.R. *Basic Principles of Practical Chemistry,* 2nd Ed., Sultan Chand & Sons Publication, New Delhi, 1997.
2. Viswanathan, B., Raghavan, P.S. *Practical Physical Chemistry Viva Books,* 3rd Ed., 2009.

Reference Books

1. Thomas, A.O. *Text Book of Practical Chemistry*, Scientific Publication, 4th Revised Edition, 1976.
2. Levitt, B.P. *Findlay's Practical Physical Chemistry*, 9th Ed., Longman Publications, 1973.
3. Palmer, G. *Experimental Physical Chemistry*, 1st Ed., Cambridge University Press, 1964.
4. Yadav, J. B. *Advanced Practical Physical Chemistry*, 22nd Ed., GOEL publishing House, Krishna Prakashan Media Ltd, 2005.

E - Resources

1. https://www.youtube.com/watch?v=RR3ys87p9aA
2. https://www.youtube.com/watch?v=2VzEpsEZOYo
3. https://www.youtube.com/watch?v=tOGdZFDU2eU
4. https://www.youtube.com/watch?v=8jp_wlQcE3Y
5. https://www.youtube.com/watch?v=WwjFwNhmhZ0

Distribution of marks

Max marks: 100

Internal	**: 40 marks**	**External**	**: 60 marks**
Attendance	: 5 marks	Experiment	: 30 marks
Laboratory performance		Procedure	: 10 marks
and model practical	: 20 marks	Record note book	: 10 marks
Viva-voce	: 5 marks	Viva-voce	: 10 marks
Observation note book	: 10 marks		
Total	: 40 marks	Total	: 60 marks

Experiment (30 marks)

Graph	: 5 marks
Calculation	: 5 marks
Tabulation	: 5 marks
Result	: 15 marks
Total	: 30 marks

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – III: **Core Practical**		SEMESTER **V**
Course Title: **INORGANIC ANALYSIS AND GRAVIMETRIC ESTIMATION**		
Course Code: **07CP62**	Hours per week: **6**	Credits: **-**
CIA Marks: -	ESE Marks: -	Total Marks: -

Preamble

Students are enabled to

- ✓ Learn the techniques of semi micro qualitative analysis of inorganic salt mixtures.
- ✓ Study the tests for acidic and basic radicals.
- ✓ Get the knowledge on hand on experience of gravimetric analysis.
- ✓

Course Learning Outcomes (CLO)

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

CLO	CLO Statement	Knowledge Level
CLO1	Anticipate, recognize, and respond properly to potential hazards in laboratory procedures	K1, K2 & K3
CLO2	Perform accurate qualitative and quantitative measurements	K1, K2 & K3
CLO3	Interpret experimental results and draw reasonable conclusions	K1, K2 & K3
CLO4	Keep accurate and complete experimental records	K1, K2 & K3
CLO5	Interpret experimental results and draw reasonable conclusions	K1, K2 & K3
CLO6	Communicate effectively through oral and written reports	K1, K2 & K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Syllabus

UNIT-I: INORGANIC QUALITATIVE AND QUANTITATIVE ANALYSIS

Semi-micro analysis:Introduction – Classification of methods of analysis – Advantages – Apparatus used – Preliminary tests – Spot tests.

Gravimetric analysis: Introduction – Apparatus used – Precipitation – Digestion – Filtration and washing – Advantages of using sintered crucible over the use of filter paper – Drying and Ignition of the precipitate – Common Errors.

UNIT-II: REAGENTS AND SOLUTIONS

Preparation of laboratory reagents for inorganic qualitative analysis – Spot test reagents – Solid reagents – Solutions and reagents for gravimetric analysis – Gravimetric factors.

UNIT-III: GENERAL REACTIONS OF INORGANIC QUALITATIVE ANALYSIS

Study the general reactions of common anions: Carbonates, sulphite, sulphate, nitrites, nitrate, chloride, borate, phosphate and oxalate.

General reactions of common cations: Group – I cations, group – II cations, group – III cations – group – IV cations, group – V cations and group VI cations.

UNIT-IV: QUALITATIVE ANALYSIS

Systematic qualitative analysis of mixtures containing two cations and two anions from the following with one interfering radical by semi-micro method only. Identification and confirmation tests and spot tests expected.

Cations: Pb^{2+}, Cu^{2+}, Zn^{2+}, Fe^{2+}, Fe^{3+}, Mn^{2+}, Co^{2+}, Ni^{2+}, Ca^{2+}, Ba^{2+}, NH_4^+ and Mg^{2+}

Anions: CO_3^{2-}, Br^-, NO_3^-, SO_4^{2-}, F^-, Cl^-, BO_3^{2-}, $C_2O_4^{2-}$ and PO_4^{3-}

Interfering anions: F^-, $C_2O_4^{2-}$, and PO_4^{3-}

(Minimum of eight mixtures (with interfering anions) to be analysed)

UNIT-V: QUANTITATIVE ANALYSIS

Gravimetric analysis

1. Estimation of Lead as Lead chromate
2. Estimation of Barium as Barium chromate
3. Estimation of Calcium as Calcium oxalate monohydrate
4. Estimation of Copper as Copper thiocyanate
5. Estimation of Nickel as Nickel dimethylglyoxime.

Text Books

1. Venkateswaran, V., Veerasamy, R. and Kulandaivelu, A.R., *Basic Principles of Practical Chemistry*, 2nd Ed., Sultan Chand & Sons, New Delhi, 2017.
2. Thomas, A.O. *Practical Chemistry*, 7th Ed., Scientific Book Centre, Kannur, 1999**.**

Reference Books

1. Svehla, G. *Vogel's Qualitative Inorganic Analysis*, 7th Ed., Pearson Education, New Delhi, 2006**.**
2. Ramanujam, V.V., *Inorganic Semi Micro Qualitative Analysis*, 3rd Ed., The National Publishing Company, Chennai, 1974.

E - Resources

1. https://www.youtube.com/watch?v=yMChYvgTfkQ
2. https://www.youtube.com/watch?v=WIxhmGbWk94
3. https://www.youtube.com/watch?v=XZB261mv4bQ
4. https://www.youtube.com/watch?v=UGczbI9gy1U
5. https://www.youtube.com/watch?v=nPWgbniFpww

Distribution of marks

Max marks: 100

Internal	**: 40 marks**	**External**	**: 60 marks**
Attendance	: 5 marks	Qualitative analysis	: 20 marks
Laboratory performance and model practical	: 20 marks	Gravimetric estimation	: 20 marks
		Record note book	: 10 marks
Viva-voce	: 5 marks	Viva-voce	: 10 marks
Observation note book	: 10 marks		
Total	: 40 marks	Total	: 60 marks

Qualitative semi micro analysis (20 marks)	**Gravimetric Estimation (20 marks)**
Four radicals with correct procedure : 20 marks	Procedure : 5 marks
Three radicals with correct procedure : 15 marks	Estimation : 15 marks
Two radicals with correct procedure : 10 marks	Less than 2 % Error : 15 marks
	2-3% Error : 14 marks
	2-3% Error : 12 marks
	2-3% Error : 10 marks
	Greater than 5% Error : 8 marks

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – III : **Discipline Specific Elective**		SEMESTER **V**
Course Title: **METALS AND CATALYSIS**		
Course Code: **07DS5A**	Hours per week: **5**	Credits: **5**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

Students are enabled to

- ✓ Understand the structure, bonding, theories and reaction mechanisms of coordination compounds.
- ✓ Learn the basics and applications of organometallic compounds.
- ✓ Understand the role of various metal ions in the function of biological systems.

Course Learning Outcomes (CLO)

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

No.	Course Learning Outcomes	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Compile and explain the theories and isomerisms of coordination compounds.	K1& K2
CLO 2	Assimilate and interpret elementary concepts and bonding theories of coordination compounds.	K1&K3
CLO 3	Infer and deduce the mechanism for reaction of complexes.	K2 & K3
CLO 4	Describe the basics and applications of organometallic compounds.	K2& K3
CLO 5	Substantiate and comprehend the role of various metal ions in the function of biological systems.	K1 & K2

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7
CLO 1	9	1	3	1	1	3	1
CLO 2	9	1	3	1	1	3	1
CLO 3	9	1	3	1	1	3	1
CLO 4	9	1	3	1	1	3	1
CLO 5	9	1	3	1	1	3	1
Weightage of the course	45	5	15	5	5	15	5

9-Strong 3-Medium 1-Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	9	3	1	1
CLO 2	9	9	3	1	1
CLO 3	9	9	3	1	1
CLO 4	9	9	3	1	1
CLO 5	9	9	3	1	1
Weightage of the course	45	45	15	5	5

9-Strong; 3-Medium; 1-Low

Syllabus

UNIT-I: COORDINATION CHEMISTRY – I

Introduction, double salt, complex compounds, ligand and its classification coordination number, coordination sphere – chelates and their uses – Werner's theory – Sidgwick's EAN rule – IUPAC nomenclature of coordination compounds – Isomerism: ionization, hydrate, linkage, coordination isomerisms, geometrical and optical isomerisms.

UNIT-II: COORDINATION CHEMISTRY-II

Valence bond theory: postulates, VBT of $[Co(NH_3)_6]^{3+}$, $[CoF_6]^{3-}$,$[Ni(Cl)_4]^{2-}$, $[Ni(CN)_4]^{2-}$, $[Ni(CO)_4]$, $[MnCl_4]^{2-}$, $[Cu(NH_3)_4]^{2+}$, limitations of VBT.

Crystal field theory: postulates, crystal field splitting in octahedral, tetrahedral complexes – high spin and low spin complexes – factors affecting crystal field splitting – spectrochemical series – crystal field stabilization energy – Jahn Teller distortion.

Molecular orbital Theory: MO diagram for $[Co(NH_3)_6]^{3+}$and $[CoF_6]^{3-}$.

UNIT-III: COORDINATIONCHEMISTRY-III

Lability and inertness – thermodynamic and kinetic stability – Ligand substitution reaction in octahedral complexes: Dissociation, association, and S_N1CB mechanisms – Substitution reaction in square planar complexes: Trans effect: Theories and its applications.

Electron transfer reaction: Mechanisms inner sphere and outer sphere electron transfer reactions.

Magnetism: Magnetic susceptibility – origin of magnetism – dia and para magnetism –magnetic moments – spin only formula – Gouy's experimental method.

UNIT-IV: ORGANOMETALLIC CHEMISTRY

Introduction, classification of organometallic compounds, EAN rule – Metal carbonyls: Preparation, properties and structure of $Ni(CO)_4$and $Fe(CO)_5$ – nature of bonding in mononuclear metal carbonyls – π-acceptor behavior of carbon monoxide – ferrocene and its reactions – Catalysis: Mechanisms of Wilkinson's catalytic process and Wacker process – Coupling reaction: Miyaura-Suzuki coupling, Negishi coupling (definition only).

UNIT-V: BIOINORGANIC CHEMISTRY

Introduction – role of Na^+ and K^+, Mg^{2+} and Ca^{2+} ions in biological system – biological functions and toxicity of chromium, manganese, cobalt, nickel, copper, arsenic, cadmium, mercury, iodine and zinc – deficiency symptoms of iron, copper and zinc – metals in medicine – structure of heme – structural features and physiological functions of hemoglobin and myoglobin – cooperativity effect – Bohr's effect – structure and functions of chlorophyll – biological fixation of nitrogen – Metalloenzyme: Structure and functions of carboxy peptidase and carbonic anhydrase (mechanism not required).

Text Books

1. Puri, B.R., Sharma, L.R. and Kalia, K.C., *Principles of Inorganic Chemistry*, 33rd Ed., Vishal Publishing, 2017.
2. Soni, P.L. and Katyal, M. *Text Book of Inorganic Chemistry*, 20th Ed., Sultan Chand and Sons, 2015.

Reference Books

1. AjaiKumar, *Organometallic and Bioinorganic Chemistry*, 2nd Ed., Aaryush Educations, Ghaziabad, 2016.
2. Huheey, J.E., Keiter, E.A. and Keiter, R.L. *Inorganic Chemistry: Principles of structure and reactivity*, 4th Ed., Pearson Education Pte. Ltd., Delhi, 2004.
3. Atkins, P.W., Overton, T.L., Rourke, J.P., Weller, M.T. and Armstrong, F.A. *Inorganic Chemistry*, 5th Ed., Oxford University Press, 2010.
4. Meissler, G.L. and Tarr, D.A. *Inorganic Chemistry*, 3rd Ed., Pearson India Education Services Pvt. Ltd., 2015.
5. Douglas, B., McDaniel, D. and Alexandar, J. *Concepts and Models of Inorganic Chemistry*, 3rd Ed., Wiley India Pvt. Ltd., Delhi, 2015.
6. Malik, W.U., Tuli, G.D. and Madan, R.D. *Selected Topics in Inorganic Chemistry*, 1st Ed., S. Chand & Company Ltd., 2008.
7. Lee, J.D. *Concise Inorganic Chemistry*, 5th Ed., Blackwell Science Ltd., 2006.

E - Resources

1. https://nptel.ac.in/courses/104/105/104105033/
2. https://nptel.ac.in/courses/104/101/104101121/
3. https://nptel.ac.in/courses/104/101/104101079/
4. https://nptel.ac.in/courses/104/104/104104109/

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – IV: **Skill Based Theory**		SEMESTER **V**
Course Title: **APPLIED CHEMISTRY**		
Course Code: **07SE51**	Hours per week: **2**	Credits: **2**
CIA Marks: **25 Marks**	ESE Marks**:75 Marks**	Total Marks: **100 Marks**

Preamble

Students are enabled to

- ✓ Learn the skills involved n the analysis and treatment of waste water
- ✓ Understand the various types fuels and their applications
- ✓ Learn the basics of match industry
- ✓ Understand about silicate industry
- ✓ Learn the fundamentals of polymer chemistry

Course Learning Outcomes (CLO)

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

No.	Course Learning Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Familiarizes and experimenting with water analysis	K1, K2 & K3
CLO 2	Discuss the basics of fuels and combustion	K1, K2 &K3
CLO 3	Illustrate the chemistry behind match industry	K1, K2& K3
CLO 4	Describe the uses of silicate industry and coating techniques	K1, K2& K3
CLO 5	Familiarizes and interpret basic concepts of polymer chemistry	K1, K2& K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Syllabus

UNIT-I: WATER AND SEWAGE TREATMENT

Water quality analysis: Chemical and physical analysis of water, quality parameter seawater as a source of drinking water – electro dialysis method, reverse osmosis method for purification of water.

Sewage Treatment: Municipal waste water – sewage treatment – aerobic and anaerobic processes.

UNIT-II: FUELS AND COMBUSTION

Fuels: Definition, characteristics of a good fuel, calorific value, coal, varieties of coal, liquid fuels gaseous fuels – preparation and specific uses of producer gas, water gas, LPG and gobar gas – advantages and disadvantages of solid, liquid and gaseous fuels.

Rocket fuels: Classification of solid propellants, liquid propellants mono – bipropellants –combustion – spontaneous ignition temperature (SIT) – combustion calculation.

UNIT-III: MATCH INDUSTRY

Raw materials: Types of matches – composition of match head striking surface manufacture of safety matches – pyrotechnics – colored matches.

Pyrotechnics and explosives: Classification of explosives, requirements and classification of a good explosives TNT, RDX, picric acid, gun powder, ammonium nitrate.

UNIT-IV: SILICATE INDUSTRY AND INDUSTRIAL COATINGS

Silicate industry: Cement, glass and gypsum, raw materials and manufacture of cement, glass.

Industrial coatings: Protective coatings, metallic coatings, non-metallic coatings, inorganic coatings, organic coatings – paints – composition of paints , pigments – lacquers – varnishes.

UNIT-V: POLYMER CHEMISTRY AND RUBBER

Polymer chemistry: Types of polymerization – addition and condensation polymerization - properties of polymers – structure and uses of polyurethane, polyester, polymethyl methacrylate – Plastics: thermo plastics of thermo setting plastics – applications of plastics in industry.

Rubber: Natural Rubber – preparation from latex – defects of natural rubber, vulcanization of rubber, synthetic rubber preparation and application of neoprene, Buna-S, Thiokol.

Text Books

1. Gopalan, R., Subramanian, P. S. and Rengarajan, K. *Elements of Analytical Chemistry*, Sultan Company, 2008.
2. Puri, B.R., Sharma, L.R. and Kalia, K.C. *Principles of Inorganic Chemistry*, 31st Ed., Milestone Publishers and Distributors, New Delhi, 2013.

Reference Books

1. Vogel, A.I. *A Text-book of quantitative inorganic analysis*, Latest Edition 2006.
2. Madan, R. D. *Advanced inorganic chemistry*, Latest Edition, 2006.
3. Finar, I.L. *Organic Chemistry*, Vol. I, 6th Ed., Pearson Education, New Delhi, 2014.

E - Resources

1. https://nptel.ac.in/courses/105/106/105106119/
2. https://www.youtube.com/watch?v=ub86Dhg67tM
3. https://www.youtube.com/watch?v=IeBzlQ5xC_E
4. https://www.youtube.com/watch?v=nTeKlxiyHa8
5. https://www.youtube.com/watch?v=3W2MkMp9Kuc

DEPARTMENT OF CHEMISTRY

Programme: B.Sc., Chemistry, (Under CBCS and LOCF)

(For those students admitted during the Academic Year 2021 - 22 and after)

Part – IV: Common Subject Theory		
Course Title: **ENVIRONMENTAL STUDIES**		
Course Code: **ESUG51**	Hours per week: **2**	Credits: 2
CIA: **25 Marks**	ESE Marks: **75**	Total Marks: **100**

Objectives

- Disseminate information of Environment of national and international issues
- Environmental consciousness creation among the students
- Facilitation of environmental leadership among students

Syllabus

Unit-I **5 hrs**

Introduction – Nature, scope and importance of Environmental studies – Natural Resources and conservation – forest, water and energy.

Unit-II **5 hrs**

Ecosystem – concept – structure and function, energy flow, food chain, food web and ecological pyramids

Unit-III **5hrs**

Biodiversity – definition, types – values – India, a mega diversity zone – Hotspots – Endangered and endemic species – threat to biodiversity and conservation

Unit-IV **5 hrs**

Environmental pollution – Air pollution- causes and effect – Ozone depletion – Global warming – acid rain – Water pollution – Noise pollution – Solid waste management – Nuclear hazard

Unit-V **4hrs**

Human population and the environment – Population growth – variation among nations – effects of population explosion – family welfare programme – environment and human health.

Text books

Environment studies – R.Murugesan (2009), Milleneum Pub. Madurai-16

Pedagogy

Chalk & Talk, PPT Presentation

Teaching Aids

Green Board, & Interactive White Board

DEPARTMENT OF CHEMISTRY

Programme : B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – III: **Core Course Theory**		SEMESTER **VI**
Course Title: **PHYSICAL CHEMISTRY - IV**		
Course Code: **07CC61**	Hours per week: **6**	Credits: **4**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

Students are enabled to

- ✓ Understand principles of spectroscopy
- ✓ Learn the basics concepts involved in chemical kinetics
- ✓ Get the knowledge on ionic equilibria
- ✓ Understand the mechanism, molecular weight and structural property of polymer

Course Learning Outcomes (CLO)

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

No.	**Course Learning Outcomes**	**Knowledge Level (according to Bloom's Taxonomy)**
CLO 1	Define and discuss the principle involved in rotational spectroscopy and vibrational spectroscopy.	K1,K2& K3
CLO 2	Define and explain the principle behind Raman, NMR and ESR spectroscopy.	K1,K2& K3
CLO 3	Illustrate the basic theoretical concepts of chemical kinetics	K1,K2& K3
CLO 4	Describe the principles of pH of a solution containing mixture of the two components to the acid dissociation constant and solubility product.	K1,K2& K3
CLO 5	Summarize and explain the various types of polymers and its properties in terms of molecular weight and conductivity.	K1,K2& K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Mapping of CLO with PLO

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7
CLO 1	9	1	1	1	3	3	1
CLO 2	9	1	1	1	3	3	1
CLO 3	9	1	1	1	3	3	1
CLO 4	9	1	1	1	3	3	1
CLO 5	9	1	3	1	1	1	1
Weightage of the course	45	5	7	5	13	13	5

9-Strong 3-Medium 1-Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	9	3	9	1
CLO 2	9	9	3	9	1
CLO 3	9	9	3	1	1
CLO 4	9	9	3	1	1
CLO 5	9	9	3	1	1
Weightage of the course	45	45	15	21	5

9-Strong; 3-Medium; 1-Low

Syllabus

UNIT-I: MOLECULAR SPECTROSCOPY - I

Basic concept: Emission and absorption spectra – atomic and molecular spectra – regions of electromagnetic spectrum in terms of wave length – conversion to wave number, frequency and energy – types of spectroscopy – basic features of spectrometer – signal to noise ratio – resolving power – line width and intensity of spectral lines.

Microwave spectroscopy: Pure rotational spectroscopy – rigid rotors – microwave spectroscopy of diatomic molecules, derivation of equation for moment of inertia, equation for rotational energy levels, rotation constant, rotational selection rules, calculation of inter atomic distance – rotational spectra of polyatomic molecules – types of rotators – applications of microwave spectroscopy.

Pure vibrational spectroscopy: Normal modes in CO_2 and H_2O – potential energy versus displacement diagram for HCl – zero point energy – vibrational selection rules – vibration spectrum of an ideal harmonic

oscillator, calculation of force constant – meaning of fundamental vibrational transitions, hot bands and overtone spectroscopy – applications of vibrational spectroscopy.

UNIT-II: MOLECULAR SPECTROSCOPY - II

Raman spectroscopy: Quantum theory of Raman scattering, Stokes and anti Stokes lines– classical theory of Raman scattering – rotational Raman spectrum of diatomic molecules –comparison Raman and IR spectroscopy.

Nuclear Magnetic Resonance Spectroscopy: nuclear spin value *vs.* mass number and atomic number, problems on calculation of nuclear spin angular momentum, NMR frequency, magnetic field strength – magnetogyric ratio – chemical shift – shielding and deshielding of protons – nuclear spin-spin interaction – equivalent and magnetically equivalent nuclei – NMR spectrum of pure ethanol versus acidified ethanol.

Electron Spin Resonance: Basic Principle – ESR spectrum of an unpaired – g factor – hyperfine splitting – applications to hydrogen atom, methyl radical and naphthalene negative ion.

UNIT-III: CHEMICAL KINETICS

Introduction, rate, order, rate law, rate constants – simple reactions involving zero, first, second and third – order reactions – effect of temperature, pressure, catalyst and other factors on reaction rates – order and molecularity of a reaction – derivation of integrated rate equations for zero, first and second order reactions (both for equal and unequal concentrations of reactants), half–life of a reaction – general method for determination of order of a reaction – concept of activation energy and its calculation from Arrhenius equation – Theories of reaction rates: Collision theory and activated complex theory of bimolecular reactions – comparison of collision and ARRT theories (qualitative treatment only) – Lindeman hypothesis.

UNIT-IV: IONIC EQUILIBRIA

Buffer solution: Buffer index, mixture of weak acid and its salt, mixture of weak base and its salt – Henderson-Hasselbalch equation.

Solubility product: Relation between solubility product and molar solubility of a sparingly soluble salt – Application of solubility product: Determination of solubility of sparingly soluble salt, predicting precipitation reactions.

UNIT-V: MACROMOLECULES

Introduction, monomer, oligomer, polymer, classification of polymers – properties of polymers – addition and condensation polymerization reactions with examples – natural rubber – isoprene unit – vulcanization of rubber – preparation and application of polystyrene, urea–formaldehyde resin, teflon and buna-S-rubber – kinetics and mechanisms of free radical and ionic polymerization – number average molecular weight and mass-average molecular weight – determination of molecular weight – light scattering, viscosity methods – electronically conducting polymers: poly sulphur nitride and poly acetylene.

Text Books

1. Puri, B.R., Sharma, L.R., and Pathania, M.S.,*Principles of Physical Chemistry*, 46th Ed., Vishal Publications, 2013.
2. Bahl, A., Bhal, B.S. and Tuli, G.D. *Essentials of Physical chemistry*, S. Chand Publishing Company, New Delhi, 2014.

Reference Books

1. Banwell, C.N. and McCash, E. M. *Fundamentals of Molecular Spectroscopy*, 4th Ed., Tata McGraw-Hill: New Delhi, 2006.
2. Gowariker, V.R., Viswanathan N.V. Jeyadev Sreedhar, *Polymer science*,Wiley,1986.
3. Glasstone, S. *Text Book of Physical Chemistry*, 7th Ed., Macmillan, 2012.
4. Castellan, G.W. *Physical Chemistry*, 4th Ed. Narosa, 2004.
5. Kapoor, K.L. *A Text book of Physical Chemistry*, 4th Ed., McGraw Hill Education, 2017.
6. Barrow, G.M. *Physical Chemistry*, 5th Ed., McGraw Hill Education, 2006.
7. Maron, S.H., and Prutton, C.F., *Principles of Physical Chemistry*, 4th Ed., Oxford & IBH publishing Co. Pvt. Ltd., New Delhi, 1972.
8. Laideler, K.J. and Meiser, J. M. *Physical Chemistry*, 3rd Ed. (International)1999

E - Resources

1. https://ocw.mit.edu/courses/chemistry/5-80-small-molecule-spectroscopy-and-dynamics-fall-2008/
2. http://ocw.uci.edu/lectures/chem_203_lecture_01_organic_spectroscopy_infrared_spectroscopy_introduction_theory_instrumentation_and_sample_preparation.html
3. https://nptel.ac.in/courses/104/101/104101099/
4. https://nptel.ac.in/courses/104/106/104106075/
5. https://nptel.ac.in/courses/104/105/104105039/

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – III: **Core Practical**		SEMESTER **VI**
Course Title: **INORGANIC ANALYSIS AND GRAVIMETRIC ESTIMATION**		
Course Code: **07CP62**	Hours per week: **6**	Credits: **4**
CIA Marks: **40 Marks**	ESE Marks: **60 Marks**	Total Marks: **100 Marks**

Preamble

Students are enabled to

- ✓ Learn the techniques of semi micro qualitative analysis of inorganic salt mixtures.
- ✓ Study the tests for acidic and basic radicals.

Get the knowledge on hand on experience of gravimetric analysis.**Course Learning Outcomes (CLO)**

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

CLO	CLO Statement	Knowledge Level
CLO1	Anticipate, recognize, and respond properly to potential hazards in laboratory procedures	K1, K2 & K3
CLO2	Perform accurate qualitative and quantitative measurements	K1, K2 & K3
CLO3	Interpret experimental results and draw reasonable conclusions	K1, K2 & K3
CLO4	Keep accurate and complete experimental records	K1, K2 & K3
CLO5	Interpret experimental results and draw reasonable conclusions	K1, K2 & K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Syllabus

UNIT-I: INORGANIC QUALITATIVE AND QUANTITATIVE ANALYSIS

Semi-micro analysis:Introduction – Classification of methods of analysis – Advantages – Apparatus used – Preliminary tests – Spot tests.

Gravimetric analysis: Introduction – Apparatus used – Precipitation – Digestion – Filtration and washing – Advantages of using sintered crucible over the use of filter paper – Drying and Ignition of the precipitate – Common Errors.

UNIT-II: REAGENTS AND SOLUTIONS

Preparation of laboratory reagents for inorganic qualitative analysis – Spot test reagents – Solid reagents – Solutions and reagents for gravimetric analysis – Gravimetric factors.

UNIT-III: GENERAL REACTIONS OF INORGANIC QUALITATIVE ANALYSIS

Study the general reactions of common anions: Carbonates, sulphite, sulphate, nitrites, nitrate, chloride, borate, phosphate and oxalate.

General reactions of common cations: Group – I cations, group – II cations, group – III cations – group – IV cations, group – V cations and group VI cations.

UNIT-IV: QUALITATIVE ANALYSIS

Systematic qualitative analysis of mixtures containing two cations and two anions from the following with one interfering radical by semi-micro method only. Identification and confirmation tests and spot tests expected.

Cations: Pb^{2+}, Cu^{2+}, Zn^{2+}, Fe^{2+}, Fe^{3+}, Mn^{2+}, Co^{2+}, Ni^{2+}, Ca^{2+}, Ba^{2+}, NH_4^+ and Mg^{2+}

Anions: CO_3^{2-}, Br^-, NO_3^-, SO_4^{2-}, F^-, Cl^-, BO_3^{2-}, $C_2O_4^{2-}$ and PO_4^{3-}

Interfering anions: F^-, $C_2O_4^{2-}$, and PO_4^{3-}

(Minimum of eight mixtures (with interfering anions) to be analysed)

UNIT-V: QUANTITATIVE ANALYSIS

Gravimetric analysis

1. Estimation of Lead as Lead chromate
2. Estimation of Barium as Barium chromate
3. Estimation of Calcium as Calcium oxalate monohydrate
4. Estimation of Copper as Copper thiocyanate
5. Estimation of Nickel as Nickel dimethylglyoxime

Text Book

1. Venkateswaran, V., Veerasamy, R. and Kulandaivelu, A.R., *Basic Principles of Practical Chemistry* 2nd Ed., Sultan Chand and Sons, New Delhi, 2017.

Reference Books

1. Thomas, A.O., *Practical Chemistry* 7th Ed., Scientific Book Centre, Kannur, 1999**.**
2. Svehla, G., *Vogel's Qualitative Inorganic Analysis* 7th Ed, Pearson Education, New Delhi, 2006**.**
3. Ramanujam, V.V., *Inorganic Semi Micro Qualitative Analysis* 3rd Ed., The National Publishing Company, Chennai, 1974.

E - Resources

1. https://www.youtube.com/watch?v=yMChYvgTfkQ
2. https://www.youtube.com/watch?v=WIxhmGbWk94
3. https://www.youtube.com/watch?v=XZB261mv4bQ
4. https://www.youtube.com/watch?v=UGczbI9gy1U
5. https://www.youtube.com/watch?v=nPWgbniFpww

Distribution of marks

Max marks: 100

Internal	**: 40 marks**	**External**	**: 60 marks**
Attendance	: 5 marks	Qualitative analysis	: 20 marks
Laboratory performance and model practical	: 20 marks	Gravimetric estimation	: 20 marks
		Record note book	: 10 marks
Viva-voce	: 5 marks	Viva-voce	: 10 marks
Observation note book	: 10 marks		
Total	: 40 marks	Total	: 60 marks

Qualitative semi micro analysis (20 marks)	**Gravimetric Estimation (20 marks)**
Four radicals with correct procedure : 20 marks	Procedure : 5 marks
Three radicals with correct procedure : 15 marks	Estimation : 15 marks
Two radicals with correct procedure : 10 marks	Less than 2 % Error : 15 marks
	2-3% Error : 14 marks
	2-3% Error : 12 marks
	2-3% Error : 10 marks
	Greater than 5% Error : 8 marks

DEPARTMENT OF CHEMISTRY
Programme: B.Sc. Chemistry, (CBCS and LOCF)
(For those students who admitted during the Academic Year 2021-22 and after

PART – III: Discipline Specific Elective		SEMESTER: **VI**
Course Title: **PROJECT**		
Course Code: **07DS6A**	Hours per week: **5**	Credits: **- 5**
CIA Marks: - **25**	ESE Marks: - **75**	Total Marks: - **100**

Preamble

Students are enabled to

On completion of the course, the students are able to

- know how to develop an aptitude for research in chemistry.
- know how to learn research methodology and literature search
- learn to identify appropriate research topic and presentation

Syllabus

Procedure:

UNIT: I

Topics of chemical interest can be selected for the project. Project is to be done by a group not exceeding 5 students.

UNIT: II

Every student should submit typed (A4 paper, 12 Font, 1.5 Space, 20- 30 pages), spirally bind project report duly attested by the supervising teacher and the Head of the Department on the day of practical examination before a board of two Examiners for viva voce examination. The viva-voce based on the project is conducted individually.

UNIT: III

Project topic once chosen shall not be repeated by any later batches of students. List of projects submitted year wise is to be maintained in a register and submitted before the examiners if requested.

UNIT: IV

The project report may contain the following sections:

1. Preliminary (Title page, declaration, certificate of the supervising teacher, content etc.)
2. Introduction with relevant literature review and objective
3. Materials and Methods
4. Results
5. Discussion
6. Conclusion / Summary
7. References.

UNIT: V

Study tour and Factory/ research institute visit Students are directed to visit one research institute/ chemical factory preferably with in the state of Tamil Nadu. Scientifically prepared hand written/typed study tour report along with photographs of candidate at the places of visit must be submitted by each student for summative examination on the day of the examination of project evaluation. The board of examiners can decide the scheme of evaluation of project, study tour report and viva voce.

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – III : **Elective Theory**		SEMESTER **VI**
Course Title: **ORGANIC SPECTROSCOPY**		
Course Code: **07DS6C**	Hours per week: **5**	Credits: **5**
CIA Marks: **25 Marks**	ESE Marks: **75 Marks**	Total Marks: **100 Marks**

Preamble

Students are practised to

- Attain a vast knowledge on Instrumentation and spectral characterizations
- Obtain the chemistry behind the characterization of compounds
- Analyse the skeleton of the molecules using Instruments

Course Learning Outcomes (CLO)

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

No.	**Course outcome(s)**	**Knowledge Level (according to Bloom's Taxonomy)**
CLO1	Discuss the basic principles and applications of ultraviolet-visible spectroscopy	K1, K2 & K3
CLO2	Illustrate the principles of infra-red spectroscopy and predict the functional groups present in a molecule	K1, K2 & K3
CLO3	Interpret the idea behind using NMR spectroscopy for structural identification	K1, K2 & K3
CLO4	realize the usage of spectral studies in structural determination	K1, K2 & K3
CLO5	Utilize the broad knowledge of spectroscopy for structure elucidation of simple organic compounds	K1, K2 & K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Mapping of CLO with PLO

	PLO 1	**PLO 2**	**PLO 3**	**PLO 4**	**PLO 5**	**PLO 6**	**PLO 7**
CLO 1	9	1	3	1	1	3	1
CLO 2	9	1	3	1	1	3	1
CLO 3	9	1	3	1	1	3	1
CLO 4	9	1	3	1	1	3	1
CLO 5	9	1	3	1	1	3	1
Weightage of the course	45	5	15	5	5	15	5

9-Strong 3-Medium 1-Low

Mapping of CLO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CLO 1	9	9	3	1	1
CLO 2	9	9	3	1	1
CLO 3	9	9	3	1	1
CLO 4	9	9	3	1	1
CLO 5	9	9	3	1	1
Weightage of the course	45	45	15	5	5

9-Strong; 3-Medium; 1-Low

Syllabus

UNIT-I: ULTRAVIOLET-VISIBLE ABSORPTION SPECTROSCOPY

Absorption laws (Beer-Lambert law), molar absorptivity, presentation and analysis of UV spectra, types of electronic transitions, effect of conjugation – concept of chromophore and auxochrome – bathochromic, hypsochromic, hyperchromic and hypochromic shifts. Woodward-Fieser rules, calculation of max of simple conjugated dienes – unsaturated ketones – applications of UV Spectroscopy in structure elucidation of simple organic compounds.

UNIT-II: INFRARED (IR) ABSORPTION SPECTROSCOPY

Molecular vibrations – Hooke's law – selection rules – intensity and position of IR bands –measurement of IR spectrum – fingerprint region – characteristic absorptions of various functional groups – interpretation of IR spectra of simple organic compounds: IR spectra of alkanes, alkenes, alkynes and simple alcohols (effect of hydrogen bonding), aldehydes, ketones, carboxylic acids and their derivatives (effect of substitution on >C=O stretching absorptions).

UNIT-III: NMR SPECTROSCOPY

Principle of nuclear magnetic resonance – number of signals, peak areas, equivalent and nonequivalent protons – positions of signals – chemical shift, shielding and deshielding of protons – proton coupling, splitting of signals and coupling constants – magnetic equivalence of protons – NMR spectra of simple molecules: ethyl bromide, n-propyl bromide, isopropyl bromide, 1,1-dibromoethane, 1,1,2-tribromoethane, ethanol, acetaldehyde, ethyl acetate, toluene, benzaldehyde and acetophenone.

UNIT-IV: MASS SPECTROMETRY

Mass spectrum, determination of molecular weight, molecular formulae, isotopic abundance – molecular ion – metastable ions – nitrogen rule – fragmentation routes – Mclafeferty rearrangement – fragmentations associated with hydrocarbons, hydroxyl compounds, ethers, ketones, aldehydes, acids, halogen compounds with one Cl/Br atoms.

UNIT-V: STRUCTURAL ELUCIDATION USING SPECTRAL DATA

Simple problems on UV visible spectroscopy for structural elucidation organic compounds – identification of functional group and structure elucidation of simple organic compounds using IR data – solving problems on NMR spectroscopy for structural determination of organic compounds problems on mass spectrometry – combined spectroscopy problems using IR, UV, NMR and mass data.

Text Books

1. Sharma, Y.R. *Elementary Organic Spectroscopy – Principles and Chemical applications*, S.Chand, 2011.
2. Pavia, D. L. and Lampan, G.M. *Introduction to Spectroscopy*, 3rd Ed., Thomson, 2007.

Reference Books

1. William Kemp, *Organic Spectroscopy*, 4th Ed., ELBS, 1991.

2. Chang, R. *Basic Principles of Spectroscopy*, McGraw Hill.
3. Hill, H.C. *Introduction to Mass Spectrometry*, 2nd Ed., London, 1972.
4. Howe, I., Williams, D.H. and Bowden, R.D. *Principles of Mass Spectroscopy*, 2nd Ed., London, 1980.
5. Silverstein, Bassler and Morril, *Spectrometric Identification of Organic Compounds*, 5th Ed., NewYork, John Wiley and Sons, 1991.
6. Jag Mohan, *Organic Spectroscopy*, 2nd Ed., New Delhi: Narosa Publishing House, 2004 .

E - Resources

1. https://nptel.ac.in/courses/104/108/104108124/
2. https://nptel.ac.in/courses/104/102/104102113/
3. https://nptel.ac.in/courses/104/106/104106075/
4. http://ndl.iitkgp.ac.in/document/bnZnR2hPaUVqRU9TbFc2Rmp1MVJzeTNuRVplUTVaVHdtUDI3eUwzTUlBWT0

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – IV: **Skill Enhancement Course**		SEMESTER **VI**
Course Title: **INDUSTRIAL CHEMISTRY AND CLINICAL CHEMISTRY**		
Course Code: **07SE61**	Hours per week: **2**	Credits: **2**
CIA Marks: **25 Marks**	ESE Marks**:75 Marks**	Total Marks: **100 Marks**

Preamble

Students are enabled to

- ✓ Gain knowledge about utilities in chemical industries
- ✓ Study the industrial process of sugar and paper industry
- ✓ Develop skills in industrial chemistry preparation
- ✓ Learn the skills of clinical hygiene and biochemical analysis

Course Learning Outcomes (CLO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	familiarizes explain the chemistry involved in sugar and paper industries	K1, K2 & K3
CLO 2	Describe the synthetic methods of oils, soaps, detergents and employ the oils, soaps, detergents in various applications.	K1, K2 &K3
CLO 3	Comprehend the chemistry behind articles used in day-to-day life	K1, K2& K3
CLO 4	Discuss the processes of clinical hygiene	K1, K2& K3
CLO 5	Analyze urine and blood samples for their compositions	K1, K2& K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Syllabus

UNIT-I: SUGAR AND PAPER INDUSTRY

Sugar industry: Double sulphitation process, refining and grading of sugar. Saccharin: Synthesis and uses as a sugar substitute. Ethanol: Manufacture from molasses by fermentation.

Paper industry: Manufacture of paper – production of sulphite pulp and conversion to paper, bleaching, filling, sizing and calendaring – world production of sugar and paper.

UNIT-II: SOAPS AND DETERGENTS

Manufacture of soaps – toilet and transparent soaps – Detergents: Synthetic detergents, surface active agents and their classification – manufacture of anionic, cationic and non ionic detergents and shampoo – advantages of detergents over soaps.

UNIT-III: CHEMICALS IN DAY-TO-DAY LIFE

Preparation and uses of the following articles: Aroma sticks, safety matches, writing inks, mixed fruit jam, liquid blue, syrup, chalk crayons, white phenyl and black phenyl, washing powder, cleaning powder, nail polishes, wax candles and moth balls.

UNIT-IV: CLINICAL HYGIENE

Definition – importance of hygiene – personal and domestic hygiene (WHO standard) – types of hygiene – sterilization of surgical instruments – disinfectants – antiseptics – sanitation.

UNIT-V: BIOCHEMICAL ANALYSIS

Urine analysis: Determination of sugar, albumin, bile salt and pile pigment in urine.

Blood analysis: Composition of blood – blood grouping – determination of blood groups and matching – blood pressure – hypertension –determination of glucose in serum.

Field visits: One full day visit to a medical research laboratory and to chemical industry.

Text Book

1. Sharma, B.K. *Industrial Chemistry*, Goel Publishing House, Meerut, 2016.

2. Jeyashree Gosh, *A text book of Pharmaceutical Chemistry*, S. Chand & Company, 2014.

Reference Books

1. Chakrabarty, B.N. *Industrial Chemistry*, Oxford & IBH Publishing Co. Pvt. Ltd., 1983.
2. Plummer, D. *Practical Biochemistry*, Tata McGraw-Hills Publishing Company, 2005.

E - Resources

1. https://www.youtube.com/watch?v=EzPGmsY1owA
2. https://www.youtube.com/watch?v=Aa-qpS4TXvA
3. https://www.youtube.com/watch?v=9ysPKkwsqXo
4. https://www.youtube.com/watch?v=PkeZG1n7pP4
5. https://www.youtube.com/watch?v=p70AaqotHnc

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – IV: **Skill Based Theory**		SEMESTER **VI**
Course Title: **CHEMISTRY FOR COMPETITIVE EXAMINATIONS**		
Course Code: **07SE62**	Hours per week: **2**	Credits: **2**
CIA Marks: **25 Marks**	ESE Marks**:75 Marks**	Total Marks: **100 Marks**

Preamble

The students will be trained to

- ✓ Face entrance examinations for admission towards Post Graduate course and also to compete the entrance examinations conducted by TNPSC, UPSC and private industries.

Course Learning Outcomes (CLO)

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

No.	Course Learning Outcomes	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Recall and summarize the periodic properties and chemical bonding of elements	K1, K2 & K3
CLO 2	Explain the concepts involved in stereochemistry, electronic effects, natural products and heterocyclic compounds	K1, K2 & K3
CLO 3	Recall and discuss the basic chemistry of chemical thermodynamics, chemical kinetics and electrochemistry	K1, K2 & K3
CLO 4	Describe the fundamentals of atomic structure and apply this knowledge to predict the stability of atom	K1, K2 & K3
CLO 5	Discuss the organic reaction mechanism and synthetic applications / apply to qualitative analysis	K1,K2 & K3

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Syllabus

UNIT-I: INORGANIC CHEMISTRY

Periodic Table: Periodic classification of elements and periodicity in properties – general methods of isolation and purification of elements.

Chemical Bonding and Shapes of Compounds: Types of bonding; VSEPR theory and shapes of molecules – hybridization – dipole moment – ionic solids – structure of NaCl, CsCl, diamond and graphite – lattice energy.

Main Group Elements (s and p blocks): Chemistry with emphasis on group relationship and gradation in properties – structure of electron deficient compounds of main group elements and application of main group elements.

Transition Metals (d block): Characteristics of 3d elements – oxide, hydroxide and salts of first row metals coordination complexes – VB and CFT approaches for structure, color and magnetic properties of metal complexes.

Organometallic compounds: Metal carbonyls, nitrosyls and metallocenes, ligands with back bonding capabilities – MO theory approaches to explain bonding in metal-carbonyl, metal-nitrosyl and metal-phosphine complexes.

Bioinorganic Chemistry: Essentials and trace elements of life – basic reactions in the biological systems and the role of metal ions especially Fe^{2+}, Fe^{3+}, Cu^{2+} and Zn^{2+} – function of hemoglobin and myoglobin.

UNIT-II: ORGANIC CHEMISTRY-I

Basic Concepts in Organic Chemistry and Stereochemistry: Electronic effect (resonance,inductive, hyperconjugation) – steric effects and its applications (acid/base property) – optical isomerism in compounds without any stereocenters (allenes, biphenyls) – conformation of acyclic systems (substituted ethane/n-propane/n-butane) and cyclic systems (mono and di substituted cyclohexanes).

Natural Products Chemistry: Introductory chemistry of alkaloids, terpenes, carbohydrates, amino acids, peptides and nucleic acids.
Heterocyclic Chemistry: Monocyclic compounds with one hetero atom.

UNIT-III: ORGANIC CHEMISTRY-II

Organic reaction mechanism and synthetic applications: Chemistry reactive intermediates, carbine, nitrene, benzyne – Hofmann-Curtius-Lossen rearrangement, Wolf rearrangement – Simmons-Smith reaction, Reimer-Tiemann reaction, Michael reaction, Darzens reaction, Witting reaction, McMurry reaction – Pinacol-pinacolone, Favorskii, benzilic acid rearrangement, dienonc-phenol rearrangement, Bayer-Villeger reaction. Oxidation and reduction reactions inorganic chemistry – Organometallic reagents in organic synthesis (Grignard and organocopper) – Diels-Alder reaction, Sigmatropic reactions.
Qualitative Organic Analysis: Functional group interconversion – structural problems using chemical reactions – identification of functional groups by chemical tests – elementary ^{1}H NMR and IR spectroscopy as a tool for structural elucidation.

UNIT-IV: PHYSICAL CHEMISTRY-I

Atomic and Molecular Structure: Fundamental particles – Bohr's theory of hydrogen-like atom – wave-particle duality – Uncertainty principle – Schrödinger's wave equation – Quantum numbers– shapes of orbitals– Hund's rule and Pauli's exclusion principle–electronic configuration of simple homonuclear diatomic molecules.
Theory of Gases: Equation of state of ideal and non-ideal (van der Waals) gases – Kinetic theory of gases. Maxwell-Boltzmann distribution law– equipartition of energy.
Solid state: Crystal systems – NaCl and KCl structures – close packing – atomic and ionic radii – radius ratio rules– lattice energy– Born-Haber cycle–isomorphism, heat capacity of solids.
Adsorption: Gibbs adsorption equation – adsorption isotherm – types of adsorption –surface area of adsorbents– surface films on liquids.
Chemical and Phase Equilibria: Law of mass action – K_p, K_c, K_x and K_n – Effect of temperature on K – Ionic equilibria in solutions – pH and buffer solutions–Hydrolysis– Solubility product–Phase equilibria– Phase rule and its application to one-component and two-component systems – colligative properties.

UNIT-V: PHYSICAL CHEMISTRY-II

Chemical Thermodynamics: Reversible and irreversible processes – First law and its application to ideal and non-ideal gases – Thermochemistry: Second law, Entropy and free energy, Criteria for spontaneity.
Chemical Kinetics: Reactions of various order – Arrhenius equation– Collision theory– theory of absolute reaction rate – chain reactions – normal and branched chain reactions– enzyme kinetics – photochemical processes– catalysis.
Electrochemistry: Conductance and its applications – transport number– Galvanic cells– EMF and Free energy–concentration cells with and without transport–polarography– concentration cells with and without transport–Debey-Huckel-Onsagar theory of strong electrolytes.
Self Study:
Instrumental Methods of Analysis: Basic principles, instrumentations and simple applications of conductometry, potentiometry, UV-visible spectrophotometry – analysis of water, air and soil samples.
Analytical Chemistry: Principles of qualitative and quantitative analysis – acid-base – oxidation-reduction and EDTA and precipitation reactions – use of indicators – use of organic reagents ininorganic analysis – radioactivity – nuclear reactions – applications of isotopes.

Text Book

Raj Kumar, S. *IIT JAM Chemistry Solved Papers and Practice Sets 2020*, Arihant Publications.

Reference Books

1. *Concise AIEEE Chemistry*, Crash Course Tata McGraw Hill Company. Ltd., New Delhi and 2012.
2. Sivakumar, M. *Objective Chemistry*, Sura's publication and 2005.
3. Srivastava, M. L. *Objective Chemistry*, Rastogi publication and 2000.

E - Resources

1. https://www.youtube.com/watch?v=t0b89hsI66E
2. https://www.youtube.com/watch?v=EcLi_EfrzQc
3. https://www.youtube.com/watch?v=-oiy95-npWk

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and LOCF)

(For those students who admitted during the Academic Year 2021-22 and after)

PART – IV: **Skill Based Theory**		SEMESTER **VI**
Course Title: **NANOCHEMISTRY AND GREEN CHEMISTRY**		
Course Code: **07SE63**	Hours per week: **2**	Credits: **2**
CIA Marks: **25 Marks**	ESE Marks**:75**	Total Marks: **100 Marks**

Preamble

Students are enabled to

- ✓ Understand the fundamentals of nanotechnology
- ✓ Impart basic knowledge on various synthesis and characterization techniques involved in nanotechnology.
- ✓ Understand the basic concept of green chemistry.

Course Learning Outcomes (CLO)

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

No.	Course Learning Outcomes	Knowledge Level (according to Bloom's Taxonomy)
CLO 1	Describe the properties of nanomaterials.	K1 & K2
CLO 2	Classify and develop various methods for synthesis of nanoparticles.	K2 & K3
CLO 3	Apply the concepts and principles of spectroscopic methods for characterization of nanomaterials.	K3
CLO 4	Comprehend the importance of green chemistry	K3 & K1
CLO 5	Discuss the twelve principles and explain the scope of green chemistry	K1 & K2

K_1-Remembering **K_2**-Understanding **K_3**-Applying

Syllabus

UNIT-I: Introduction, nanotechnology – nanomaterials and its types – properties of nanomaterials: surface, electrical, optical and thermal properties.

UNIT-II: Growth techniques of nanomaterials: Role of Bottom-up and Top-Down approaches in nanotechnology – sol-gel process – electrodeposition – sputtering – spray pyrolysis.

UNIT-III: Characterization tools of nanomaterials: XRD – SEM – TEM – UV-Visible spectroscopy – Photoluminescence Spectroscopy.

UNIT-IV: Introduction to Green chemistry – need for green chemistry – sustainability and cleaner production – green chemistry and Eco-efficiency – environmental protection laws, changes ahead for a chemist – green chemistry educations.

UNIT-V: Inception and evolution of Green chemistry – twelve Principles of green chemistry – atom economy – scope of Green chemistry.

Text Books

Chattopadhyay, K.K. and Banerjee, A.N. *Introduction to Nanoscience and Nanotechnology*, PHI Learning Pvt. Ltd, 2012.

Reference Books

1. Pradeep, T. *Nano the essential*, Tata Mc Graw Hill Company, Ltd., New Delhi, 2007.
2. Sanghi, R. and Srivastava, M.M. *Green Chemistry*, Narosapublilshing House, 2003.

E - Resources

1. https://www.youtube.com/watch?v=S-SOEBTplOM
2. https://www.youtube.com/watch?v=XcUedMpv_w8
3. https://www.youtube.com/watch?v=lFYs3XDu4fQ
4. https://www.youtube.com/watch?v=fo8NYuMOojE
5. https://www.youtube.com/watch?v=C0K1XRT1myg

SEMESTER – VI

(For those who joined in June 2021-2022 and After)

PART – IV : Common Course Theory		
Course Title **: Value Education**		
Course Code: **VEUG61**	Hours per week: **2**	Credit: **2**
CIA: 25 Marks	**ESE: 75 Marks**	Total Marks: **100**

Syllabus

UNIT I: The heart of Education:

Introduction – Eternal Value – Integrated approach to value education - one for all and all for one – Responsibilities of a citizen – Habit Vs wisdom – purifying mind pollution – Respect for all Religions – Parents, teachers and fellow students – The need and benefit of exercise and meditation for students.

UNIT II: The Value of Body and Life Energy

Introduction – what are the causes for paid, Disease and death? Three Basic needs for all living Beings – Personal Hygeine Five Factors of Balance in Life – The need and benefits of physical Exercise – The value and Base of Life energy – The value and Base of Bio-magnetism - You are your own best caretaker.

The Marvelous nature of mind

Introduction- Bio-magnetism – The base of the mind – characterisation of the Genetic Centre – metal frequency – practice for a creative mind - benefits of meditation.

UNIT III: Analysis of Thought

Introduction – An Explosition on the nature of thought– six roots for thoughts – Introspection for analysis of thoughts-practical techniques for analysis of thoughts. Benefits of Blessings

Effects of good vibrations – Make Blessing a Daily Habit

UNIT IV: Moralisation of Derive

Introduction – moralization of desire - Analyse your desires – Summary of practice.

Neutralision of Anger:

Introduction – meaning – characteristics of Anger – Anger is a Destructive emotion – Anger spoils our relationship with others – Some common misconception about anger – will power and method success through awareness – method of neutralisation of anger.

UNIT V: Eradication of Worries

Worry is a mental disease – Nature's Law of cause and effect – factors beyond our control – How to deal with problems – analyse your problem and eradicate worry Harmonious Relationships

Introduction – Three angles of life – The value of harmony in personal relations – Love and Compassion – pleasant face and loving words – appreciation and gratitude to parents and teachers – Bringing needed reforms in educational institutions Why should we serve others? Brotherhood – A scientific

Basis for Universal Brotherhood protection of the environment – non-violence and the five fold moral culture.

Text Book: Value Education for Health, Happiness and Harmony

Based on the Philosophy and Teachings of Swami Vethanthiri Maharisi) Published By: Brain Trust, Aliyar A Wing of World Community Service Centre

Pedagogy

Chalk and talk, Group Discussion and PPT

Teaching Aids

Green Board, LCD Projector, Interactive White Board

SEMESTER – VI

(For those who joined in June 2021 and after)

PART – V : Common Course Theory		
Course Title **: EXTENSION ACTIVITIES**		
Course Code: **EAUG61**	Hours per week:	Credit: **1**
CIA: 25 Marks	**ESE: 75 Marks**	Total Marks: **100**

Syllabus

UNIT-I:

Community Development-I: definition – structure and composition – community based issues – need for awareness – Developmental Programmes.

UNIT – II:

Community Development–II: Rural Scenario – need of the Community – need for the community service – role of youth in community building – communal harmony – literacy – Educational Recreation.

UNIT – III:

Volunteer Empowerment: Women's Emancipation – formation of Youth Clubs – Self-Help Groups – Youth and Development.

UNIT – IV:

Social Analysis: Social issues – cultural invasion – media infiltration – human rights Education/Consumer Awareness – Adolescents Reproductive – HIV/AIDS/STD – Social harmony/National integration – Blood Donation.

UNIT – V:

Introduction to NSS: Basic Concepts – profile – aims – objectives – symbol – Motto – structure – Regular activities – Special Camping Programme – Adventure Programme – National Days and Celebrations.(Applicable to NSS Students)

(OR)

NCC- Origin – Organisation – Ministry of Defence – Armed forces – commands – Defence establishments in Tamil Nadu

Civil Defence – Aid to civil authorities – Disaster management – Leadership – Man management – Adventure activities – Social service

Reference:

National Service Scheme Manual (Revised), Ministry of Human Resources Development, government of India.

Pedagogy

Chalk and talk, Group Discussion and PPT

Teaching Aids

Green Board, LCD Projector, Interactive White Board