VIVEKANANDA COLLEGE

College with Potential for Excellence

Residential & Autonomous – A Gurukula Institute of Life-Training
Re-accredited with 'A' Grade (CGPA 3.59 out of 4.00) by NAAC
Affiliated to Madurai Kamaraj University
Tiruvedakam West, Madurai District– 625 234

POSTGRADUATE AND RESEARCH DEPARTMENT OF CHEMISTRY

B.Sc. Chemistry

SYLLABUS

Choice Based Credit System (CBCS) & Outcome Based Education (OBE)

(For those students admitted during the Academic Year 2020-21 and after)

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,	**Heart**

GA 7	**Creativity**	Demonstration of knowledge, understanding of management principles and application of these to one's own work to manage projects and in multidisciplinary environments	**Heart**
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.

Assessment *(Pattern- CIA and ESE)*

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**

PG AND RESEARCH DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry (Under CBCS and OBE)
(For those students who admitted during the Academic Year 2020-21 and after)
SCHEME OF EXAMINATION-(Batch 2020-2023)
FIRST SEMESTER

Part	Study Component	Subject Code	Title of the Paper	Hrs	Credit	Sessional Marks	End Semester Marks	Total Marks
I	Tamil	P1LT11	IkkalakKavithaiyumUrainadaiyum	6	3	25	75	100
	Sanskrit	P1LS11	Fundamental Grammar & History of Sanskrit Literature – I					
II	English	P2LE11	English for Communication Skills–I	6	3	25	75	100
III	Core	07CT11	General Chemistry – I	4	4	25	75	100
	Core	07CT12	General Chemistry – II	4	4	25	75	100
	Core		Volumetric Estimation and Organic Preparation	2	-	-	-	-
	Allied	06AT01	Allied Paper I : Allied Physics – I	4	4	25	75	100
	Allied		Allied: Practical	2	-	-	-	-
IV	Non Major	07NE11	Food Chemistry	2	2	25	75	100
			TOTAL	**30**	**20**			**300**

SECOND SEMESTER

Part	Study Component	Subject Code	Title of the Paper	Hrs	Credit	Sessional Marks	End Semester Marks	Total Marks
I	Tamil	P1LT21	IkkalakKadhaiIlakkiyamumMakkalThagavaliyalum	6	3	25	75	100
	Sanskrit	P1LS21	Poetry, Grammar & History of Sanskrit Literature – II					
II	English	P2LE21	English for Communication Skills – II	6	3	25	75	100
	Core	07CT21	General Chemistry – III	4	4	25	75	100
	Core	07CT22	General Chemistry – IV	4	4	25	75	100
III	Core	07CP23	Volumetric Estimation and Organic Preparation	2	4	40	60	100
	Allied	06AT02	Allied Paper II : Allied Physics II	4	4	25	75	100
	Allied	06AP03	Allied : Allied Physics Practical	2	2	40	60	100
IV	Non Major	07NE21	Chemistry in Medicine	2	2	25	75	100
			TOTAL	**30**	**26**			**500**
07CP23 End Semester Practical Examinations = 4 Hrs								

THIRD SEMESTER

Part	Study Component	Subject Code	Title of the Paper	Hrs	Credit	Sessional Marks	End Semester Marks	Total Marks
I	Tamil	P1LT31	KappiyamumPakthiIlakkiyamumNadagamum	6	3	25	75	100
	Sanskrit	P1LS31	Prose, Poetics & History of Sanskrit Literature-II					
II	English	P2LE31	English for Academic and Professional Excellence–I	6	3	25	75	100
III	Core	07CT31	Organic Chemistry -I	4	4	25	75	100
	Core	07CT32	Physical Chemistry – I	3	4	25	75	100
	Core	07CP43	Semi Micro Inorganic Qualitative Analysis and Organic Estimation	3	-	-	-	-
	Allied	05AT01	Allied Paper I : Mathematics – I	6	4	25	75	100
	Allied	09AT01	Animal Organisation					
	Allied		Allied: Practical		-	-	-	-
IV	Skill Based	07SB31	Medicinal & Pharmaceutical Chemistry	2	2	25	75	100
			TOTAL	**30**	**20**			**300**

FOURTH SEMESTER

Part	Study Component	Subject Code	Title of the Paper	Hrs	Credit	Sessional Marks	End Semester 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 Academic and Professional Excellence - II	6	3	25	75	100
III	Core	07CT41	Inorganic Chemistry – I	4	4	25	75	100
	Core	07CT42	Physical Chemistry - II	3	4	25	75	100
	Core	07CP43	Semi Micro Inorganic Qualitative Analysis and Organic Estimation	3	4	40	60	100
	Allied-II	05AT02	Mathematics – II	6	6	25	75	100
	Allied-II	05AT03	Mathematics – III			25	75	100
	Allied-II	09AT02	Biology and Human Welfare			25	75	100
	Allied-II	09AP03	Allied Practical			40	60	100
IV	Skill Based	07SB41	Biomolecules	2	2	25	75	100
			TOTAL	**30**	**26**			**500**
			07CP43 End Semester Practical Examinations = 4Hrs					

FIFTH SEMESTER

Part	Study Component	Subject Code	Title of the Paper	Hrs	Credit	Sessional Marks	End Semester Marks	Total Marks
III	Core	07CT51	Organic Chemistry –II	5	4	25	75	100
	Core	07CT52	Inorganic Chemistry – II	5	4	25	75	100
	Core	07CP53	Practical Physical Chemistry	5	4	40	60	100
	Core	07CP62	Organic analysis and gravimetric estimation	6	-	-	-	-
	Elective	07EP5A	Physical Chemistry –III	5	5	25	75	100
		07EP5B	Polymer chemistry					
IV	Skill Based	07SB51	Water Analysis	2	2	25	75	100
	ES	ESUG51	Environmental Studies	2	2	25	75	100
			TOTAL	**30**	**21**			**400**
			07CP53 End Semester Practical Examinations = 5 Hrs					

SIXTH SEMESTER

Part	Study Component	Subject Code	Title of the Paper	Hrs	Credit	Sessional Marks	End Semester Marks	Total Marks
III	Core	07CT61	Organic Chemistry - III	6	4	25	75	100
	Core	07CP62	Organic Analysis and Gravimetric Estimation	6	4	40	60	100
	Elective	07EP6A	Project	5	5	25	75	100
		07EP6B	Textile Chemistry					
	Elective	07EP6C	Elements of spectroscopy	5	5	25	75	100
		07EP6D	Stereochemistry					
IV	Skill Based	07SB61	Industrial Chemistry and Clinical Chemistry	2	2	25	75	100
	Skill Based	07SB62	Chemistry for Competitive Examinations	2	2	25	75	100
	Skill Based	07SB63	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
			TOTAL	**30**	**27**			**400**
07CP62 End semester practical Examinations = 6 Hrs								
			Total Hours	**180**				
			Total Credits		**140**			
			Total Marks (Part III-only)					**2400**

Programme: B.A., BSc., (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2020 – 2021 and after)
பாடத்திட்டத்தின் கட்டமைப்பு (PROGRAMME STRUCTURE)

UG Language PART – I TAMIL		SEMESTER : I
Name of the Course : இக்காலக் கவிதையும் உரைநடையும்		
Course Code :P1LT11	**Hours per week : 18**	**Credit : 03**
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

பார்வை (Vision)

➢ பூர்விக மொழியான நமது தாய்மொழியின் வாயிலாக மாணவர்களிடையே தமிழினத்தின் பாரம்பரிய பண்பாட்டுக் கூறுகளைக் கற்பித்து அதனை பரப்ப வழிவகை செய்தல்.

பணி (Mission)

➢ செம்மொழியான தமிழ் மொழியின் வாயிலாக கல்வியின் தரத்தினை வளப்படுத்துதல்.

➢ தாய் மொழியின் வாயிலாக மாணவர்களிடம் காணப்படக்கூடிய ஆக்கப்பூர்வமான சுய சிந்தனைத் திறன்களை வெளிக்கொணர்தல்.

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 Outcomes (POs)

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 உணர்தல்.
2. புதுக்கவிஞர்களின் படைப்பாக்கங்கள் வழி பொருள், கட்டமைப்பு அறிவித்தல்.
3. தனி மனித ஒழுக்கம் கடைபிடித்தல்.
4. தமிழ் எழுத்துக்களின் வகைமைகளை அறிதல்.
5. தமிழிலக்கியத்தின் மரபு மற்றும் புதுக்கவிதையின் வரலாற்றினை அறிவித்தல்.

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

NO.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	உரைநடை இலக்கியத்தின் வாயிலாகவும், மரபுக்கவிதை - புதுக்கவிதையின் வாயிலாகவும் தனி மனித மற்றும் சமூக ஒழுக்கங்கள் குறித்து வரையறை செய்தல்.	K_1, K_2
CO 2	உயிர் எழுத்துக்கள், மெய்யெழுத்துக்கள், உயிர்மெய்யெழுத்துக்கள், சார்பெழுத்துக்கள் ஆகியன குறித்தும் அவற்றை எழுதும் விதங்கள் குறித்தும் வகைப்படுத்தும் திறன் அறிதல்.	K_2, K_3
CO 3	மரபுக்கவிதை வாயிலாக படைப்பாளர்களின் காலகட்டத்தையும், படைப்பின் வழியாக அக்காலகட்ட மக்களின் வாழ்க்கை நிகழ்வுகளின் வரலாற்றினையும் விவரித்தல்.	K_2, K_3
CO 4	தாய் மொழியின் சிறப்பு, பொதுவுடைமை சிந்தனை, அறியாமை நீக்கல், உண்மைத்துறவு நிலை குறித்த சமூக நிலைகளை கலந்துரையாடுதல்	K_2
CO 5	மொழியினைப் பிழையின்றி எழுதுதல் -பேசுதல், ஒலி வேறுபாட்டினை அறிந்து மயக்கம் நீக்குதல் போன்ற ஒரு மொழியின் பயன்பாட்டுத் தன்மையைத் தெளிவுறுத்தல்.	K_1, K_2, K_3

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

Mapping of CO and PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	3	3	9	3	1	9
CO2	9	3	9	3	3	1	9
CO3	9	3	9	9	9	3	9
CO4	3	9	3	9	9	-	9
CO5	9	3	3	3	3	-	9
	39	21	27	33	27	03	45

Note: Strong- 9 Medium-3 and Low-1

பாடத்திட்டம்(Syllabus)

	தமிழ்ச்செய்யுள் : மரபுக்கவிதைகள்	
அலகு : 1	1.பாரதியார் கவிதைகள் 1. தமிழ் (நான்கு பத்தி) 2. நடிப்புச் சுதேசிகள் 2. பாரதிதாசன் கவிதைகள் **1.** நீங்களே சொல்லுங்கள் **2.** புதியதோர் உலகம் செய்வோம் 3. நாமக்கல் கவிஞர் வெ.இராமலிங்கம் பிள்ளை 1.குருதேவர் இராமகிரு'ஷ்ணர் (3 பாடல்கள்) 4. கவிமணி தேசிய விநாயகம் பிள்ளை 1.கோவில் வழிபாடு 5. அரசஞ்சண்முகனார் 1.மதுரை ஸ்ரீமீனாட்சியம்மைத் திருவடிப்பத்து	18மணிநேரம்

	(முதல் ஐந்து பாடல்கள்)	
அலகு : 2	தமிழ்ச்செய்யுள் : புதுக்கவிதைகள் 6. அன்னை - கவிஞர் கண்ணதாசன் 7. கிழக்கு விழிக்கும் நேரம் - கவிஞர் வைரமுத்து (கொடிமரத்தின் வேர்கள்) 8. அவர்கள் வருகிறார்கள் - மு.மேத்தா (சுதந்திர தாகம்) 9. புதுக்கவிதைகள் - க.நா.சுப்ரமண்யம் (கவிதை) 10. நாம் இருக்கும் நாடு - தமிழன்பன் (வாக்கு வரம் தரும் தெய்வம்) 11. தீர்த்தக்கரையினிலே - முருகு சுந்தரம் (ஒலிபெருக்கி) 12. ஹைக்கூ பூக்கள் - க.ராமச்சந்திரன்	18மணிநேரம்
அலகு : 3	தமிழ் உரைநடை இலக்கியம் சுவாமி சித்பவானந்தரின்சிந்தனைகள்	18மணிநேரம்
அலகு : 4	தமிழ் இலக்கணம் - எழுத்து 1. முதல் எழுத்துக்கள்,சார்பெழுத்துக்கள் 2. மொழி முதல் எழுத்துக்கள்,மொழி இறுதி எழுத்துக்கள் 3. வல்லெழுத்து மிகும் இடங்கள்,வல்லெழுத்து மிகா இடங்கள்	18மணிநேரம்
அலகு: 5	தமிழ் இலக்கிய வரலாறும் பயன்பாட்டுத் தமிழும் அ) 1.புதுக்கவிதையின் தோற்றமும் வளர்ச்சியும் 2.மரபுக்கவிதையின்தோற்றமும் வளர்ச்சியும் ஆ) மரபுப்பிழை நீக்குதல் - பிறமொழிச் சொற்களை நீக்குதல் - பிழையற்ற தொடரைத் தேர்ந்தெடுத்தல் - ஒருமை பன்மை மயக்கம் - ஓர் எழுத்து ஒரு மொழிக்குரிய பொருள் - ஒலி வேறுபாடுகளும் பொருள் வேறுபாடுகளும் - பொருத்தமான பொருள் - பொருத்தமான தொடர் அறிதல்.	18 மணிநேரம்

பாட நூல்கள்;(Text books)
1. தமிழ்ச் செய்யுள் தொகுப்பு (தமிழ்த்துறை வெளியீடு)
2. சுவாமி சித்பவானந்தரின் சிந்தனைகள் (தமிழ்த்துறை வெளியீடு)

பார்வை நூல்கள்(Reference Books)
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 அகாடமி, தலைமை அலுவலகம்,ரவீந்திர பவன், 35,பெரோஸ்'ா சாலை,புதுதில்லி.

கற்பிக்கும் முறைகள்;(Pedagogy)
விரிவுரை கொடுத்தல்,கலந்துரையாடல், காட்சிப் பதிவுகளின் வழியாக புலப்படுத்துதல்.

DEPARTMENT SANSKRIT
Programme: B.A./ B.Sc. (CBCS and OBE)
(For those students admitted during the Academic Year 2020-21 and after)

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

Preamble:

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

Course Outcomes (COs)

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

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

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

Mapping of CO and PO

	PO1	PO2	PO3	PO4	PO5	PO 6	PO 7
CO1	9	9	3	9	9	-	9
CO2	3	3	9	9	9	-	9
CO3	9	3	9	9	9	-	3
CO4	9	9	9	9	9	-	9
CO5	9	9	3	9	9	-	9
	39	33	33	45	45		39

Note: 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 Books

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

Reference Books

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

Part -II English (CBCS and OBE) - SEMESTER I
(For those who join in June 2020 and after)

PART II – Paper I		
Subject Title **: General English - I**		
Subject Code: P2LE11/P2CE11	Hours per week/Sem: **6/75 hrs**	Credit: **3**
Formative Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Preamble
To strength the basic English Grammar knowledge in order to utilize it for effective communication

Course objectives
1. To acquire Basics of English Grammar for Communication
2. To form sentences with the help of Basic Grammar Knowledge
3. To familiarize with Tenses and their usages to form sentences
4. To understand Active & Passive Voices and Degrees of Comparison for effective communication
5. To frame different types of sentences and use it in communication

Course Outcomes

No.	Course Outcomes	Knowledge Level (Bloom's Taxonomy)
CO 1	Acquisition of Basics of English Grammar for Communication	K1
CO 2	Formation of Sentences with the help of Basis Grammar Knowledge	K3
CO 3	Familiarization of Tenses and their usages to form sentences	K3
CO 4	Understanding of Active & Passive Voices and Degrees of Comparison for effective communication	K2
CO 5	Ability to frame different types of sentences and use it in communication	K3

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

Mapping of CO with PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	3	3	-	-	-	9
CO2	9	3	3	-	-	-	9
CO3	9	3	3	-	-	-	9
CO4	9	9	3	-	-	-	9
CO5	9	9	3	-	-	-	9
	45	27	15				36

Note: Strong -9 Medium -3 and Low -1

Syllabus
UNIT 1:   **(15 Hours)**
- Noun, Proper Noun, Common Noun, Collective Noun, Material Noun, and Abstract Noun.
- Pronoun, First Person, Second Person, Third Person, Pronouns, Reflexive Personal Pronouns.
- Adjectives
- Number (Singular and Plural)
- Gender (Masculine, Feminine, Common and Neuter)
- Verb (Weak and Strong), Present/Past/Past Participle of Strong Verbs, Main verbs, Auxiliary Verbs
- Adverb of Time/Place/Manner

UNIT II: **(15 Hours)**
- Articles
- Preposition

- ➢ Interjection
- ➢ Formation of Noun from Verbs, Adverb Formation
- ➢ Sentence Formation
- ➢ Formation of Sentences using Auxiliary Verbs

UNIT III: **(15 Hours)**
- ➢ Tense
- ➢ Affirmative/Negative/Interrogative/Exclamatory Sentences
- ➢ Positive/Negative Sentence Formation
- ➢ Yes or No type and Information Question

UNIT IV: **(15 Hours)**
- ➢ Infinitive
- ➢ Conjunction
- ➢ Modal Auxiliaries
- ➢ Passive Voice
- ➢ Positive, Comparative and Superlative Degrees

UNIT V: **(15 Hours)**
- ➢ Direct to Indirect Speech
- ➢ Idioms and Phrases
- ➢ Simple, Compound and Complex Sentences
- ➢ Agreement of Verb with the Subject

Text Book:
1. In-house Text book prepared by Department of English in consultation with experts.

Reference Books:
1. Swan, Michael. Practical English Usage, 4th Edition.OUP, 2018.
2. Quirk, Randolph. A Comprehensive Grammar of the English Language, Pearson, 2017.
3. Murthy, JD. Contemporary English Grammar for Scholars and Students.16th Edition.Book Palace, NewDelhi, 2013.
4. Karal, Rajeevan. English Grammar Just for You. OUP,2016.
5. Jospeh KV, English Grammar and Usage, McGraw Hill Education, 2nd Edition,2010.

Pedagogy
Chalk and talk, Group Discussion, PPT, Preserved animals and Field visit

Teaching Aids
Green Board, LCD Projector, Interactive White Board

Core:

PART – III : **Core Theory**		SEMESTER - I
Course Title : **General Chemistry - I**		
Course Code: 07CT11	Hours per week: 4	Credits: 4
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

Preamble

Students are enabled to
- ✓ Revive the fundamental concepts of chemistry learned at school level with detailed explanation
- ✓ Provide strong foundation on structure, properties of atoms and nature of the bonding in molecules.
- ✓ Understand the nomenclature of organic compounds, types of chemical reactions, surface chemistry and catalysis

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Recall the fundamentals of atomic structure and apply this knowledge to predict the stability of atom	K1 & K2
CO 2	Study, understand and apply the periodic properties and chemical bonding of elements	K1, K2 & K3
CO 3	Learn and apply nomenclature rule of naming organic compounds and aromaticity	K1, K2 & K3
CO 4	Learn and understand various types of organic reactions and its electronic effects	K1 & K2
CO 5	Familiar with surface chemistry and catalysis	K1

K1-knowledge   K2-Understand   K3-Apply

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CO 1	9	1	3	3	3	1	3
CO 2	9	1	3	3	3	1	3
CO 3	9	1	3	3	3	1	3
CO 4	9	1	3	3	3	1	3
CO 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 CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	9	1	1	1	3
CO 2	9	3	9	1	3
CO 3	3	1	1	1	1
CO 4	3	1	9	9	1
CO 5	9	3	3	3	3
Weightage of the course	33	9	23	15	11

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 – de Broglie equation – Heisenberg uncertainty principle – derivation of Schrodinger wave equation, significance of ψ **and** ψ^2 – radial and angular wave functions – quantum numbers – atomic orbitals - shapes of atomic s, p and d orbitals – Aufbau principle – Hund's rule – Pauli's exclusion principle – electronic configuration of elements.

UNIT-II: PERIODIC PROPERTIES & CHEMICAL BONDING - I

Periods – groups – s, p, d and f block elements –covalent radius – van der Waal's radius – ionic radius – periodic trends of ionization energy and electron affinity – definition and periodic trends of electronegativity, determination of electronegativity by Pauling's and Mulliken's scale. **Covalent bond:** Definition and characteristics of covalent bond – valence bond theory and its limitations – definition of bond length and bond energy. **Ionic Bond**: Definition and its characteristics – polar covalent bond with examples – definition and examples of dipole moment – comparison of dipole moment of NH_3 and NF_3.

UNIT- III: NOMENCLATURE AND AROMATICITY

IUPAC Nomenclature: Rules of IUPAC system for naming organic compounds – naming of acyclic and cyclic compounds – empirical formula – molecular formula – structural formula – isomerism - structural isomerism.
Aromaticity: Hückel's rule – aromatic, anti-aromatic and non-aromatic species in benzenoid and non-benzenoid compounds.

UNIT - IV: 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 cleavage – **Intermediates**: Formation, structure and stability of carbocations, carbanions, free radicals, carbene, nitrene and benzyne.

UNIT- V: SURFACE CHEMISTRY AND CATALYSIS

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.

Text Books

1. Puri, B.R., Sharma, L.R., & Kalia, K.C., *Principles of Inorganic Chemistry*, Himalaya Publishing House Pvt, Ltd., Mumbai, 2000
2. Lee, J.D., *Concise Inorganic Chemistry*, Vikas Publishing House Pvt. Ltd., New Delhi, 1982.
3. Jain, M.K. & Sharma, S.C., *Modern Organic Chemistry,* 3rd Ed., Vishal Publishing Company, 2009.
4. Bahl, A., Bhal, B.S., & Tuli, G.D., *Essentials of Physical Chemistry*, S. Chand Publishing Company, New Delhi, 2010.
5. Puri, B.R., Sharma, L.R., & Pathania, M.S., *Principles of Physical Chemistry*, Vishal Publications, 46th Ed., 2013.

Reference Books

1. Cotton, F.A., & Wilkinson, *Principles of Inorganic Chemistry*, Himalaya Publishing House Pvt, Ltd., Mumbai, 2000.
2. Morrison, R.T., Boyd, R.N. & Bhattacharjee S.K, *Organic Chemistry*, 7th Ed., Pearson, 2010.
3. Bahl, A & Bahl, B.S., *Advanced Organic Chemistry,* S. Chand & Company Ltd, New Delhi, 2012.
4. Glasstone, S., *Text Book of Physical Chemistry*, 7th Ed., Macmillan, 2012.

Core:

DEPARTMENT OF CHEMISTRY
Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2020-21 and after)

PART – III : **Core Theory**		SEMESTER - I
Course Title **: General Chemistry - II**		
Course Code: 07CT12	Hours per week: 4	Credits: 4
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

Preamble

Students are enabled to
- ✓ Compare and infer the various concepts of acids and bases and reactions in non-aqueous solvents.
- ✓ Understand the basic properties of s-block elements, preparation and properties of hydrocarbons.
- ✓ Explain the principles and ascertain the basics of chemical equilibrium and colloidal state.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Define and compare the various concepts of acids and bases and illustrate the reactions of non-aqueous solvents	K1 & K2
CO 2	Recall the basic chemistry of hydrogen, heavy water and demonstrate the properties s block elements	K1 & K2
CO 3	Understand the preparation and properties of alkanes, alkenes and alkynes	K2
CO 4	Understand the basic concept of chemical equilibrium and apply Le Chatlier's principle	K2 & K3
CO 5	Explain the various phenomena involved in colloidal state	K2

K1-Knowledge   K2-Understand   K3-Apply

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CO 1	9	1	3	1	3	3	3
CO 2	9	1	3	1	3	3	3
CO 3	9	1	3	1	3	3	3
CO 4	9	1	3	1	3	3	3
CO 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 CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	9	3	9	9	1
CO 2	9	3	3	3	1
CO 3	3	3	9	9	1
CO 4	3	1	1	1	1
CO 5	9	3	1	1	3
Weightage of the course	33	13	23	23	7

9-Strong;   3-Medium;   1-Low

UNIT-I: ACIDS AND BASES & NON-AQUEOUS SOLVENTS

Acids and bases: Arrhenius – Bronsted-Lowry (conjugate acid and base) – Lux-Flood – Lewis – Cady & Elsey – Usanovich.
Non-aqueous solvents: Classification of solvents – reactions in non-aqueous solvents with reference to liquid NH_3 and liquid SO_2.

UNIT-II: HYDROGEN & 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- III: 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 – Markounikov'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.

UNIT- IV: THERMODYNAMICS I

Basic concepts: 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: Mathematical statement of first law – 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 – enthalpies of formation, combustion and neutralization –Hess's law and its applications – Kirchoff's equation.

UNIT- V: COLLOIDAL STATE

Colloidal state: 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. & Kalia, K.C., *Principles of Inorganic Chemistry*, Vishal Publishing, 2017.
2. Jain, M.K.& Sharma, S.C., *Modern Organic Chemistry*, 3rd Ed., Vishal Publishing Company, 2009
3. Puri, B.R., Sharma, L.R. and Pathania, M.S., *Principles of Physical Chemistry*, 44th Ed, Vishal Publications, 2010.

Reference Books

1. Cotton, F.A., Wilkinson, G. & Gus, P.L., *Basic Inorganic Chemistry*, John Wiley & Sons (Asia) Pte. Ltd.
2. Lee, J.D, *Concise Inorganic Chemistry*, 5th Ed, Blackwell Science Ltd., 1996.
3. Morrison, R.T., Boyd, R.N. & Bhattacharjee, S.K, *Organic Chemistry*, 7th Ed., Pearson, 2010.
4. Finar, I.L., *Organic Chemistry*, Volume 1, 6th Ed., 2002.
5. Bahl, A & Bahl, B.S., *Advanced Organic Chemistry,* S.Chand & Company Ltd, New Delhi, 2012.
6. Bahl, A & Bahl, B.S. & Tuli, G.D., *Essentials of Physical Chemistry*, S. Chand Publishing Company, New Delhi, 2010.

Lab:

DEPARTMENT OF CHEMISTRY
Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2020-21 and after)

PART – III **: Core Lab**		SEMESTER **– I**
Course Title: Volumetric Estimation and Organic Preparation		
Course Code: 07CP23	Hours per week:2	Credits:
CIA Marks:	ESE Marks:	Total Marks:

Preamble

Students are enabled to
- ✓ Make solutions of different concentration and understand the principles behind volumetric analysis.
- ✓ Experience hands on training in volumetric titration, organic compound preparation and its recrystallization.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Define and understand the preparation of different concentrations of solution.	K1 & K2
CO 2	Interpret the principles and terminology involved in volumetric estimation.	K2
CO 3	Experiment with the acidimetry, alkalimetry and permanganometry titrations	K3
CO 4	Demonstrate the preparation and recrystallization of organic compounds	K2

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

Syllabus

UNIT-I: 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.

UNIT-II: PRINCIPLE OF VOLUMETRIC ANALYSIS

Principle of volumetric estimation – definitions of titration, standard solution, analyte, titrant, indicator, end point, equivalent point – primary standard and secondary standard – preparation of standard solution.

UNIT- III: ACIDIMETRY AND ALKALIMETRY

1. Estimation of sulphuric acid
2. Estimation of hydrochloric acid
3. Estimation of sodium carbonate
4. Estimation of sodium hydroxide

UNIT- IV: PERMANGANOMETRY

1. Estimation of oxalic acid
2. Estimation of ferrous sulphate
3. Estimation of Mohr's salt

UNIT- V: ORGANIC PREPARATION

1. Preparation of benzanilide from aniline
2. Preparation of tribromophenol from phenol
3. Preparation of urea nitrate from urea
4. Preparation of benzoic acid from ethyl benzoate

Text Books

1. Venkateswaran, V., Veerasamy, R. & Kulandaivelu, A.R., *Basic Principles of Practical Chemistry*, Sultan Chand & Sons, New Delhi, 2017.

Reference Books

1. Thomas, A.O, *B.Sc. Main Practical Chemistry*, Scientific Book Centre, Cannanore, 2003.

Allied:

Programme: B.Sc., PHYSICS, (Under CBCS and OBE)
(For those students admitted during the Academic Year 2020-21 and after)

Part III : **Allied Theory**		Semester – **I**
Course Title : **ALLIED PHYSICS – I**		
Course Code: **06AT01**	Hours Per Week : **4**	Credit: **4**
CIA Marks : **25**	ESE Marks : **75**	Total Marks : **100**

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 Outcomes (CO**)**

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

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

K1- Remembering   K2-Understanding   K3-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	(12 Hrs)
	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	
UNIT- V	GEOMETRICAL OPTICS	(12 Hrs)
	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	

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7
CO 1	9	3	9	1	3	1	1
CO 2	9	3	9	1	3	1	1
CO 3	9	3	9	1	1	1	1
CO 4	9	3	9	1	1	1	1
CO 5	9	3	3	1	1	1	1

9 – Strong   3 – Medium   1 – Low

Mapping of CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	9	9	9	3	3
CO 2	9	9	9	3	3
CO 3	9	9	9	3	9
CO 4	9	3	9	3	9
CO 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/115/104/115104088/
4. https://www.youtube.com/watch?v=bxGgcgSbQBA

DEPARTMENT OF PHYSICS

Programme: B.Sc., PHYSICS, (Under CBCS and OBE)
(For those students admitted during the Academic Year 2020-21 and after)

Part III : **Allied Practical**		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 (1st law & 2nd 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

Non Major Elective:

DEPARTMENT OF CHEMISTRY
Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2020-21 and after)

PART – IV : **Non Major Elective**		SEMESTER **-I**
Course Title: **Food Chemistry**		
Course Code: 07NE11	Hours per week:2	Credits: 2
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

Preamble

This course is offered for the ALL UG I year students (Except Chemistry)

- ✓ To provide a strong foundation on concepts and theories of Food Chemistry.
- ✓ It also helps the students to create an awareness regarding the food, nutrition and spices.
- ✓ To realize the importance of quality of food in day to day life

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Acquire the basic knowledge of food chemistry	K1
CO 2	realize the importance of health benefits of Indian spices	K1 & K2
CO 3	Know about the different types of micro organisms responsible for food deterioration and poisoning.	K2 & K3
CO 4	Understand the storage, preservation and processing of food products.	K2 & K3
CO 5	create an awareness of the food technology in India	K1 & K3

K1-knowledge   **K2-Understand**   **K3-Apply**

Syllabus

UNIT-I:**INTRODUCTION:**   **(7 Hrs)**

 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: (4 Hrs)

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: (7 Hrs)

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: (6 Hrs)

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

UNIT- V:FOOD TECHNOLOGY: (6 Hrs)

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*, Third Edition, New Age International (P) Limited, Publishers - 2002
2. Singh V.B. and Kirti Singh, *Spices*, New Age International (P) Limited, Publishers -1996.

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.

தமிழ்த்துறை,
விவேகானந்த கல்லூரி, திருவேடகம் மேற்கு.
Programme : B.A., BSc., (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2020 – 2021and after)
பாடத்திட்டத்தின் கட்டமைப்பு (PROGRAMME STRUCTURE)

UG Language PART – I TAMIL		SEMESTER : II
Subject Title : இக்காலக் கதை இலக்கியமும் மக்கள் தகவலியலும்		
Course Code : P1LT21	Hours per week : 18	Credit : 03
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

1. சமூக வெளிப்பாடுகளை உணர்த்துதல்
2. தனிமனித நேர்மை உணர்த்துதல்
3. இதழ்கள் பற்றிய அடிப்படை அறிவை புகட்டுதல்

4. சொற்களின் வகைமை அறிதல்
5. சிறுகதை - புதின 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)
CO 1	சிறுகதைகள் மற்றும் புதினத்தின் வாயிலாக தனி மனித மற்றும் சமூக ஒழுக்கங்கள் குறித்து தன்மையினை வரையறை செய்தல்.	K_1, K_2
CO 2	இதழ்கள், பேட்டி வகைகள், நிர்வாக அமைப்பு முறைகள் ஆகியன குறித்த செய்திகளை கலந்துரையாடுதல்.	K_2, K_3
CO 3	சிறுகதை, புதினம் போன்ற இக்கால இலக்கியத்தின் தன்மைகளையும், அதனைப் படைத்த படைப்பாளர்களின் வரலாற்றினையும் விவரித்தல்.	K_2, K_3
CO 4	பெயர், வினை, இடை, உரி, வினா, விடை, வேற்றுமை, தொகைகள் ஆகியன குறித்த தெளிவும், அவற்றை வகைப்படுத்தும் திறன் குறித்தும் அறிதல்.	K_2
CO 5	வாக்கியங்களைக் கண்டறிதல், சொற்களை ஒழுங்குபடுத்துதல், ஆங்கிலத்திற்கு நிகரான தமிழ்ச்சொற்களை கண்டறிதல், வழுவுச்சொற்களை நீக்குதல் போன்ற ஒரு மொழியின் பயன்பாட்டுத் தன்மையை தெளிவுறுத்தல்.	K_1, K_2, K_3

K_1-Knowledge K_2-Understand K_3-Apply

CO and PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	3	9	9	3	3	9
CO2	9	3	9	9	3	3	9
CO3	9	9	3	3	3	3	9
CO4	9	9	1	9	9	-	9
CO5	9	3	3	3	9	-	9
	45	27	25	33	27	09	45

Note: Strong -9 Medium -3 and Low -1

பாடத்திட்டம் (Syllabus)

அலகு: 1	தமிழ்ச் சிறுகதை இலக்கியம் பூ மலரும் காலம் (ஜி.மீனாட்சி)	(18 மணிநேரம்)
அலகு: 2	தமிழ் நாவல் இலக்கியம் வேரில் பழுத்த பலா (சு.சமுத்திரம்)	(18மணிநேரம்)
அலகு: 3	மக்கள் தகவலியல் 1. இதழ்கள் தொடங்குவதற்குரிய வழிமுறைகள் -செய்த நிறுவனம் தொடங்குவதற்கான முறைமை கூறல். 2. செய்தித்தாள் நிர்வாக அமைப்பு - நிர்வகிக்கும் முறை 3. பேட்டி - அதன் வகைகள் - செய்தி திரட்டும் கலையை அறிதல் 4. செய்தி - செய்தி விளக்கம் - செய்தியின் விளக்கம் மற்றும் வகைமை அறிதல் 5. பல்வேறு வகையான செய்திகள்	(18மணிநேரம்)
அலகு: 4	தமிழ் இலக்கணம் - சொல் 1 நான்கு வகைச் சொற்கள் 1. வினா - விடை வகைகள் 2. வேற்றுமைகள் 3. தொகைகள் வேற்றுமைத் தொகை, வினைத்தொகை, பண்புத்தொகை, உவமைத்தொகை, உம்மைத்தொகை, அன்மொழித்தொகை	(18மணிநேரம்)
அலகு: 5	தமிழ் இலக்கிய வரலாறும் பயன்பாட்டுத்தமிழும் அ) 1. சிறுகதையின் தோற்றமும் வளர்ச்சியும். 2. புதின இலக்கியத்தின் தோற்றமும் வளர்ச்சியும். ஆ) தொடரும் தொடர்பும் அறிதல் - பிரித்து எழுதுதல் பொருந்தாச் சொல்லைக் கண்டறிதல் - வழூவுச்சொற்களை நீக்கிய தொடரைக் குறிப்பிடுதல்- சொற்களை அகர வரிசைப்படுத்தல்- வேர்ச்சொல்லைத் தேர்வு செய்தல் - எவ்வகை வாக்கியம் எனக் கண்டு எழுதுதல் - சொற்களை ஒழுங்குபடுத்திச் சொற்றொடர் ஆக்குதல் - ஆங்கிலச்சொல்லுக்கு நிகரான தமிழ்ச் சொல் அறிதல்.	(18மணிநேரம்)

பாட நூல்கள்

1. சிறுகதைகள் பத்து - ஜி. மீனாட்சி
   நியூ செஞ்சுரி புக் ஹவுஸ்(பி)லிட்,
   41-பி, சிட்கோ இண்டஸ்டிரியல் எஸ்டேட்,
   அம்பத்தூர், சென்னை- 600 098.

2. நாவல் - வேரில் பழுத்த பலா - சு.சமுத்திரம்
   அறிவுப்பதிப்பகம் (பி) லிட்., 16(142),
   ஜானி ஜான்கான் சாலை,
   இராயப்பேட்டை, சென்னை - 600 014.

3. இதழியல் கலை (டாக்டர்.மா.பா.குருசாமி)
   தாயன்பகம்,
   6-வது தெரு, ஏ.கே.எம்.ஜி.நகர்,
   திண்டுக்கல் - 624 001.

4. தமிழ் இலக்கிய வரலாறு - முனைவர்பாக்யமேரி

நியூ செஞ்சுரி புக் ஹவுஸ்(பி)லிட்,
41-பி, சிட்கோ இண்டஸ்டிரியல் எஸ்டேட்,
அம்பத்தூர், சென்னை- 600 098.

பார்வை நூல்கள்

1. மக்கள் தகவல் தொடர்பியல் அறிமுகம் (டாக்டர் கி. இராசா)
2. இதழியல் (ச.ஈஸ்வரன்)
3. இதழியல் (டாக்டர் இரா.கோதண்டபாணி)
4. இதழியல் ஓர் அறிமுகம் (டாக்டர் அந்தோணி இராசு)
5. தமிழ் இலக்கிய வரலாறு (மு.வரதராசனார்)

Pedagogy

விரிவுரை கொடுத்தல்,கலந்துரையாடல், காட்சிப் பதிவுகளின் வழியாக புலப்படுத்துதல், கதை எழுதப் பயிற்சி கொடுத்தல், இதழ் ஒன்றை உருவாக்கக் கற்றுக்கொடுத்தல்

Teaching Aids

கரும்பலகை பயன்படுத்துதல், காட்சி திரைவழியாக புலப்படுத்துதல்.

DEPARTMENT SANSKRIT
Programme: B.A./ B.Sc. (CBCS and OBE)
(For those students admitted during the Academic Year 2010-21 and after)

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

Preamble

Sanskrit is offered as an alternative language under Part –I for B.A./ B.Sc students during first foursemesters 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
CO 1	To understand Sanskrit poetry literature	K1, K2
CO 2	Comparing literature with modern life	K2
CO 3	Classify and discuss the importance of Sanskrit literature	K2
CO 4	Describe and defend history of early Sanskrit literature	K2
CO 5	Practice Creativity and Demonstrate different aspects of life as portrayed in Sanskrit literature	K2, K3

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

CO PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO 6	PO 7
CO1	3	9	9	9	9	1	9
CO2	9	9	3	9	9	-	9
CO3	3	3	9	9	9	-	9
CO4	9	9	9	9	3	-	9
CO5	9	9	9	9	3	-	9
	33	39	39	45	33	1	45

Note: Strong -9 Medium -3 and Low -1

Syllabus

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

Unit 2: Kalividambanam- scholars - teachers- Astrologers.

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

Unit 4: Sabhāraṅjanaśatakam -Wisdom and its acquisition

Unit 5: Sabhāraṅjanaśatakam- Poetry

Text Book(s)

1. Kalividambanam and Sabhāraṅjanaśatakam 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

Part -II English (CBCS and OBE) **SEMESTER– II**
(For those who join in June 2020 onwards)

PART II – Paper II		
Subject Title **: General English-II**		
Subject Code: P2LE21/P2CE21	Hours per week/Sem: **6/75**	Credit: **3**
Formative Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Preamble

o To apply the basic English Grammar knowledge in personal and professional life
o To learn different sentence structures in order to form different kinds of sentences and utilize it for effective communication

Course Objectives

1. To acquire the ability to communicate in English at personal and professional spheres of life
2. To frame statements and questions with *be* form verbs of past, present and future tenses
3. To use Modal verbs, Gerunds and to form statements and questions with helping verbs
4. To frame sentences with the help of different sentence structures
5. To form sentences with connecting words, prepositions and to report statements, questions and instructions.

Course Outcomes

No.	Course Outcomes	Knowledge Level (Bloom's Taxonomy)
CO 1	Ability to communicate in English at personal and professional spheres of life	K3
CO 2	Knowledge on framing statements and questions with *be* form verbs of past, present and future tenses	K1
CO 3	Ability to use Modal verbs, Gerunds and to form statements and questions with helping verbs	K3
CO 4	Ability to frame sentences with the help of different sentence structures	K3
CO 5	Framing sentences with connecting words, prepositions and to report statements, questions and instructions	K3

K1-knowledge   **K2**-Understand   **K3**-Apply

Mapping of CO with PO

PO1	PO2	PO3	PO4	PO5	PO6
9	9	9	1	-	1
9	9	3	-	-	-
9	3	3	-	-	-
9	3	3	-	-	-
9	3	9	-	-	-
45	27	27	1	-	1

Note: Strong-9 Medium-3 Low- 1

Syllabus

Unit I   (15 hours)
Self-Introduction
Getting to Know
Expressing one's Interest
Talking about Places

Talking about your profession/organization
Speaking about your business
Activities at home
Likes and Dislikes

Giving directions/instructions
Saying 'Thank you'
Apologising
Asking for advice/ giving advice

Talking about the present
Talking about the past
Talking about the future

Asking for opinion/giving opinion
Making a request/ asking permission
Giving Message

Telephonic Conversation
News and Views
Narrating

General Enquiries
Short responses

Skills and Talents
Job Interviews
Short Speeches
Farewell

Unit II   (15 hours)

Understanding the sentence pattern: **I am, We are, You are, He is, She is, They are and Who is**
Understanding the Question Pattern: **Who + am/is/are+ you/he/she/they**
Words that name relationship-Friend, colleague, neighbour
Singular and Plural forms
Speech Generating Drill: Who're you? Who's he? Who's She? Who're they?

Understanding the Sentence Pattern: **He/She/They/I + am/is/are + article + name (of a profession)**
Names of profession: eg. Advocate, homemaker, etc.

Understanding the structures **How is**, **How are** and the replies to such questions under the structures **I am**, **We are**, **He is**, **She is** and **They are**.

Location Words

Understanding the question pattern **where is/are/ + a location word**
Understanding the sentence pattern **I/You/He/She/They/It + am/is/are + location word**

Time words
Understanding the question pattern: When + is + naming word
Understanding the sentence pattern: It + is + a time word

Understanding the sentence pattern: There is.., There are... and It is...
Difference between It is... and There is...

Present tense forms of 'be': am, is, are
Past tense forms of 'be': was, were
Future tense forms of 'be': will be
Sentence Patterns associated with 'be'

Yes/No Questions with the 'be' words
Formation of negative questions with 'Be'

Wh-question structures with the be forms

Unit III   (15 hours)

'Third person singular +s' rule
Sentence patterns using 'do not' and 'does not'
Question patterns using 'do' and 'does'

Giving instructions with the help of the present tense form of the action word
Asking questions about everyday activities using what, when, how, which, where, why, who and whom

Usage of 'have' and 'has'
Different meanings of 'have'

Usage of the past form of the action word
Usage of *'did not'*

Understanding how *questions* of the *past tense* are formed
Difference between *Yes/No questions* and the *Wh-questions*
Negative questions

Usage of *'will'*
Understanding how positive, negative and question sentences are made with *'will'*
Usage of *won't*
Difference between *don't, doesn't, didn't and won't*

The structure *am/is/are + -ing* words used in speaking about action going on now, planned future action and activities of temporary nature

The structure *was/were + -ing action words*
The structure *wh. words + was/were + ing*words
The connectives *when* and *while*
Difference between *am/is/are + ing* words and *was/were + ing* words

Unit IV   **(15 hours)**

Sentence pattern with *'will be + ing word'*
The structure employing *'going to'*
Question patterns with *'will be + ing words'*
Question patterns with *'going to'*
Difference between the future continuous for planned actions and the future continuous for a running action in the future

Sentence structure with *have/has + past participle* (ed/en action word) and its usage
Difference between *simple past* and *present perfect*

The structure employing *have not* and *has not*
Question patterns using *has/have + past participle*
Wh-questions with *has/have + past participle*
Difference between *did not* and *has not/ have not*
Usage of words such as yet, so far, never, since, for ages and ever

Sentence structure using *had+ past participle*
Difference between *did not* and *had not*

Sentence structure using *has been/have been + -ing*verb
Difference between the present continuous and the present perfect continuous

Usage of modals *can* and *could*
Difference between *can* and could
Difference between *I didn't* and *I couldn't*

Usage of *should*, *must* and *have to*
Usage of *had to*, *should be*, *must be* and *will have to*
Difference between *should* and *must*

Usage of *should not*, *must not*, *don't have to*, *doesn't have to* and *need not*
Difference between *need not* and *don't have to*

Usage of *shall I, can I, could I, should I*, and *may I*
Difference between *may* and *might*

Usage of *would, used to, supposed to* and *likely to*
Difference between *I used to* and *I am used to*

Unit V   **(15 hours)**

Usage of *to+ present tense action word* in a sentence
Sentence structure: *It is too + adjective + to + present tense action word*

Usage of –ing word as a naming word
Other usages of the –ing words
How prepositions are used with 'ing' words
Usage of *let* and *let us*
Usage of *let me, let him, let her, let them*, and *let it*
Exceptions of *let*
Difference between *shall we* and *let us*

Usage of connecting words such as *as if, because, till, unless, as, since*

Types of sentences
How sentences can be combined using connectives

Usage of prepositions such as in, at, for, by, on
Common errors involving prepositions
How the same prepositions can be used in various contexts

Sentence pattern using get + adjectives
Sentence pattern using get + nouns
Sentence pattern using phrasal verbs

Sentence pattern in which 'be' words are combined with the past participle
Situations that call for this pattern
How certain verbs cannot be used in the passive voice

Reported statements
Reporting questions
Types of Questions
Usage of *that*, *whether* and *if*
Where *if* or *whether* is not used
Change of tenses when a reporting occurs

Reporting instructions
Reporting someone's ideas or opinions
Difference between *said* and *told*
Difference between *asked me to* and *told me to*

Text Book:
In-house text book would be prepared by the department in consultation with the experts.

Reference Books:
1. Swan, Michael. Practical English Usage, 4th Edition.OUP, 2018.
2. Quirk, Randolph. A Comprehensive Grammar of the English Language, Pearson, 2017.
3. Murthy, JD. Contemporary English Grammar for Scholars and Students.16th Edition.Book Palace, New Delhi, 2013.
4. Karal, Rajeevan. English Grammar Just for You. OUP,2016.
5. Jospeh KV, English Grammar and Usage, McGraw Hill Education, 2nd Edition,2010.

Pedagogy
Chalk & Talk, Group Discussion, PPT

Teaching Aids
Green Board, LCD Projector, Interactive White Board

Core:

DEPARTMENT OF CHEMISTRY
Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2020-21 and after)

PART – III : Core Theory		SEMESTER - II
Course Title : **General Chemistry - III**		
Course Code: 07CT21	Hours per week: 4	Credits: 4
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

Preamble

Students are enabled to
- ✓ To revive the fundamental and basics of chemistry learned at school level with detailed explanation
- ✓ To impart knowledge in fundamental aspects of all branches of chemistry
- ✓ To acquire basic knowledge in bonding, benzene derivatives, alcohols, dilute solutions and in colligative properties

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	recall the fundamentals of bonding and theory. Apply this knowledge to predict the molecular shapes, bond order and magnetic properties	K1 & K3
CO 2	compare and contrast the structure and aromatic properties of benzene with naphthalene, anthracene and phenanthrene. Recognize and able to predict the directing properties of substituted benzene	K2 & K3
CO 3	learn the important physical properties of alcohols, thioalcohols and phenols	K1 & K2
CO 4	learn and understand the derivations and calculations related to liquids and solutions	K1
CO 5	familiar with *colligative properties* and to use them to determine the molecular weight of an unknown compound.	K1 & K3

K1-knowledge   **K2-Understand**   **K3-Apply**

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CO 1	9	1	3	1	3	1	3
CO 2	9	1	3	1	3	3	3
CO 3	9	1	3	1	3	3	3
CO 4	9	1	3	1	3	3	3
CO 5	9	1	3	1	3	1	3
	45	5	15	5	15	11	15

9-Strong;   3-Medium;   1-Low

Mapping of CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	9	3	1	1	1
CO 2	3	3	9	9	1
CO 3	3	3	9	9	1
CO 4	3	9	1	3	3
CO 5	1	9	1	1	3
	19	27	21	23	9

9-Strong;   3-Medium;   1-Low

Syllabus

UNIT-I: **CHEMICAL BONDING - II**
Covalent bond: Types of overlapping: s-s, s-p and p-p orbitals overlapping – difference between sigma and pi bonds.
Hybridization: sp^3, sp^2, sp, dsp^2 and sp^3d^2 hybridizations.
VSEPR theory: postulates, regular and irregular geometries, shapes of CH_4, NH_3, H_2O, PCl_5 and SF_6 molecules.
Molecular orbital theory: Drawbacks of VB theory, postulates of MOT, MO diagram of H_2, He_2^+, N_2, O_2 and CO.
Ionic bond: Lattice energy, Born Haber cycle, Born-Lande' equation**,** polar covalent bond, Fajan's rule.
Hydrogen bonding: Introduction, intermolecular and intramolecular hydrogen bonding.

UNIT-II: **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: *o-,p-,m*-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- 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: **SOLUTIONS OF NON-ELECTROLYTE**
Solutions of liquids in liquids: Concentration terms: molarity, molality, normality, mole fraction. Ideal solutions: Raoult's law and Henry's law – non-ideal solutions – vapour pressure-composition curves, vapour pressure-temperature curves. Azeotropes: $HCl-H_2O$ systems and ethanol-water system – fractional distillation – steam distillation
Partially miscible liquids: phenol-water, trimethylamine-water and nicotine-water systems.

Solutions of gases in liquids Factors influencing the solubility of a gas

UNIT- V: COLLIGATIVE PROPERTIES

Introduction – lowering of vapor pressure – Raoults law – determination of molecular weight from lowering of vapour pressure – experimental determination of lowering of vapour pressure by Ostwald–Walker method – depression of freezing point – determination of molecular weight from depression of freezing point – experimental determination of depression of freezing point by Beckmann method – elevation of boiling point – determination of molecular weight from elevation of boiling point – experimental determination of elevation of boiling point by Cottrell's method – osmotic pressure – determination of molecular weight from osmotic pressure – experimental determination of osmotic pressure by Berkley-Hartley method – Abnormal colligative properties – association – dissociation – Van't Hoff factor

Text Books

1. Puri, B.R., & Sharma, L.R. & Kalia, K.C, *Principles of Inorganic Chemistry*, Himalaya Publishing House Pvt, Ltd., Mumbai, 2000.
2. Jain, M.K. & Sharma, S.C., *Modern Organic Chemistry,* 3rd Ed., Vishal Publishing Company, 2009.
3. Puri, B.R., & Sharma, L.R. & Pathania, M.S, *Principles of physical chemistry*, Vishal Publications, 46th Ed., 2013.

Reference Books

1. Cotton, F.A. & Wilkinson, *Principles of Inorganic Chemistry*, Himalaya Publishing House Pvt, Ltd., Mumbai, 2000.
2. Lee, J.D., *Concise Inorganic Chemistry*, Vikas Publishing House Pvt. Ltd., New Delhi, 1982.
3. Morrison, R.T., Boyd, R.N. & Bhattacharjee S.K., *Organic Chemistry*, 7th Ed., Pearson, 2010.
4. Finar, I.L., Organic Chemistry, Volume 1, 6th Ed., 2002.
5. Bahl, A. & Bahl, B.S., *Advanced Organic Chemistry,* S.Chand & Company Ltd, New Delhi, 2012.
6. Bahl, A., Bhal, B.S. & Tuli, G.D., *Essentials of Physical chemistry*, S.Chand Publishing Company, New Delhi, 2010.
7. Glasstone, S., *Text Book of Physical Chemistry* –Macmillan. 7th Ed, 2012

Core:

DEPARTMENT OF CHEMISTRY
Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2020-21 and after)

PART – III : Core Theory		SEMESTER - II
Course Title: **General Chemistry - IV**		
Course Code: 07CT22	Hours per week: 4	Credits: 4
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

Preamble

Students are enabled to
- ✓ understand the basic concepts of nuclear chemistry
- ✓ learn the preparative methods and properties of ethers, thioethers, epoxides and organometallic reagents
- ✓ acquire knowledge about photochemistry and chemical kinetics

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level

		(according to Bloom's Taxonomy)
CO 1	explain the basic concepts of nuclear chemistry and radioactivity	K2
CO 2	understand the preparation and properties of ethers, thioethers and epoxides	K2
CO 3	outline the preparation and apply the use of organometallic reagents in synthetic organic chemistry	K2, K3
CO 4	define the laws of photochemistry and demonstrate the various photochemical phenomenon	K1, K2
CO 5	illustrate the basic theoretical concepts of chemical kinetics	K2

K1-Knowledge   K2-Understand   K3-Apply

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CO 1	9	1	3	1	3	1	3
CO 2	9	1	3	1	3	3	3
CO 3	9	1	3	1	3	3	3
CO 4	9	1	3	1	3	3	3
CO 5	9	1	3	1	3	1	3
	45	5	15	5	15	11	15

9-Strong;   3-Medium;   1-Low

Mapping of CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	9	3	1	1	1
CO 2	3	3	9	9	1
CO 3	3	3	9	9	1
CO 4	3	9	1	3	3
CO 5	1	9	1	1	3
	19	27	23	23	9

9-Strong;   3-Medium;   1-Low

Syllabus

UNIT-I: NUCLEAR CHEMISTRY

Introduction: Mass defect and binding energies of the nucleus, binding energies and nuclear stability, n/p ratio, packing fraction, nuclear shell model – Radioactivity – rate of radioactive disintegration – half-life period – nature of radiation from radioactive elements (α, β and γ rays) – nuclear fission – nuclear fusion reactions and their differences – nuclear reactors: thermal and breeder reactor – disposal of radioactive waste – Artificial transmutation of elements – induced radioactivity –applications of radioactive isotopes in agriculture, medicine and in carbon dating.

UNIT-II: 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 – THF.
Aromatic ethers-Preparation and properties of anisole and phenetole – crown ether- [18]-crown-6 – applications – PTC.
Thioethers: Preparations and properties of mustard gas.
Epoxides: Preparation and physical properties – acid and base catalysed ring opening of unsymmetrical epoxides.

UNIT- III: ORGANOMETALLIC COMPOUNDS

Introduction – Grignard reagents: preparations and synthetic applications-tetraethyllead - organolithium compounds – preparations and reactions with aldehyde, ketones and acetyl chloride – organozinc compounds – Frankland's reagent – Reformatsky reaction – organocopper compounds – Gilman's reagent – preparation and synthetic uses.

UNIT- IV: PHOTOCHEMISTRY

Introduction – Thermal reaction Vs. photochemical reaction, Grothus-Drapper law, Stark-Einstein law, Beer-Lambert's law – quantum yield – primary process and secondary process – Jablonski diagram – fluorescence, phosphorescene – photochemical rate law – kinetics of photochemical reactions: HCl, and HI – photosensitization and quenching – photosynthesis – chemiluminescence – bioluminescence.

UNIT- V: CHEMICAL KINETICS

Rate law and rate constants – order and molecularity of reactions – derivation of rate constant and half-life period for first order, second order, third order and zero order reactions – methods of determining the orders of reactions – Arrhenius rate equation – significance of energy of activation –theories of reaction rates: collision theory - derivation – limitations, absolute reaction rate theory (Concept only).

Text Books

1. Puri, B.R, Sharma, L.R., and Kalia, K.C., *Principles of Inorganic Chemistry*, 23rd Edition, Shoban Lal, Nagin Chand and Co., New Delhi, 2001.
2. Jain, M.K. and Sharma, S.C., *Modern Organic Chemistry*, 3rd Edition, Vishal Publishing Company, 2009.
3. Puri, B.R., & Sharma, L.R. & Pathania, M.S, *Principles of physical chemistry*, Vishal Publications, 46th Ed., 2013.

Reference Books

1. Cotton, F.A., Wilkinson, G., and Gaus, *P.L., Basic Inorganic Chemistry,* 3rd Ed., New York J. Wiley, 1995.
2. Lee, J.D., *Concise Inorganic Chemistry*, 5th Edition, Blackwell Science, London, 1996.
3. Morrison, R.T., Boyd, R.N. and Bhattacharjee, S.K., *Organic Chemistry*, 7th Ed., Pearson, 2002.
4. Bahl, A and Bahl, B.S., *Advanced Organic Chemistry,* S.Chand & Company Ltd, New Delhi, 2012.
5. Bahl, A., Bahl, B.S & Tuli, G.D., *Essentials of Physical Chemistry*, S.Chand Publishing Company, New Delhi, 2010.
6. Rohatgi Mukherjee, K.K., *Fundamentals of Photochemistry*, Wiley Eastern Ltd., Revised Ed., New York, 1999.
7. Laider, K.S., *Chemical Kinetics*, 3rd Ed., TMH, New York, 2005.

Lab:

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)

(For those students admitted during the Academic Year 2020-21 and after)

PART – III **: Core Lab**		SEMESTER – **II**
Course Title: Volumetric Estimation and Organic Preparation		
Course Code: 07CP23	Hours per week:2	Credits: 4
CIA Marks: 40	ESE Marks: 60	Total Marks: 100

Preamble

Students are enabled to
- ✓ Make solutions of different concentration and understand the principles behind volumetric analysis.
- ✓ Experience hands on training in volumetric titration, organic compound preparation and its recrystallization.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Define and understand the preparation of different concentrations of solution.	K1 & K2
CO 2	Interpret the principles and terminology involved in volumetric estimation.	K2
CO 3	Experiment with the acidimetry, alkalimetry and permanganometry titrations	K3
CO 4	Demonstrate the preparation and recrystallization of organic compounds	K2

K1-Knowledge   K2-Understand   K3-Apply

Syllabus

UNIT-I: **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.

UNIT-II: **PRINCIPLE OF VOLUMETRIC ANALYSIS**

Principle of volumetric estimation – definitions of titration, standard solution, analyte, titrant, indicator, end point, equivalent point – primary standard and secondary standard – preparation of standard solution.

UNIT- III: **ACIDIMETRY AND ALKALIMETRY**

1. Estimation of sulphuric acid

2. Estimation of hydrochloric acid
3. Estimation of sodium carbonate
4. Estimation of sodium hydroxide

UNIT- IV: **PERMANGANOMETRY**

1. Estimation of oxalic acid
2. Estimation of ferrous sulphate
3. Estimation of Mohr's salt

UNIT- V: ORGANIC PREPARATION

1. Preparation of benzanilide from aniline
2. Preparation of tribromophenol from phenol
3. Preparation of urea nitrate from urea
4. Preparation of benzoic acid from ethyl benzoate

Text Books

1. Venkateswaran, V., Veerasamy, R. & Kulandaivelu, A.R., *Basic Principles of Practical Chemistry*, Sultan Chand & Sons, New Delhi, 2017.

Reference Books

1. Thomas, A.O, *B.Sc. Main Practical Chemistry*, Scientific Book Centre, Cannanore, 2003.

Non Major Elective:

DEPARTMENT OF CHEMISTRY
Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2020-21 and after)

PART – IV : **Non Major Elective**		SEMESTER **-II**
Course Title: **Chemistry in Medicine**		
Course Code: 07NE21	Hours per week:2	Credits: 2
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

Preamble

Students are enabled to,
- ✓ To have knowledge of first aid and the important rules.
- ✓ To know the common chemicals in medicine
- ✓ To have awareness of some common diseases and the drugs used
- ✓ To understand the role of Anaesthetics in human

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	able to understand the basic idea of the first Aid and importance rules.	K1, K2
CO 2	list the physiological principles underlying pathogenesis and treatment of disease.	K1 & K3
CO 3	make the students to understand and appreciate the concept of chemistry in health	K1, K2
CO 4	point out the general and local Anaesthetics	K2 & K3
CO 5	know the importance of medicinal plants in human life	K1, K3

K1-knowledge   **K2-Understand**   **K3-Apply**

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 Books

1. Jayashree Ghosh, *Fundamental concepts of Applied Chemistry*, S. Chand & Co. Publisheres. 1998

Reference Books

1. Lakshmi, S. *Pharmaceutical Chemistry*, S. Chand and Sons, New Delhi, 1995.

தமிழ்த்துறை,
விவேகானந்த கல்லூரி, திருவேடகம் மேற்கு.
Programme : B.A., BSc., (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2020 – 2021and after)
பாடத்திட்டத்தின் கட்டமைப்பு (PROGRAMME STRUCTURE)

UG Language PART – I TAMIL		SEMESTER : III	
Subject Title : காப்பியழமும் பக்தி இலக்கியமும் நாடகமும்			
Course Code : P1LT31	**Hours per week : 18**		**Credit : 03**
CIA Marks : 25	ESE Marks : 75		Total Marks : 100

Preamble

1. வாழ்க்கையின் உறுதிப்பொருள்களான அறம், பொருள், இன்பம் வீடுபேறு ஆகியனவற்றை உணர்த்துதல்.
2. இறைவழிபாட்டு சிந்தனைகளை வளர்த்தல்.
3. புராண இதிகாச கருத்துக்களை நாடகம் வாயிலாக எளிமைப்படுத்தி தனிமனித நிலைகளை எடுத்துக்காட்டல்.
4. மரபுக்கவிதைகளின் வகைமைகளை அறிதல்.
5. காப்பியம் மற்றும் பக்தி இலக்கியத்தின் வரலாற்றினை அறிவித்தல்.

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)
CO 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.	K_1, K_2
CO 2	மரபு இலக்கணங்களான அணிகள், பாவகைகளின் வாயிலாக மாணவர்களின் இலக்கியச்சுவை உணர்வினை வளர்த்து, கற்பனைத் திறன்களை அறிவித்தல்.	K_2, K_3
CO 3	பக்தி இலக்கியங்களின் வாயிலாக இறைவழிபாட்டுச் சிந்தனைகளை தனிமனித வாழ்க்கை நிகழ்வுகளின் வழி வெளிப்படுத்தி, உலக இயல்புகளை மொழிந்து, பரம்பொருளை அடையக்கூடிய வழிவகைகளையும், சமரச சன்மார்க்க நெறிகளையும் தெளிவுறுத்துதல்.	K_2, K_3
CO 4	புராண, இதிகாச நாடக கதைகளின் வழி அக்காலகட்ட மக்களின் சமூக நிலைகளைக் கலந்துரையாட செய்தல்.	K_2
CO 5	காப்பியம் மற்றும் பக்தி இலக்கியம் தோன்றிய காலகட்ட வரலாற்றினை விவரித்தல். இதழ்கள் தொடர்பான சிந்தனைகள் வளர கற்றுக்கொடுத்தல்.	K_1, K_2, K_3

K_1-Knowledge K_2-Understand K_3-Apply

Mapping of CO and PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	3	3	9	3	9
CO2	9	3	3	9	9	3	9
CO3	9	3	9	9	3	3	9
CO4	9	3	3	3	9	-	9
CO5	9	3	3	9	3	-	9
	45	21	21	33	33	09	45

Note: Strong-9 Medium-3 Low- 1

பாடத்திட்டம் (Syllabus)

அலகு : 1	**தமிழ்க் காப்பிய இலக்கியம்** 1. சிலப்பதிகாரம் (வழக்குரை காதை) 2. மணிமேகலை (ஆபுத்திரன் திறம் அறிவித்த காதை) 3. கம்பராமாயணம் (வாலி வதைப்படலம்) 4. வில்லிப்புத்துரார் பாரதம்(கண்ணன் தூதுச்சருக்கம்) 5. கந்த புராணம் (அயனைச் சிறை நீக்கும் படலம்)	18மணிநேரம்
அலகு : 2	**தமிழ் பக்தி இலக்கியம்** **1.** தேவாரம் - திருஞானசம்பந்தர் (திருவேடகப் பதிகம்) **2.** திருவாசகம் - மாணிக்கவாசகர் (பிடித்த பத்து) **3.** திருமந்திரம் - திருமூலர் (10 பாடல்கள்) **4.** திருப்பாவை - ஆண்டாள் (10 பாசுரங்கள் தெரிவு செய்யப்பெற்றவை) **5.** பராபரக்கண்ணி - தாயுமானவர் (10 கண்ணிகள் தெரிவு செய்யப்பெற்றவை)	18மணிநேரம்
அலகு : 3	**நாடகம்** 1. வைகையில் வெள்ளம் வரும் - சேதுபதி	18மணிநேரம்
அலகு : 4	**தமிழ் இலக்கணம் - அணிகள்** 1.அணிகள் - உவமை - உருவகம் - பிறிது மொழிதல் - தற்குறிப்பேற்றம் வஞ்சப்புகழ்ச்சி - சிலேடை - வேற்றுமை அணி 2.பாவகைகள் - வெண்பா - ஆசிரியப்பா 3.கடிதம் வரைதல் - விண்ணப்பம் - புகார்க் கடிதம் - பாராட்டுக் கடிதம்	18மணிநேரம்
அலகு : 5	**தமிழ் இலக்கிய வரலாறும் பயன்பாட்டுத் தமிழும்** அ) 1. காப்பிய இலக்கிய வரலாறு 2. பக்தி இலக்கிய வரலாறு ஆ) பத்திரிக்கைச் செய்தி எழுதுதல் - நேர்காணல் எடுத்தல் - துணுக்குகள் எழுதுதல்.	18மணிநேரம்

பாட நூல்கள்
1. தமிழ்ச் செய்யுட் தொகுப்பு - தமிழ்த்துறை வெளியீடு
2. நாடகம் - வைகையில் வெள்ளம் வரும் - சேதுபதி.   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.

Pedagogy

விரிவுரை கொடுத்தல், கலந்துரையாடல், காட்சிப் பதிவுகளின் வழியாக புலப்படுத்துதல்.

Teaching Aids

கரும்பலகை பயன்படுத்துதல், காட்சி திரைவழியாகப் புலப்படுத்துதல்.

UG Programme,
Part -II English (CBCS and OBE) **- SEMESTER III**
(For those students who joined in the academic year 2020-2021onwards)

PART II		
Course Title : **English for Academic and Professional Excellence-I**		
Course Code: P2LE31/ P2CE31	Hours per week: **6**	Credit: **3**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Preamble:

The students are expected to inculcate English socio-linguistic competence and moral values through world literature in English for communication skills.

Course Outcome (CO):

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

	Course Outcome	**Knowledge Level (according to Bloom's Taxonomy)**		
CO1	Appraise various authors' socio-linguistic interests through prose discourses	K1	K2	K3
CO2	Develop comprehension skills through poetry	K1	K2	K3
CO3	Critique the discourses, characters and their psychological behaviour found in a English novel	K1	K2	K3
CO4	Demonstrate acquired grammar skill in listening, speaking, reading and writing	K1	K2	K3
CO5	Design and Repeat creative writing through composition exercises	K1	K2	K3

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

PO and CO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	9	9	9	9	-	9
CO2	9	3	9	9	9	-	3
CO3	9	9	9	3	9	1	3
CO4	3	9	3	-	-	-	9
CO5	9	9	9	1	-	-	3
	39	39	39	22	27	1	27

Note: Strong-9 Medium-3 Low- 1

SYLLABUS

Unit-1 Prose
1. *The Indian National Education* - Swami Chidbhavananda
    Educating the Adult (*Chapter I*)
2. *Women not the Weaker Sex* (gender)   – Mahatma Gandhi
3. *Travel by Train* – John Boynton Priestley

Unit-2 Poetry
1. *The Toys* – Coventry Patmore
2. *The Soul's Prayer* – Sarojini Naidu
3. *Where the mind is Without Fear* - Rabindranath Tagore

Unit-3 Novel
Oliver Twist - Charles Dickens [*Abridged*]
                    (For the three Sessional Exam)

Unit-4 Grammar
1. Concord and Question Tag
2. Spotting Errors
   (For the three Sessional Exam)

Unit-5 Composition
1. Covering Letter and Résumé Preparation -1 (UK)
2. Interview skills
3. Dialogue Writing

Text Book

1. Swami Chidbhavananda. The Indian National Education. Tirupparaithurai: Sri Ramakrishna Tapovanam, 2017.

2. Dr.P.C.James Daniel, ed. Gateway to English: An Anthology of Prose. Chennai: Harrows Publications, 2018.

3. Poetry. Chennai: Main Spring Publishers, (or)
  < https://www.poetryfoundation.org/poems/44845/the-toys-56d22417d5e2e>
  < https://www.poemhunter.com/poem/the-soul-s-prayer/>
  <https://www.poetryfoundation.org/poems/45668/gitanjali-35>

4. Charles Dickens, Oliver Twist. London: Wordsworth Classic, 1992.

5. Abhijit Acharijee, and Rakesh Ramamoorthy, ed. Frontiers of Communication: An Anthology of Short Stories and Prose. Chennai: Cambridge University Press, 2018.

6. KV Joseph and Ae Augustine. Trinity Grammar a Handbook. New Delhi: Trinity Press… (or)
   G.Radhakrishna Pillai. Emerald English Grammar and Composition. Emerald Publisher. (or)
   Owen Hargie, David Dickson, and Dennis Tourish. Communication Skills for Effective Management. New York: Palgrave Macmillan, 2004.

6. Hari Mohan Prasad, and Uma Rani Sinha. Objective English for Competitive Examinations. New Delhi: McGraw Hill Education, 2016. (Prescribed chapters will be given.)

Refernce Books:

1.. Swami Chidbhavananda. Vedanta Society. <https://sfvedanta.org/authors/swami-chidbhavananda/>

2. Dr.A.Shanmugakani, ed. Prose for Communication: An Anthology of Prose. Madurai: Manimekala Publishing House, 2008.

3. Charles Dickens, Oliver Twist (the Parish Boy's Progress). London: Richard Bentley, 1839.

4. K.V.Joseph. A Textbook of English Grammar and Usage. New Delhi: TATA McGraw Hill Education Private Limited, 2012.

5. A. J. Thomson, and A. V. Martinet. A Practical English Grammar. New Delhi: OUP, 1986.

6. Books by Dickens, Charles (sorted by popularity). <http://www.gutenberg.org/ebooks/author/37>

7. Mary Ellen Guffey, and Richard Almonte. Essentials of Business Communication. Toronto: Nelson Education, 2007.

8. Edgar Thorpe, and Showick Thorpe. Objective English for Competitive Examinations. New Delhi: Pearson India Education, 2017.

Pedagogy

Teacher made aids and Mechanical (ITC) Aids, Chalk and Talk with interactive session.

Note: (Additional online sources, presentation, and test will be given by the respective teachers in the English Language Lab. [Either 8.45 am to 9.30 am or 5.00 pm to 5.45 pm]).

Teaching Aids

Course Texts, Reference books, Writing Board, and Online Sources.

Core:

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)

(For those students admitted during the Academic Year 2020-21 and after)

PART – III : Core Theory		SEMESTER - III
Course Title: **Organic Chemistry - I**		
Course Code: 07CT31	Hours per week: 4	Credits: 4
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

Preamble

Students are enabled to

➢ Understand the chemistry of alkyl and aryl halides

➢ Acquired knowledge on amino, quaternary salts, nitro, diazonium and carbonyl compounds

➢ Explain the basics of stereochemistry

Course Outcomes (CO)

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

No.	Course outcome(s)	Knowledge Level (according to Bloom's Taxonomy)
CO1	Relate, outline and identify the reaction mechanism of alkyl and aryl halides	K1, K2 & K3
CO2	Explain the preparation and make use of the properties of aliphatic and aromatic nitro compounds and diazonium salts in organic chemistry	K2 & K3
CO3	Demonstrate the preparation and utilize properties of aliphatic and aromatic amines and quaternary ammonium salts	K2 & K3
CO4	Illustrate the preparation and utilize the properties of carbonyl compounds	K2 & K3
CO5	Define the basic terminology in stereochemistry and explain and apply CIP rules to identify the absolute of organic molecules	K1, K2 & K3

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

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CO 1	9	1	1	1	3	3	1
CO 2	9	1	1	1	3	3	1

CO 3	9	1	1	1	3	3	1
CO 4	9	1	1	1	3	3	1
CO 5	9	1	3	1	1	1	1
	45	5	7	5	13	13	5

9-Strong;   3-Medium;   1-Low

Mapping of CO with PSO

	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**
CO 1	3	3	9	9	3
CO 2	3	3	9	9	3
CO 3	3	3	9	9	3
CO 4	3	3	9	9	3
CO 5	1	1	3	1	9
	13	13	39	37	21

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 and 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°, 2° and 3° 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 Bouman 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 acetaldehyde and benzaldehyde – chemical tests to distinguish ketone and aldehyde.

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.

Reference Books

1. Morrison, R.T., Boyd, R.N. and Bhattacharjee S.K, *Organic Chemistry*, 7th Ed., Pearson, 2010.
2. Finar, I.L*., Organic Chemistry, Volume 2: Stereochemistry and the Chemistry Natural Products,* 5th Ed., Pearson, 2002.
3. Bruice, P.Y., *Organic Chemistry,* 7th Ed., Pearson, 2013.
4. Bahl, A and Bahl, B.S., *Advanced Organic Chemistry,* S. Chand & Company Ltd, New Delhi, 2012.
5. Smith, M.B. and March, J., *Advanced Organic Chemistry: Reactions, Mechanisms, and Structure*, 6th Ed., Wiley, 2007
6. Kalsi, P.S, *Stereochemistry: Conformation and Mechanism*, 9th Ed., New Age International Publisher, 2017.
7. Eliel, E.L., and Wilen, S.H., *Stereochemistry of Organic Compounds*, 1st Ed., John Wiley and Sons, 1994.

Core:

DEPARTMENT OF CHEMISTRY
Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2020-21 and after)

PART – III : Core Theory		SEMESTER - III
Course Title: **Physical Chemistry - I**		
Course Code: 07CT32	Hours per week: 3	Credits: 4
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

Preamble

Students are enabled to
- ✓ Identify the unique vocabulary associated with thermodynamics and explain the basic concepts of second and third law of thermodynamics
- ✓ Provide importance of buffer solution and solubility product in chemical phenomena
- ✓ Understand relation between physical properties and chemical structure of compounds
- ✓ Acquire knowledge on distribution law and its applications

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	To understand the concept of thermodynamics and apply it to physical and chemical system	K1, K2 & K3
CO 2	Learn the concept of residual entropy and entropy of perfectly crystalline solid with respect to temperature	K1 & K2
CO 3	Learn the concept of buffer solution, hydrolysis of salts and solubility product and apply it to solutions	K1, K2 & K3
CO 4	Learn and understand various physical properties and its uses to determine unknown chemical structure of the compounds	K1 & K2
CO 5	To understand Nernst distribution law and utilize it in various applications	K2 & K3

K1-knowledge   K2-Understand   K3-Apply

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CO 1	9	1	3	1	1	1	1
CO 2	9	1	3	1	1	1	1
CO 3	9	1	3	1	1	1	1
CO 4	9	1	3	1	1	1	1
CO 5	9	1	3	1	1	1	1
	45	5	15	5	5	5	5

9-Strong;   3-Medium;   1-Low

Mapping of CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	9	1	1	1	1
CO 2	9	1	1	1	1
CO 3	9	9	1	1	3
CO 4	9	9	1	1	3
CO 5	9	3	1	1	3
	45	23	5	5	11

9-Strong;   3-Medium;   1-Low

Syllabus

UNIT-I: SECOND   LAW   OF   THERMODYNAMICS–I
Need of second law – spontaneous process – cyclic process – 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 – entropy changes of an ideal gas in different process – entropy of mixture of ideal gases.

UNIT- II: SECOND LAW OF THERMODYNAMICS–II AND THIRD LAW OF THERMODYNAMICS

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: IONIC EQUILIBRIA

Buffer solution: Buffer index, mixture of weak acid and its salt, mixture of weak base and its salt – Henderson-Hasselbalch equation.

Hydrolysis of salts: salts of strong acids and strong bases, salts of weak acids and strong bases, salts of strong acids and weak bases, salts of weak acids and weak bases – determination of degree of hydrolysis by indirect method and freezing point depression method.

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- IV: 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.

UNIT- V: DISTRIBUTION LAW

Nernst's distribution law – conditions for validity of the distribution law – thermodynamic derivation – association of solute – dissociation of solute – solute enters into chemical combination – limitation of distribution law – Henry's law – determination of equilibrium constant from distribution coefficient – Application of distribution law: Determination of association and dissociation, distribution indicators, study of complex ion and solvent Extraction.

Text Books

1.Puri, B.R., Sharma, L.R., and Pathania, M.S., *Principles of Physical Chemistry*, 46th Ed., Vishal Publications, 2013.
2.ArunBahl, B.S.Bhal and G.D.Tuli, *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. Kapoor, K. L., *A Text book of Physical Chemistry*, **4th Ed.**, McGraw Hill Education, 2017
4. **Barrow, G.M.,** *Physical Chemistry,* 5th Ed., McGraw Hill Education**, 2006**
5. Glasstone, S., *Thermodynamics for chemists*, EWP, 2008
6. Maron, S.H., and Prutton, C.F., *Principles of Physical Chemistry*, 4th Ed., Oxford & IBH publishing co.Pvt.Ltd., New Delhi, 1972

Lab:

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2020-21 and after)

PART – III **: Core Lab**		SEMESTER **- III**
Course Title: Semi Micro Inorganic Qualitative Analysis and Organic Estimation		
Course Code: 07CP43	Hours per week:3	Credits:
CIA Marks:	ESE Marks:	Total Marks:

Preamble

Students are enabled to
- ✓ Analyze the Inorganic salt by doing systematic practical skill and understand the principles behind semi micro inorganic analysis
- ✓ Experience hands on training in organic estimation of organic compounds.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Define and understand the Inorganic qualitative analysis	K1 , K2 & K3
CO 2	Experiment with the Inorganic qualitative analysis to find out the anion present in given inorganic salt	K1 , K2 & K3
CO 3	Experiment with the Inorganic qualitative analysis to find out the cation present in given inorganic salt	K1 , K2 & K3
CO 4	Demonstrate the estimation of phenol	K1 , K2 & K3
CO 5	Demonstrate the estimation of aniline	K1 , K2 & K3

K1-Knowledge   K2-Understand   K3-Apply

Syllabus

UNIT-I: Introduction to semi micro inorganic qualitative analysis and organic estimation

UNIT-II: Analysis of mixture containing ONE anion:
    The following anions may be given
    Anions : CO_3^{2-}, Br^-, NO_3^-, SO_4^{2-}, F^-, BO_3^{2-}, $C_2O_4^{2-}$, $^-$, PO_4^{3-}
UNIT- III: Analysis of mixture containing ONE cation

    The following cations may be given
    Cations : Pb^{2+}, Cu^{2+}, Zn^{2+}, Mn^{2+}, Co^{2+}, Ni^{2+}, Ca^{2+}, Ba^{2+}, $^+NH_4$, Mg^{2+}

UNIT- IV: Estimation of Phenol (Bromination method)

UNIT- V: Estimation of aniline (Bromination method)

Text Books

1.Venkateswaran, V., Veerasamy, R. & Kulandaivelu, A.R., *Basic Principles of Practical Chemistry*, Sultan Chand & Sons, New Delhi, 2017.

Reference Books

1.Thomas, A.O, *B.Sc. Main Practical Chemistry*, Scientific Book Centre, Cannanore, 2003.

DEPARTMENT OF MATHEMATICS
Programme: B.Sc. MATHEMATICS (Under CBCS and OBE)
(For those students admitted during the Academic Year 2020 - 21 and after)

PART – III **: Allied**	SEMESTER **- III**
Course Title **: MATHEMATICS – I**	
Course Code: **05AT01**	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 Outcomes (CO)

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

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

K1-Remebering   K₂-Understanding   K₃-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	**(18 Hrs)**

		and its maximum value – Divergence and curl of a vector – solenoidal and irrotational vectors (Simple problems only).	
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 CO with PO

CO – PO Mapping for Course Code: 05AT01

05AT01	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	-	3	3	3	3	3
CO2	9	-	3	3	3	3	3
CO3	9	-	3	3	3	3	3
CO4	9	-	3	3	3	3	3
CO5	9	-	3	3	3	3	3
Weightage of the course	45	-	15	15	15	15	15
Weighted percentage of Course contribution to POs	3	0	2	2	2	4	1

Mapping of CO with PSO

CO – PSO Mapping for Course Code: 05AT01

05AT01	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	9	3	9	3	9
CO2	9	3	9	3	9
CO3	9	3	9	9	3
CO4	9	9	3	9	3
CO5	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

Expansion of Trigonometry Ratio: https://youtu.be/6Rw-GMEjQ8shttps://youtu.be/giAjpfwC2LE
https://youtu.be/2VMiwNcg0ek
Inverse Trigonometry Ratio: https://youtu.be/YXWKpgmLgHk

https://youtu.be/w9sjzaXEGVw
https://youtu.be/ADpxUQMCSng
Hyperbolic function: https://youtu.be/PtKQKc629v8
Differential calculus: https://youtu.be/A6Ad7VnSlZE
https://youtu.be/UwmWTxAXMk4 , https://youtu.be/n2HDbExJWBU , https://youtu.be/om8OkTVrSbU
Integral calculus: https://youtu.be/iDSc2o-wE4I
Vector Integration: https://youtu.be/K37VbB5Ukxk
Vector differentiation: https://youtu.be/FfJtVvQtqTM
Gauss divergence theorem: https://youtu.be/kox4HHL43oM
Stock's Theorem: https://youtu.be/MZnymin9i3s
Green's Theorem: https://youtu.be/6fJE3vvjB8o

DEPARTMENT OF ZOOLOGY
Programme: B.Sc., Zoology, (Under CBCS and OBE)
(For those students admitted during the Academic Year 2020 - 21 and after)

PART – III**: Allied**	SEMESTER **- III**
Course Title**: ANIMAL ORGANISATION**	

Course Code: **09AT01**	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 Outcomes (CO)

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

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

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

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7
CO 1	9	3	-	3	9	9	3
CO 2	9	1	3	3	3	9	3
CO 3	9	1	9	3	9	3	3
CO 4	9	1	9	3	3	3	3
CO 5	9	1	9	9	9	9	3

	45	7	30	21	33	33	15	

Mapping of CO with PSO

Department	Botany					Chemistry				
PSO/CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	1	3	1	9	2	3	-	1	1	-
CO 2	1	1	-	3	1	3	-	-	-	-
CO 3	-	3	2	3	1	1	1	-	1	-
CO 4	-	1	3	2	1	-	-	-	-	-
CO 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 **(12 Hrs)**
– 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

UNIT-II: 1. Feeding and digestion in Amoeba and Frog. **(12 Hrs)**
2. Respiration in Amoeba, Cockroach, Gills in Fish and Lungs in bird.

UNIT- III: 1. Circulatory system in Earthworm and Calotes. **(12 Hrs)**
2. Locomotion in Amoeba and Earthworm: Flight mechanism in Pigeon.

UNIT- IV: 1. Nervous system of Earthworm and Frog. **(12 Hrs)**
2. Receptors – photoreceptors of insects and man. Human ear.

UNIT- V: 1. Excretion in Amoeba, Earthworm and Frog. **(12 Hrs)**
2. Reproductive system of Rabbit.

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

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

E - Resources
https://www.slideshare.net/badshah77/zoologic-al-nomenclatures-5
https://www.slideshare.net/badshah77/ist-lecture-1
https://www.slideserve.com/remington/principles-of-taxonomy
https://www.slideshare.net/alice91827/nutrition-in-amoeba-46887840
https://www.slideshare.net/sabidasamad93/nutrition-in-amoeba-53683796
https://www.slideshare.net/ayesahn1951/paramecium-61896792
https://www.microscopemaster.com/paramecium.html
https://www.slideshare.net/manishdash1/flight-adaptation-and-mechanism-of-flight-in-birds
https://www.biologydiscussion.com/zoology/birds/flight-mechanism-in-pigeons-discussed-birds/41214
https://microbiologynotes.com/nervous-system-of-earthworm/
https://www.studyandscore.com/studymaterial-detail/earthworm-nervous-system-and-sense-organs

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 ZOOLOGY
Programme: B.Sc., Zoology, (Under CBCS and OBE)
(For those students admitted during the Academic Year 2020 - 21 and after)

PART – III: Allied		SEMESTER - III
Course Title: **PRACTICAL - I**		
Course Code: **09AP03**	Hours per week: **2**	Credits: **4**
CIA: **40 Marks**	ESE: **60 Marks**	Total: **100 Marks**

Preamble
Visualize, analyse and observe the various types of organisms in microbes, invertebrata and chordata, their organ systems, adaptations, their diversity and behavioral patterns.

Course Outcomes (CO)
On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Acquire knowledge on the body systems in the representative animals	K1,K2,K3
CO 2	Notify the specific characters, identifying structures in the preserved, stuffed and dried animals.	K1,K2,K3
CO 3	Observe the microscopic organisms to analyse their survival skills.	K1,K2,K3
CO 4	Demonstrate the staining and mounting techniques in microbes and representative insects.	K1,K2,K3
CO 5	Trace the entrepreneurial skills, biodiversity, habitat, environment through the field visit.	K1,K2,K3

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

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7
CO 1	3	-	-	-	3	3	1
CO 2	3	-	-	-	3	9	3
CO 3	1	-	-	1	3	3	1
CO 4	1	-	-	1	1	3	3
CO 5	-	-	9	3	3	9	3
	8	-	9	5	13	27	11

Mapping of CO with PSO

Department	Botany					Chemistry				
PSO/CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5

CO 1	-	3	1	3	1	1	-	1	1	1
CO 2	-	1	1	3	-	1	-	-	3	1
CO 3	-	-	1	1	1	-	-	1	1	1
CO 4	-	1	9	3	3	-	-	-	-	3
CO 5	-	1	9	9	1	1	-	-	-	-
	-	**6**	**21**	**19**	**6**	3	**-**	2	5	6

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

Syllabus

1. Observation of the following -Spotters   **(12 Hrs)**

- Paramoecium conjugation
- Obelia (entire)
- Hydra (entire)
- Taenia (entire)
- Scolex of Taenia
- Ascaris male and female
- Neries (entire)
- Penaeus
- Pila (entire) and shell of Fresh water mussel)
- Starfish (entire)
- Amphioxus, Balanoglossus, Scoliodon
- Cobra, Viper, Pigeon
- Skull of Pigeon dorsal and ventral view
- Pectoral girdle of pigeon
- Fore and hind limb of Frog
- Synsacrum of bird

2. Simple staining of Bacteria from milk and sewage water.
3. Mounting of mouth parts of Mosquito, Housefly and Honey bee.
4. Identification of Ascaris (male & female) and Tapeworm.
5. Identification of egg, larva, pupa and adult of silk moth.
6. Dissection to show silk glands.
7. Common appliances used in silkworm rearing and apiculture.
8. Visit to Biogas production, Mushroom culture and Fish culture centres.

Text Books

1.Kapoor, 2014 Practical Zoology, Silver Line Publications, Allahabad, Uttrapradesh

Reference Books

1. Pechenik, Jan A 2014 – Biology of the Invertebrates, Tata Mcgraw – Hill Pub. Company Ltd., New Delhi
2. Vasantika Kashyap, 2013, Life of Invertebrates, Second Revised Edition, Vikas Pub. House Pvt. Ltd., New Delhi
3. Kotpal, R.L. 2012. Modern Text Book of Zoology, Invertebrates (Animal diversity – I), Rastogi Publications, Meerut
4. Barnes, R.D. 2006,Invertebrate Zoology, IV Edition, Holf Saunders International edition
5. Ekambaranatha Ayyar and Ananthakrishnan, T.N. 2005, A manual of Zoology, volume I, Invertebrate, Viswanathan (Printers and Publishers) Pvt. Ltd., ChennaiKotpal, R.L. 2011. Vertebrates, Rastogi Publications

6. Gupta R.C and Girish Chopra, 2003 - Comparative Anatomy of Chordates – R.Chand & Co, New Delhi
7. Newmann, 1981, The Phylum chordata, Biology of vertebrates and their kin, Satish Book Enterprises, Agra.

Pedagogy

Chalk & Talk, PPT Presentation

Teaching Aids

Green Board, & Interactive White Board

Skill Based:

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)

(For those students admitted during the Academic Year 2020-21 and after)

PART – IV : **Skill Based Theory**		SEMESTER **-III**
Course Title **: Medicinal &Pharmaceutical Chemistry**		
Course Code: 07SB31	Hours per week: 2	Credits: 2
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

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 Outcomes (CO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	to understand the basic idea of the first Aid and importance rules.	K1, K2&K3
CO 2	list the physiological principles underlying pathogenesis and treatment of disease.	K1, K2 &K3
CO 3	make the students to understand and appreciate the concept of chemistry in local anaesthetics	K1, K2 &K3
CO 4	point out the general and local analgesic, antipyretic and anti-inflammatory agents.	K1, K2 &K3
CO 5	know the importance of antiseptics and disinfectants	K1, K2 &K3

    K1-knowledge   K2-Understand   K3-Apply

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, anaesthetics, advantage and disadvantages of vinyl ether, cyclopropane, chloroform, haloethane, trichloroethylene.

Intravenullar Anaesthetics

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

Unit-IV:Analgesic, Antipyretic and Anti inflammatory agents

Analgesic: Definition, narcotic analgesic, morphine and its derivative, pethidine and methadone. non- narcotic analgesic.

Antipyretic analgesics: salicylic acid derivatives, indole derivatives and *p*-aminophenolderivatives.

Anti-inflammatory:paracetamol, naproxen and ibuprofen (threptic uses and structure only).

Unit-V: Antiseptics and Disinfectants

Definitionuses phenol derivative, halogen compounds, bleaching powder - organic mercurial's – formaldehyde and its derivatives, nitro furan derivatives-distinction between disinfectants and antiseptics

Text Book

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

Reference Books

1. Lakshmi, S. *Pharmaceutical Chemistry*, S. Chand and Sons, New Delhi, 1995.

2. Ashutoshkar,S.*Medicinal Chemistry*, New Age International Publisher, New Delhi, 3rd Edn., 2006.

தமிழ்த்துறை,
விவேகானந்த கல்லூரி, திருவேடகம் மேற்கு.
Programme : B.A., BSc., (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2020 – 2021and after)
பாடத்திட்டத்தின் கட்டமைப்பு (PROGRAMME STRUCTURE)

UG Language PART – I TAMIL		SEMESTER : IV
Subject Title : சங்க இலக்கியமும் நீதி இலக்கியமும்		
Course Code : P1LT41	**Hours per week : 18**	**Credit : 03**
CIA Marks : 25	ESE Marks : 75	Total Marks : 100

Preamble

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.

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)
CO 1	பண்டைத் தமிழர்களில் ஒரு சமூகம் சார்ந்த ஒழுக்கங்கள் குறித்த நிலையினை வரையறை செய்தல்.	K_1, K_2

CO 2	ஐந்திணை மக்களின் அகஒழுக்கங்கள் குறித்த செய்திகளை கலந்துரையாடுதல்.	K_2, K_3
CO 3	சங்க இலக்கியம் மற்றும் நீதி இலக்கிய காலகட்டங்களில் வாழ்ந்த மக்கள் மற்றும் அவர்களின் வாழ்க்கையினை பதிவுசெய்த படைப்பாளர்கள் ஆகியோரின் வரலாற்றினை விவரித்தல்.	K_2, K_3
CO 4	பழங்கால மக்களின் அகம், புறம் தொடர்பான வாழ்க்கை நிகழ்வுகளின் மரபுநிலைகள் குறித்த திறன்களை அறிவித்தல்.	K_2
CO 5	வாக்கியங்களைக் கண்டறிதல், சொற்களை ஒழுங்குபடுத்துதல், ஆங்கிலத்திற்கு நிகரான தமிழ்ச்சொற்களை கண்டறிதல், வழுவுச்சொற்களை நீக்குதல் போன்ற ஒரு மொழியின் பயன்பாட்டுத் தன்மையை தெளிவுறுத்தல்.	K_1, K_2, K_3

K_1-Knowledge K_2-Understand K_3-Apply

Mapping of CO with PO

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	3	9	9	9	9	9
CO2	9	9	9	9	9	3	9
CO3	9	9	9	9	9	9	9
CO4	9	3	3	9	9	9	9
CO5	9	3	9	9	9	3	9
	45	27	39	45	45	33	45

Note: 9-Strong**; 3-**Medium**; 1-**Low

பாடத்திட்டம் (Syllabus)

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) 1. புறப்பொருள் (புறத்திணைகள் - வெட்சி முதல் பெருந்திணை வரையுள்ள 12திணைகள்) 2. 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 (Text Books)

1.தமிழ் செய்யுட் தொகுப்பு (தமிழ்த்துறை வெளியீடு)

பார்வை நூல்கள் (Reference Books)

1. தமிழ் இலக்கிய வரலாறு - சி.சேதுராமன் பாவை பப்ளிகேஷன்ஸ், 16(142) ஜானிஜான்கான் சாலை, இராயப்பேட்டை, சென்னை - 600014.

2.

2. தமிழ் இலக்கிய வரலாறு - முனைவர்பாக்யமேரி நியூ செஞ்சுரி புக் ஹவுஸ்(பி)லிட், 41-பி, சிட்கோ இண்டஸ்டிரியல் எஸ்டேட், அம்பத்தூர், சென்னை- 600 098.

Pedagogy

விரிவுரை கொடுத்தல், கலந்துரையாடல், காட்சிப் பதிவுகளின் வழியாக புலப்படுத்துதல், பயிற்சி கொடுத்தல்.

Teaching Aids

கரும்பலகை பயன்படுத்துதல், காட்சி திரைவழியாக புலப்படுத்துதல்.

DEPARTMENT SANSKRIT
Programme: B.A./ B.Sc. (CBCS and OBE)
(For those students admitted during the Academic Year 2010-21 and after)

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

Preamble:

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

Course Outcomes (COs)

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

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

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

PO and CO mapping

	PO1	PO2	PO3	PO4	PO5	PO 6	PO 7
CO1	9	9	9	9	3	-	3
CO2	9	9	3	9	3	3	3
CO3	9	9	3	9	9	-	3
CO4	3	9	9	9	9	-	3
CO5	9	9	9	9	9	3	3
	39	45	33	45	33	6	15

Note: 9-Strong**; 3-**Medium**; 1-**Low

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 personaluse.

Unit 3: Karṇabhāra up to Karṇa revealing his life history to Śalya, Dramas of Bhāsa, spoken Sanskrit forEducational purpose

Unit 4: Karṇabhāra up to the curse of Karṇa by Paraśurāma, Dramas of Kālidāsa, Moral and social aspects of dramas of Kālidāsa, spoken Sanskrit for commercial purpose.

Unit 5: Karṇabhāra up to the end of the play, Dramas of Bhavahūti, Moral and social aspects of dramas of Bhavahūti and other dramas,

Text Book(s)

1. Karṇabhāra of Bhāsa, pub. By R.S. Vadyar & sons, Palakkad, Kerala, 2004
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 PublishersPrivate Limited, Delhi, 2017.

Pedagogy

Chalk & Talk, Group Discussion, PPT

Teaching Aids

Green Board, LCD Projector, Interactive White Board

UG Programme,
Part -II English (CBCS and OBE) - SEMESTER IV
(For those students who joined in the academic year 2020-2021onwards)

PART II
Course Title : **English for Academic and Professional Excellence-II**

Course Code: P2LE41/ P2CE41	Hours per week: **6**	Credit: **3**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Preamble:

The students are expected to inculcate English socio-linguistic competence and moral values through world literature in English for communication skills.

Course Outcome (CO):

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

State One	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)		
CO1	Examine authors' motivations on life-training through various discourses	K1	K2	K3
CO2	Demonstrate the power of rhetoric skills through dramatic interactions	K1	K2	K3
CO3	Identify and demonstrate language skill and proficiency through objective English for competitive examinations/methods	K1	K2	K3
CO4	Author effective discourses for Public Speaking through acquired grammar skills	K1	K2	K3
CO5	Weigh current global issues through soft skills trained lessons and create writing through composition tools	K1	K2	K3

K1- Remembering   K2 – Understanding   K3 – Applying

CO and PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	3	9	9	9	-	3
CO2	9	3	9	9	9	3	3
CO3	9	3	3	-	-	-	3
CO4	9	9	9	1	1	-	3

CO5	9	9	9	3	3	3	3
	45	27	39	22	22	6	15

Strong -9　　　**Medium -3**　　　**Low -1**

SYLLABUS

Unit-1 Prose

The Indian National Education by Swami Chidbhavananda
1. The Teacher
2. The Student
3. University Education on the Gurukula Pattern

Unit-2 Drama
1. William Shakespeare's *The Merchant of Venice*
   (Act-IV, Scene-I: Court scene)
2. Shakespeare's *Julius Caesar*
   (Act-III, Scene-II: Mark Antony and Brutus Speech)
3. Shakespeare's *Twelfth Night*
   (Act-V, Scene-I: Before Olivia's House)

Unit-3 English for Competitive Examinations
1. Synonyms and Antonyms
2. One word Substitution & Analogy
3. Foreign Words and Phrases in English

Unit-4 Art of Public Speaking Skills
1. Master of Ceremony/Anchoring Skills
2. Welcome Address, Introducing a Speaker,
3. Presidential Address, Keynote or Chief Guest's Address and Vote of Thanks

Unit-5 Soft-Skills for Capacity Building
1. *Interpersonal skills (Greetings* and Leave-taking Etiquette etc.)
2. Group Discussion for Placement
3. Covering Letter and Résumé Preparation -2 (USA)

Course Text:

1. Swami Chidbhavananda. *The Indian National Education*. Tirupparaithurai: Sri Ramakrishna Tapovanam, 2017.
2. Richard Proudfoot, et al. *The Arden Shakespeare Complete Works*. London: Bloomsbury, 2016. (Prescribed Acts will be given.)
3. Bikram K. Das. *Functional Grammar & Spoken & Written Communication in English*. New Delhi: *Orient BlackSwan*, (or) Mary Ellen Guffey, and Richard Almonte. *Essentials of Business Communication*. Toronto: Nelson Education, 2007.
4. Dale Carnegie. *The Art of Public Speaking.* Massachusetts: Wyatt North Publishing, 2013.
5. Hari Mohan Prasad, and Uma Rani Sinha. *Objective English for Competitive Examinations*. New Delhi: McGraw Hill Education, 2016. (Prescribed chapters will be given.)

Refernces

1. Swami Chidbhavananda. *Vedanta Society*. <https://sfvedanta.org/authors/swami-chidbhavananda/>
2. Edgar Thorpe, and Showick Thorpe. *Objective English for Competitive Examinations*. New Delhi: Pearson India Education, 2017.
3. W M. Cullen Bryant, ed. *The Complete Works of Shakespeare.* New York: The Amies Publishing Company, 1888.
4. William James Craig, ed. *The Complete Works of William Shakespeare (The Oxford Shakespeare.* London: Oxford University Press, 1914.

5. Stephen E Lucal. *The Art of Public Speaking.* New York: McGraw-Hill Education, 2015.

6. K.V.Joseph. *A Textbook of English Grammar and Usage*. New Delhi: TATA McGraw Hill Education Private Limited, 2012.

Pedagogy:

Teacher made aids and Mechanical (ITC) Aids, Chalk and Talk with interactive session.
Note: (Additional online sources, presentation, and test will be given by the respective teachers in the English Language Lab. [*Either 8.45 am to 9.30 am or 5.00 pm to 5.45 pm*]).

Core:

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)

(For those students admitted during the Academic Year 2020-21 and after)

PART – III : Core Theory		SEMESTER - IV
Course Title : **Inorganic Chemistry - I**		
Course Code: 07CT41	Hours per week: 4	Credits: 4
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

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 Outcomes (CO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Compare, contrast and discuss the basic properties p-block elements and its compounds of carbon and boron families	K2
CO2	Explain the basic properties of nitrogen and oxygen families and illustrate the preparation, properties and structures of their compounds	K1 & K2
CO 3	Explain and summarize the basics of chemistry of halogens and noble gas	K3
CO 4	Describe and compare the basic properties of transition and inner transition elements	K2
CO 5	Outline the various principles and methods involved in metallurgy	K1 & K3

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CO 1	9	1	1	1	3	3	1
CO 2	9	1	1	1	3	3	1
CO 3	9	1	1	1	3	3	1
CO 4	9	1	1	1	3	3	1
CO 5	9	1	3	1	3	9	3
	45	5	7	5	15	21	7

9-Strong;   3-Medium;   1-Low

Mapping of CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	9	9	3	3	1
CO 2	9	9	3	3	1

CO 3	9	9	3	3	1
CO 4	9	9	3	3	1
CO 5	3	9	1	3	3
	39	45	13	15	7

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 of 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 & 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 properties of lanthanides and actinides.

Comparison of characteristics 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,* 20th Ed., Sultan Chand and Sons, 2015.

Reference Books

1. Cotton, F.A., Wilkinson, G. and Gus, P.L., *Basic Inorganic Chemistry*, 3rd Ed., John Wiley & Sons (Asia) Pte. Ltd., 2007.

2. Lee, J.D, *Concise Inorganic Chemistry*, 5th Ed, Blackwell Science Ltd., 1996.

Core:

DEPARTMENT OF CHEMISTRY
Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2020-21 and after)

PART – III **: Core Theory**		SEMESTER **- IV**
Course Title: **Physical Chemistry - II**		
Course Code: 07CT42	Hours per week: 3	Credits: 4
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

Preamble

Students are enabled to
- ✓ To obtain the knowledge on design and development of materials with pre-required properties based on understanding the structure of solids in its influence on physical-chemical properties
- ✓ Understand and identify the similarities and differences among important classes of materials
- ✓ Understand states of mater in gaseous state and Determine the difference between solids and gases

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Learn the arrangement of atoms or ions in a crystal lattices and sketch the seven crystal systems and fourteen Bravais lattices.	K1 & K2
CO 2	Correlate X-ray diffraction information with crystal structure, understand the conducting behavior and point defects in crystalline solids	K1 & K2
CO 3	Familiar with different types of crystals and liquid crystal	K1, K2 & K3
CO 4	Describe the assumptions made in the kinetic-molecular theory and how the distribution of speeds of gas molecules change with temperature	K1 & K2
CO 5	Explain anomalous behavior of real gas, types of intermolecular forces in gases and methods of liquefaction of gases	K1

K1-knowledge   **K2-Understand**   **K3-Apply**

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CO 1	9	1	1	1	1	3	1
CO 2	9	1	1	1	1	3	1
CO 3	9	1	1	1	1	3	1
CO 4	9	1	1	1	1	3	1
CO 5	9	1	1	1	1	3	1

	45	5	5	5	5	15	5

9-Strong;   3-Medium;   1-Low

Mapping of CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	9	1	1	1	1
CO 2	9	1	1	1	1
CO 3	9	1	1	1	1
CO 4	9	1	1	1	1
CO 5	9	1	1	1	1
	45	5	5	5	5

9-Strong;   3-Medium;   1-Low

Syllabus

UNIT-I:SOLIDSTATE-I

Crystalline solid and amorphous solid – polymorphism – allotropy – interfacial angle – unit cell space 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 – law of constancy of interfacial angle – law of rational indices.

UNIT- II: SOLID STATE-II

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 – 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.

UNIT- III: SOLID STATE – III

Types of crystals: Molecular crystal: Ammonia and water – Covalent crystal: Diamond and graphite – Ionic crystals: rock salt, zinc blende – Born-Lande equation (without derivation) – radius ratio rule – Metallic crystal: Electron sea model – quasi crystal.

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

UNIT- IV: GASEOUS STATE-I

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- V: GASEOUS STATE-II

Deviation of real gases from ideal behaviour– compressibility factor – effect of temperature on deviation from ideal behavoiour – derivation of van der Waals equation – Dieterici equation – Berthelot equation – Clausius equation – Redlic-Kwong equation – Intermolecular forces: ion-dipole, dipole-dipole interaction, dipole-induced dipole, London dispersion forces, van der Waals forces, hydrogen bonds.

Text Books

1. Puri, B.R., Sharma, L.R., and Pathania, M.S., *Principles of Physical Chemistry*, 46th Ed., Vishal Publications, 2013.

Reference Books

1. ArunBahl, B.S.Bhal and G.D.Tuli, *Essentials of Physical chemistry*, S.Chand Publishing Company, New Delhi, 2014.
2. Glasstone, S., *Text Book of Physical Chemistry*, 7th Ed., Macmillan, 2012.
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

Lab:

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)

(For those students admitted during the Academic Year 2020-21 and after)

PART – III **: Core Lab**		SEMESTER **- IV**
Course Title: Semi Micro Inorganic Qualitative Analysis and Organic Estimation		
Course Code: 07CP43	Hours per week:3	Credits: 4
CIA Marks: 40	ESE Marks: 60	Total Marks: 100

Preamble

Students are enabled to
- ✓ Analyze the Inorganic salt by   doing systematic practical skill and understand the principles behind semi micro inorganic analysis
- ✓ Experience hands on training in organic estimation of organic compounds.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Define and understand the Inorganic qualitative analysis	K1 , K2 & K3
CO 2	Experiment with the Inorganic qualitative analysis to find out the anion present in given inorganic salt	K1 , K2 & K3
CO 3	Experiment with the Inorganic qualitative analysis to find out the cation present in given inorganic salt	K1 , K2 & K3
CO 4	Demonstrate the estimation of phenol	K1 , K2 & K3
CO 5	Demonstrate the estimation of aniline	K1 , K2 & K3

K1-Knowledge   K2-Understand   K3-Apply

Syllabus

UNIT-I: Introduction to semi micro inorganic qualitative analysis and organic estimation

UNIT-II: Analysis of mixture containing ONE anion:
   The following anions may be given
   Anions : CO_3^{2-}, Br^- , NO_3^-, SO_4^{2-}, F^-, BO_3^{2-}, $C_2O_4^{2-}$, $^-$, PO_4^{3-}
UNIT- III: Analysis of mixture containing ONE cation

   The following cations may be given
   Cations : Pb^{2+}, Cu^{2+}, Zn^{2+}, Mn^{2+}, Co^{2+}, Ni^{2+} , Ca^{2+}, Ba^{2+}, $^+NH_4$, Mg^{2+}

UNIT- IV: Estimation of Phenol (Bromination method)

UNIT- V: Estimation of aniline (Bromination method)

Text Books

1.Venkateswaran, V., Veerasamy, R. & Kulandaivelu, A.R., *Basic Principles of Practical Chemistry*, Sultan Chand & Sons, New Delhi, 2017.

Reference Books

1.Thomas, A.O, *B.Sc. Main Practical Chemistry*, Scientific Book Centre, Cannanore, 2003
.

DEPARTMENT OF MATHEMATICS
Programme: B.Sc. MATHEMATICS (Under CBCS and OBE)
(For those students admitted during the Academic Year 2020 - 21 and after)

PART – III **: Allied**	SEMESTER **- IV**
Course Title **: MATHEMATICS – II**	
Course Code:**05AT02**	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 Outcomes (CO)

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

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

CO – PO Mapping for Course Code: 05AT02

05AT02	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	-	3	9	3	3	3
CO2	9	-	3	9	3	3	3
CO3	9	-	3	9	3	3	3
CO4	9	-	3	9	3	3	3
CO5	9	-	3	9	3	3	3
Weightage of the course	45	-	15	45	15	15	15
Weighted percentage of Course contribution to POs	3	0	2	5	2	4	1

Mapping of CO with PSO

CO – PSO Mapping for Course Code: 05AT02

05AT02	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	9	9	9	3	3
CO2	3	3	3	3	3
CO3	9	3	3	3	9

CO4	9	3	3	3	3
CO5	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 coefficents

DEPARTMENT OF MATHEMATICS
Programme: B.Sc. MATHEMATICS (Under CBCS and OBE)
(For those students admitted during the Academic Year 2020 - 21 and after)

PART – III **: Allied**		SEMESTER **- IV**
Course Title **: MATHEMATICS – III**		
Course Code: **05AT03**	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 Outcomes (CO)

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

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

K1-Remebering   **K₂-Understanding**   **K₃-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: $f(p, q) = 0$ –	**(9 Hrs)**

	Type II: $z = px + qy + f(p,q)$ – Type III: $f(z,p,q) = 0$ - Type IV: $f_1(x,p) = f_2(y,q)$.		
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		Chapter 4 (Section: 4.1-4.3)
2		Chapter 4 (Section: 4.4)
3	1	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 CO with PO

CO – PO Mapping for Course Code: 05AT03

05AT03	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	9	-	-	-	-	-	3
CO2	9	-	-	-	-	-	3
CO3	9	-	-	-	-	-	3
CO4	9	-	-	-	-	-	3
CO5	9	-	-	-	-	-	3
Weightage of the course	45	-	-	-	-	-	15
Weighted percentage of Course contribution to POs	3	0	0	0	0	0	1

Mapping of CO with PSO

CO – PSO Mapping for Course Code: 05AT03

05AT03	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	9	9	3	3
CO2	3	9	9	3	3
CO3	3	9	9	3	3
CO4	3	9	9	3	3
CO5	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

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

DEPARTMENT OF ZOOLOGY

Programme: B.Sc., Zoology, (Under CBCS and OBE)
(For those students admitted during the Academic Year 2020 - 21 and after)

PART – III: Allied	SEMESTER - IV
Course Title: **BIOLOGY AND HUMAN WELFARE**	
Course Code: **09AT02**	Hours per week: **4**	Credits: **4**
CIA: **25 Marks**	ESE: **75 Marks**	Total: **100 Marks**

Preamble

To enable the students to develop knowledge on various diseases, transmission and remedies. Also develop knowledge on entrepreneurial avenues in biology.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Acquire knowledge on structure, mode of infection, development and remedies of virus and viral diseases.	K1
CO 2	Understand the structure, mode of infections, biology and remedies of bacteria and bacterial diseases.	K2
CO 3	Impart knowledge on differential diseases caused by fungal, protozoan and helminthes.	K2
CO 4	Explore the avenues, opportunities and limitations of sericulture, fish culture and vermiculture	K2
CO 5	Trace the organisation, characteristics, candidates, culture and entrepreneurial values of biogas, mushroom culture, apiculture.	K3

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

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7
CO 1	3	-	9	3	3	1	1
CO 2	3	-	9	3	3	1	1

CO 3	3	-	9	3	3	1	-
CO 4	3	-	3	1	-	9	3
CO 5	3	-	3	1	-	9	3
	15	-	33	11	9	21	8

Mapping of CO with PSO

Department	Botany					Chemistry				
PSO/CO	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**
CO 1	-	3	1	2	1	3	-	-	1	-
CO 2	-	1	1	3	-	3	-	-	-	-
CO 3	-	-	1	1	1	1	-	-	1	-
CO 4	-	1	9	3	3	-	-	-	1	-
CO 5	-	1	9	9	1	-	-	-	-	-
	-	6	21	18	6	7	-	-	3	-

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

Syllabus

UNIT-I:	a. Structure of a typical virus	**(12 Hrs)**
	b. Brief account on Viral diseases	
	c. Polio, Rabies AIDS and COVID-19	
UNIT-II:	a. Structure of typical Bacteria	**(12 Hrs)**
	b. Brief account on Bacterial diseases	
	c. Cholera, Tuberculosis and Tetanus	
UNIT- III:	a. Fungal diseases – Ringworm and Black piedra	**(12 Hrs)**
	b. Protozoan diseases – Amoebic dysentery and Malaria	
	c. Helminth parasites – Ancylostoma and Wucheraria	
UNIT- IV:	a. Sericulture – Scope – Silkworm biology – Life cycle – common diseases and control – silkworm rearing methods.	**(12 Hrs)**
	b. Fish culture – Scope and Importance – types of culture – diseases and control – maintenance of fish pond.	
	c. Vermiculture – Features of exotic and indigenous species – rearing and culturing – Characteristics of Vermicast and Vermiwash – Economics of vermiculture	
UNIT- V:	a. Biogas production – characteristic features of biogas – production of biogas – uses	**(12 Hrs)**
	b. Mushroom culture – nutritive and medicinal value – Morphology of Indian oyster mushroom – cultivation of paddy straw mushroom – Advantages.	
	c. Apiculture – biology of honey bee – bee hive – honey extraction – medicinal value – bee wax and bee venom.	

Text Books
- Text Book of Clinical Protozoology – N.S. Ruprah, Oxonian Press.
- Text Book of Microbiology – 2004 Ananthanarayanan, Orient Longman.

Reference Books

- Text Book of Preventive and Social Medicines – Park and Davis.
- Handbook on Mushrooms – 1988. Nita Bahi, Oxford and IBH.
- Biogas Technology- A Practical Handbook – Khandelwal & S.S. Mahdi.
- An Introduction to Sericulture Ganga shetty, Oxford and IBH.
- Vermicomposting for sustainable agriculture 2005 Gupta, Agrobios.

E - Resources

https://www.slideshare.net/Punjabia/virus-61954814
https://youtu.be/i0ZabxXmH4Y
https://www.slideshare.net/jrudyr/bacteria-2652076
https://www.slideshare.net/EmmanuelItighise/nematode-221702914
https://www.slideshare.net/tintujohnson77/sericulture-41012739
https://www.slideshare.net/BishwasKafle/fish-culture-system
https://youtu.be/MYj13FB_Iac
https://www.slideshare.net/chanthirasekarSekar/apiculture-232840908

Pedagogy

Chalk & Talk, PPT Presentation

Teaching Aids

Green Board, & Interactive White Board

DEPARTMENT OF ZOOLOGY

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

(For those students admitted during the Academic Year 2020 - 21 and after)

PART – III: **Allied**		SEMESTER **- IV**
Course Title**: PRACTICAL - I**		
Course Code: **09AP03**	Hours per week: **2**	Credits: **4**
CIA: **40 Marks**	ESE: **60 Marks**	Total: **100 Marks**

Preamble

Visualize, analyse and observe the various types of organisms in microbes, invertebrata and chordata, their organ systems, adaptations, their diversity and behavioral patterns.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Acquire knowledge on the body systems in the representative animals	K1,K2,K3
CO 2	Notify the specific characters, identifying structures in the preserved, stuffed and dried animals.	K1,K2,K3
CO 3	Observe the microscopic organisms to analyse their survival skills.	K1,K2,K3
CO 4	Demonstrate the staining and mounting techniques in microbes and representative insects.	K1,K2,K3
CO 5	Trace the entrepreneurial skills, biodiversity, habitat, environment through the field visit.	K1,K2,K3

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

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO7
CO 1	3	-	-	-	3	3	1
CO 2	3	-	-	-	3	9	3
CO 3	1	-	-	1	3	3	1
CO 4	1	-	-	1	1	3	3
CO 5	-	-	9	3	3	9	3
	8	-	9	5	13	27	11

Mapping of CO with PSO

Department	Botany					Chemistry				
PSO/CO	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	-	3	1	3	1	1	-	1	1	1
CO 2	-	1	1	3	-	1	-	-	3	1
CO 3	-	-	1	1	1	-	-	1	1	1
CO 4	-	1	9	3	3	-	-	-	-	3
CO 5	-	1	9	9	1	1	-	-	-	-
	-	6	21	19	6	3	-	2	5	6

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

Syllabus

1. Observation of the following -Spotters   **(12 Hrs)**

- Paramoecium conjugation
- Obelia (entire)
- Hydra (entire)
- Taenia (entire)
- Scolex of Taenia
- Ascaris male and female
- Neries (entire)
- Penaeus
- Pila (entire) and shell of Fresh water mussel)
- Starfish (entire)
- Amphioxus, Balanoglossus, Scoliodon
- Cobra, Viper, Pigeon
- Skull of Pigeon dorsal and ventral view
- Pectoral girdle of pigeon
- Fore and hind limb of Frog
- Synsacrum of bird

2. Simple staining of Bacteria from milk and sewage water.
3. Mounting of mouth parts of Mosquito, Housefly and Honey bee.
4. Identification of Ascaris (male & female) and Tapeworm.

5. Identification of egg, larva, pupa and adult of silk moth.

6. Dissection to show silk glands.

7. Common appliances used in silkworm rearing and apiculture.

8. Visit to Biogas production, Mushroom culture and Fish culture centres.

Text Books

Kapoor, 2014 Practical Zoology, Silver Line Publications, Allahabad, Uttrapradesh

Reference Books

- Pechenik, Jan A 2014 – Biology of the Invertebrates, Tata Mcgraw – Hill Pub. Company Ltd., New Delhi
- Vasantika Kashyap, 2013, Life of Invertebrates, Second Revised Edition, Vikas Pub. House Pvt. Ltd., New Delhi
- Kotpal, R.L. 2012. Modern Text Book of Zoology, Invertebrates (Animal diversity – I), Rastogi Publications, Meerut
- Barnes, R.D. 2006,Invertebrate Zoology, IV Edition, Holf Saunders International edition
- Ekambaranatha Ayyar and Ananthakrishnan, T.N. 2005, A manual of Zoology, volume I, Invertebrate, Viswanathan (Printers and Publishers) Pvt. Ltd., ChennaiKotpal, R.L. 2011. Vertebrates, Rastogi Publications
- Gupta R.C and Girish Chopra, 2003 - Comparative Anatomy of Chordates – R.Chand & Co, New Delhi
- Newmann, 1981, The Phylum chordata, Biology of vertebrates and their kin, Satish Book Enterprises, Agra.

Pedagogy

Chalk & Talk, PPT Presentation

Teaching Aids

Green Board, & Interactive White Board

Skill Based:

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)

(For those students admitted during the Academic Year 2020-21 and after)

PART – IV : **Skill Based Theory**		SEMESTER -IV
Course Title **: BIOMOLECULES**		
Course Code: 07SB41	Hours per week: 2	Credits: 2
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

Preamble

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

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)

CO 1	to understand the basic idea of the amino acids	K1, K2& K3
CO 2	make the students to understand and appreciate the concept of proteins	K1, K2 & K3
CO 3	make the students to understand and appreciate the concept of chemistry enzymes	K1, K2 & K3
CO 4	point out the general nucleic acid.	K1, K2 & K3
CO 5	know the importance of lipids.	K1, K2 & K3

K1-knowledge   K2-Understand   K3-Apply

Syllabus

UNIT-I: **Lipids**

Definition, classification of simple, compound and derived lipids –Fatty acids –nomenclature and importance - tests to check purity of fats and oils – iodine number – saponification number,Reichert – Meissl (RM) number, acid number.

UNIT-II:**Amino acidsand Proteins**

Amino acids

Classification –synthesis of α-amino acids (Gabriel phthalimide and Strecker synthesis), properties of amino acids,-colour tests of amino acids -Peptide bond.

Proteins

Definition - General introduction, classification- simple protein – conjugated protein derived protein- Nutritional classification of proteins, primary, secondary, tertiary and quaternary structure of proteins (elementary idea).Properties of proteins – denaturation .

UNIT- III:**Nucleic acids**

Introduction, structuralaspects, nucleosides andnucleotides,Double helical structure of DNA (Watson - Crick Model), various forms of DNA. Structure of RNA and it types, messenger RNA (mRNA), transfer RNA (tRNA) and ribosomal RNA (rRNA) -biological difference between DNA and RNA.

UNIT- IV: **Enzymes**

Definition, nomenclature and classification, enzyme action, Fischer – Lock and Key modeland induced fit models or (Koshland's model), active site, Enzyme inhibition, mechanism of inhibition (competitive, non- and uncompetitive and allosteric).enzyme specificity, coenzyme –isoenzymes- immobilization of enzymes.

UNIT- V: **Vitamins**

Introduction, nomenclature and classification of vitamins – fat soluble (A, D, E, and K), water soluble (B_1, B_2 B_5,B_6 and B_{12}) chemical name, functions and deficiency, antivitamins.

Text Books

2. Sathyanarayana, U.and chakrapani, U. *Biochemistry Books* and Allied (P) Ltd. Kolkata3rd Ede.

3. Lehninger, *Principles of Biochemistry*, Fourth Edition, by David L. Nelson and

Reference Books

1. Robert L.Caret, Katherine J. Denniston, Joseph J. Topping, *Principles and Applications oforganic*

and biological chemistry, WBB publishers, USA, 1993.

2. Jain, J. L. *Biochemistry*, Sultan Chand and Co.1999

3. MazurA. and Harrow, B. *Text book of biochemistry*, 10th Ede, W.B. Saunders Co. Philadelphia,

Core:

DEPARTMENT OF CHEMISTRY
Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2020-21 and after)

PART – III **: Core Theory**		SEMESTER **- V**
Course Title **: Organic Chemistry - II**		
Course Code: 07CT51	Hours per week: 5	Credits: 4
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

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 Outcomes (CO)

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

No.	Course outcome(s)	Knowledge Level (according to Bloom's Taxonomy)
CO1	Relate and explain the preparation and properties of mono and dicarboxylic acids	K1 & K2
CO2	Demonstrate the preparation and properties of carboxylic acid derivatives and utilize of the synthetic utility of active methylene compounds	K2 & K3
CO3	Demonstrate and apply the chemistry of heterocyclic compounds	K2 & K3
CO4	Identify and outline the mechanism of naming reactions and reagents	K2 & K3
CO5	Relate and apply the detailed knowledge of conformational analysis	K2 & K3

K1-Knowledge   K2-Understand   K3-Apply

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7

CO 1	9	3	3	1	3	3	3
CO 2	9	3	3	1	3	3	3
CO 3	9	3	3	1	3	3	3
CO 4	9	3	3	1	3	3	3
CO 5	9	3	3	1	3	3	3
Weightage of the course	45	15	15	5	15	13	15

9-Strong;   3-Medium;   -Low

Mapping of CO with PSO

	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**
CO 1	3	3	9	9	3
CO 2	3	3	9	9	3
CO 3	3	3	9	9	3
CO 4	3	3	9	9	3
CO 5	3	1	3	3	3
Weightage of the course	15	13	39	39	15

9-Strong;   3-Medium;   1-Low

Syllabus

UNIT – 1: 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 – glycollic acid, action of heat on α,β and γ-hydroxy acids.
UNIT – 2: 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 – 3: HETEROCYCLIC COMPOUNDS
Single ring heterocyclics: Preparation and chemical properties of furan, pyrrole, thiophene and pyridine.
Condensed ring heterocyclics: Preparation and chemical properties of indole, quinoline and isoquinoline.
UNIT-4: 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–5: 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. & 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. & Bhattacharjee S.K, *Organic Chemistry*, 7th Ed., Pearson, 2010.
2. Bahl, A & 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.

Core:

DEPARTMENT OF CHEMISTRY
Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2020-21 and after)

PART – III **: Core Theory**		SEMESTER **- V**
Course Title: **Inorganic Chemistry - II**		
Course Code: 07CT52	Hours per week: 5	Credits: 4
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

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 Outcomes (CO)
On the successful completion of the course, students will be able to

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Compile and gain knowledge of theories andisomerismsof coordination compounds.	K1& K2
CO2	Assimilate and interpret elementary concepts and bonding theoriesof coordination compounds.	K1&K3
CO 3	Infer and deduce the mechanism for reaction of complexes.	K2 & K3

CO 4	Learn the basics and applications of organometallic compounds.	K2& K3
CO 5	Substantiate the role of various metal ions in the function of biological systems.	K1 & K2

K1-Knowledge   K2-Understand   K3-Apply

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CO 1	9	3	3	1	3	3	3
CO 2	9	3	3	1	3	3	3
CO 3	9	3	3	1	3	3	3
CO 4	9	3	3	1	3	3	3
CO 5	9	3	3	1	3	1	3
Weightage of the courses	45	15	15	5	15	13	15

9-Strong;   3-Medium;   1-Low

Mapping of CO with PSO

	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**
CO 1	3	3	3	3	1
CO 2	3	3	3	3	1
CO 3	3	3	3	3	1
CO 4	3	3	3	3	1
CO 5	3	1	3	1	1
Weightage of the courses	15	13	15	13	5

9-Strong;   3-Medium;   1-Low

Syllabus

UNIT-I: COORDINATION CHEMISTRY – I
Introduction-double salt, complex compounds –ligand, coordination number, coordination sphere –ligands and its classification– chelates and their uses – Werner's theory – Sidgwick's concept – 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 diagram for $[Co(NH_3)_6]^{3+}$ and $[CoF_6]^{3-}$.

UNIT-III: COORDINATION CHEMISTRY– 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 behaviorof 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-stuctural 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. &Kalia, K.C., *Principles of Inorganic Chemistry*, Vishal Publishing, 2017.
2. Soni, P.L. &Katyal, M. *Text book of inorganic chemistry,* Sultan Chand and Sons.

Reference Books
1. 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.
2. Shriver, D.F. and Atkins, P.W., Inorganic chemistry, 3rd Ed., Oxford University Press, London, 2001.
3. Malik, W.U., Tuli, G.D. &Madan, R.D., *Selected topics in inorganic chemistry,* S.Chand Publishing.
4. Ajai Kumar, *Coordination chemistry,* Aaryush Educations, Ghaziabad, 2014.
5. AjaiKumar, *Organometallic and bioinorganic chemistry,* Aaryush Educations, Ghaziabad, 2014.
6. Lee, J.D, *Concise Inorganic Chemistry*, 5th Ed, Blackwell Science Ltd., 1996.

Lab:

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)

(For those students admitted during the Academic Year 2020-21 and after)

PART – III **: Core Lab**		SEMESTER **- V**
Course Title **:** Practical Physical Chemistry		
Course Code: 07CP53	Hours per week:5	Credits: 4
CIA Marks: 40	ESE Marks: 60	Total Marks: 100

Preamble

Students are enabled to

- ✓ Understand the principle of thermochemistry, chemical kinetics, potentiometric and conductometric titrations.
- ✓ Gain knowledge about the phase transformations of different systems.

Course Outcomes (CO)

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

CO Number	CO Statement	Knowledge Level
CO1	understand the enthalpy of solubility of solution	K4
CO2	examine the strength of the solutions and K_a values by kinetic methods	K3
CO3	analyse the molecular weight of chemical compounds from K_f values by Rast micro method	K4
CO4	analyze Phase diagrams	K4 & K3
CO5	analyse the conductometric and potentiometric titration	K4

Syllabus

UNIT-I

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 Book

1. VenkatesanV.Veeraswamy R. andKulandaivelu A.R. *Basic Principles of Practical Chemistry*, 2nd Ed., Sultan Chand and Sons Publication, New Delhi, 1997.

Reference Books

1. Thomas, A.O., *Text Book of Practical Chemistry* Scientific Publication, 4th Revised Edition, 1976.
2. Viswanathan B. & Raghavan P.S. *Practical Physical Chemistry Viva Books*,3rd Ed 2009
3. Levitt B.P. *Findlay's Practical Physical Chemistry*, 9th Ed., Longman Publications1973,
4. Palmer G. *Experimental Physical Chemistry,* 1st Ed., Cambridge University Press1964.
5. Yadav J. B., *Advanced Practical Physical Chemistry*, 22ndEd., GOEL publishing House, Krishna Prakashan Media Ltd, 2005.
.

Lab:

DEPARTMENT OF CHEMISTRY
Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2020-21 and after)

PART – III **: Core Lab**		SEMESTER **- V**
Course Title **:** Organic analysis and Gravimetric Estimation		
Course Code: 07CP62	Hours per week:6	Credits:
CIA Marks:	ESE Marks:	Total Marks:

Preamble

Students are enabled to
- ✓ Understand the principle of analysis of organic compounds and gravimetric estimation

Course Outcomes (CO)

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic principles of organic analysis	K3
CO2	Get practical skill on organic analysis	K4
CO3	Get practical skill on preparation of organic compounds	K4
CO4	Understand the principles of gravimetric estimation	K1 & K2
CO5	Analysis of Lead, Barium, Calcium and copper by Gravimetrically	K4

K1-Knowledge K2-Understand K3-Apply   K4 – Analyze

Syllabus

UNIT-I

Analysis of presence of special elements (N, S and Halogens), saturated /Unsaturated and Aromatic / Aliphatic.

UNIT-II

ANALYSIS OF FUNCTIONAL GROUPS

Systematic analysis of an organic compound containing one or two functional groups.

Carboxylic acids, phenols, aldehydes, ketones, esters, nitro compounds, primary amines, aliphatic diamide, diamide containing sulphur and Carbohydrates (reducing and non-reducing sugar).

UNIT- III

Preparation of suitable solid derivatives for the confirmation of functional groups.

UNIT- IV: GRAVIMETRIC ESTIMATION – I

Introduction – Apparatus used in gravimetric analysis, Sintered silica crucible, desiccators – Care and use of desiccators – Experimental techniques in Gravimetric analysis, precipitation, digestion, filtration, washing, drying – Common errors in gravimetric estimation.

UNIT- V: GRAVIMETRIC ESTIMATION – II

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. VenkatesanV.Veeraswamy R. and Kulandaivelu A.R. *Basic Principles of Practical Chemistry*, 2nd Ed., Sultan Chand and Sons Publication, New Delhi, 1997.

Reference Books

1. Thomas, A.O., *Text Book of Practical Chemistry* Scientific Publication, 4th Revised Edition, 1976.

Elective:

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)

(For those students admitted during the Academic Year 2020-21 and after)

PART – III **: Elective Theory**	SEMESTER **- V**

Course Title **: Physical Chemistry-III**		
Course Code: 07EP5A	Hours per week:5	Credits: 5
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

Preamble

Students are enabled to

➢ Grasp 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 Outcomes (CO)

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

No.	Course outcome(s)	Knowledge Level (according to Bloom's Taxonomy)
CO1	Compute conductance and recite the diverse laws governing electrochemistry	K1, K2 & K3
CO2	Appreciate the theory of electrochemical cells and correlate them with thermodynamic phenomenon	K1, K2 & K3
CO3	Narrate the vital uses of emf measurements in everyday life	K1, K2 & K3
CO4	Identify the symmetry operation, order and group	K1, K2 & K3
CO5	State the theory behind phase rule	K1, K2 & K3

K1-Knowledge   K2-Understand   K3-Apply

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CO 1	9	3	3	1	3	3	3
CO 2	9	3	3	1	3	3	3
CO 3	9	3	3	1	3	3	3
CO 4	9	3	3	1	3	1	3
CO 5	9	3	3	1	3	1	3
	45	15	15	05	15	11	15

9-Strong;   3-Medium;   1-Low

Mapping of CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	3	9	1	1	3
3CO 2	3	9	1	1	3
CO 3	3	9	1	1	3

CO 4	3	1	1	1	3
CO 5	3	9	1	1	1
	15	37	5	5	3

9-Strong;   3-Medium;   1-Low

Syllabus

UNIT- 1: ELECTROLYTIC CONDUCTANCE

Electrolytic conductance – specific, equivalent and molar conductance, variation with dilution – Cell constant – Ionic mobility, Grothus type mechanism – transport number – determination 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 Huckle theory of strong electrolytes – Onsager equation (derivation not required).

UNIT - 2: 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 - 3: APPLICATIONS OF EMF MEASUREMENTS

Determination of activity co-efficients, transport number, valency of ions, solubility product constant, pH using hydrogen, quinhydrone and glass electrodes – Potentionmetric 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 - 4: GROUP THEORY

Symmetry-a fascinating phenomenon – Group theory concept – symmetry element- symmetry operation – Group postulates – Types of groups: Abelian, non-abelian and cyclic groups – order of a group, sub-group, point group and geometry 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, similarity transformation and conjugate elements, class.

UNIT - 5: PHASE RULE

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, Sharma and Pathania, Principles of Physical Chemistry, Vishal publishing company, New Delhi, 47th Edition

Reference Books

1. Arun Bahl, B.S.Bahl and G.D.Tuli, Essentials of Physical chemistry, S.Chand Publishing company, New Delhi, 2010 Edition.

2. Gurdeep Raj, Advanced physical chemistry, S. Chand Publishing company, New Delhi, 2008 edition.
3. Cotton.F.A, Chemical applications of group theory, 2nd edition, Wiley eastern Limited, 1997.
4. Raman.K.V, Group theory and its applications to chemistry, Tata Mcgraw Hill, company limited, New Delhi 1990.

Skill Based:

DEPARTMENT OF CHEMISTRY
Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2020-21 and after)

PART – IV: **Skill Based Theory**		SEMESTER -V
Course Title: **WATER ANALYSIS**		
Course Code: 07SB51	Hours per week: 2	Credits: 2
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

Preamble

Students are enabled to
- ✓ Develop theoretical aquatic chemistry basis and use the principles for the evaluation of water quality.
- ✓ Analyze how aquatic chemistry principles can be applied in natural water resources and in treatment of drinking water and wastewater.

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Define basic water quality terms; explain the main physical, chemical and biological parameter of water.	K1 &K2
CO 2	Design and explain basic water treatment processes.	K2
CO 3	Develop innovative methods of produce soft water for industrial use and potable water at cheaper cost.	K3
CO 4	Critically analyse theory and techniques and apply them to the problem of restoring a degraded urban stream.	K3
CO 5	Develop skill in experimental and data interpretation.	K2 & K3

K1-Knowledge   K2-Understand   K3-Apply

Syllabus

UNIT-I

1.1 Introduction - characteristics of water - alkalinity - hardness - unit of hardness - total solids - oxidation - transparency - silica content.

1.2 Water quality parameters: physical, chemical and biological water quality parameter – water quality standards for drinking water – BIS and WHO.

UNIT-II

2.1 Purification of water for drinking purpose – Sedimentation – filtration and disinfection – Osmosis.

2.2 Water softening methods – clark's process – modified lime soda process – Ion exchange process – demineralization of water.

UNIT- III

3.1 Desalination of brackish water – electrodialysis – reverse osmosis – removal of Ca, Mn and Silicic acid.

3.2 Determination of hardness of water – complexometric method using EDTA – expressing 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 – A restoration case study: Ganga action plan: objectives implementation and drawbacks – rain water harvesting – water recycling - the water prevention and control of pollution Act 1974.

UNIT- V

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

Text Books

1. Sharma, B.K. *Industrial chemistry (including chemical - engineering),* Goel publishing house, Meerut - 2000.
2. WHO, *International standards for drinking water*, World Health Organization, Geneva -1992

B.Sc. Chemistry CBCS Syllabus **- SEMESTER – V**
(For those who join in June 2016 and after)

Part – IV : Common Subject Theory		
Subject Title : **Environmental studies**		
Subject Code: **ESUG51**	Hours per week: **2**	Credit: **2**
Sessional Marks: **25**	Summative Marks: **75**	Total Marks: **100**

Objectives

To enable students to
 - ➢ *Disseminate information of Environment of national and international issues*
 - ➢ *Environmental consciousness creation among the students*

Syllabus

Unit-I

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

Unit-II

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

Unit-III

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

Unit-IV

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

Unit-V

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

Text book:

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

Pedagogy

Chalk and talk, Group Discussion and PPT

Core:

DEPARTMENT OF CHEMISTRY
Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2020-21 and after)

PART – III : Core Theory		SEMESTER - VI
Course Title: **Organic Chemistry - III**		
Course Code: 07CT61	Hours per week:6	Credits: 4
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

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 Outcomes (CO)

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

No.	Course outcome(s)	Knowledge Level (according to Bloom's Taxonomy)
CO1	Classify the carbohydrates and explain its chemical properties	K2
CO2	Define and explain the basic chemical properties of terpenoids, alkaloids and steroids	K1 & K2
CO3	Interpret and make use of the chemistry of amino acids, peptides, chemotherapy and dyes	K2 & K3
CO4	Outline and identify the mechanism of molecular rearrangement.	K2 & K3
CO5	Define and illustrate the organic photochemical and pericyclic reactions	K1 & K2

K1-Knowledge   K2-Understand   K3-Apply

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CO 1	9	3	3	1	3	3	3
CO 2	9	3	3	1	3	3	3
CO 3	9	3	3	1	3	3	3
CO 4	9	3	3	1	3	3	3
CO 5	9	3	3	1	3	3	3
Weightage of the course	45	15	15	5	15	15	15

9-Strong;   3-Medium;   1-Low

Mapping of CO with PSO

	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	3	3	9	9	3
CO 2	3	1	9	9	3
CO 3	3	3	9	9	3
CO 4	3	1	9	9	1
CO 5	3	1	9	3	1
Weightage of the course	15	9	45	39	11

9-Strong;   3-Medium;   1-Low

Syllabus

UNIT – 1: CARBOHYDRATES
Classification and general properties, glucose and fructose (open chain and cyclic structures)-Glucose-oxidation, osazone formation, Fischer'-Killiani synthesis, Ruff degradation, anomers, epimers, mutarotation, oxidation of monosaccharides (using Benedict's and Tollen's reagents), interconversion of glucose and fructose and vice versa, determination of configuration of monosaccharides- Disaccharides-sucrose, maltose, cellobiose and lactose (structures only) and polysaccharides-starch-amylose and amylopectin (structure and properties)-structure of cellulose.

UNIT – 2: 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, esterogen and thyroxin. (Synthesis and structural elucidation is not required).

UNIT – 3: 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.

Peptides-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 – 4: 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 – 5: 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).

Text Books

1. Jain, M.K. & 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

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

Lab:

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)

(For those students admitted during the Academic Year 2020-21 and after)

PART – III **: Core Lab**		SEMESTER **- VI**
Course Title **:** Organic analysis and Gravimetric Estimation		
Course Code: 07CP62	Hours per week:6	Credits:4
CIA Marks: 40	ESE Marks: 60	Total Marks:

Preamble

Students are enabled to
   ✓ Understand the principle of analysis of organic compounds and gravimetric estimation

Course Outcomes (CO)

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

CO Number	CO Statement	Knowledge Level
CO1	Understand the basic principles of organic analysis	K3
CO2	Get practical skill on organic analysis	K4
CO3	Get practical skill on preparation of organic compounds	K4
CO4	Understand the principles of gravimetric estimation	K1 & K2
CO5	Analysis of Lead, Barium, Calcium and copper by Gravimetrically	K4

K1-Knowledge K2-Understand K3-Apply   K4 – Analyze

UNIT-I
Analysis of presence of special elements (N, S and Halogens), saturated /Unsaturated and Aromatic / Aliphatic.
UNIT-II
ANALYSIS OF FUNCTIONAL GROUPS
 Systematic analysis of an organic compound containing one or two functional groups.
Carboxylic acids, phenols, aldehydes, ketones, esters, nitro compounds, primary amines, aliphatic diamide, diamide containing sulphur and Carbohydrates (reducing and non-reducing sugar).

UNIT- III
Preparation of suitable solid derivatives for the confirmation of functional groups.

UNIT- IV: GRAVIMETRIC ESTIMATION – I
Introduction – Apparatus used in gravimetric analysis, Sintered silica crucible, desiccators – Care and use of desiccators – Experimental techniques in Gravimetric analysis, precipitation, digestion, filtration, washing, drying – Common errors in gravimetric estimation.

UNIT- V: GRAVIMETRIC ESTIMATION – II
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. VenkatesanV.Veeraswamy R. and Kulandaivelu A.R. *Basic Principles of Practical Chemistry*, 2nd Ed., Sultan Chand and Sons Publication, New Delhi, 1997.

Reference Books
1. Thomas, A.O., *Text Book of Practical Chemistry* Scientific Publication, 4th Revised Edition, 2008

Elective:

DEPARTMENT OF CHEMISTRY
Programme: B.Sc. Chemistry, (CBCS and OBE)

	Course Title: **PROJECT**	
Course Code: **07EP6A**	Hours per week: **5**	Credits: **- 5**
CIA Marks: **- 25**	ESE Marks: **- 75**	Total Marks: **- 100**

(For those students who admitted during the Academic Year 2020-21 and after

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.

Elective:

DEPARTMENT OF CHEMISTRY
Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2020-21 and after)

PART – III **: Elective Theory**		**SEMESTER - VI**
Course Title: **Elements of spectroscopy**		
Course Code: 07EP6C	Hours per week:5	Credits: 5
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

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 Outcomes (CO)

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

No.	Course outcome(s)	Knowledge Level (according to Bloom's Taxonomy)
CO1	Understand the basic principles of molecular spectroscopy and its various terminologies	K1 & K2
CO2	Understand the theories behind the IR and Raman spectra and its various modes of vibrations	K1 & K2
CO3	Explain the principles of UV spectroscopy and apply it to calculate the spectral wavelengths of compounds	K1, K2 & K3
CO4	Acquire the detail knowledge in various parameters involved in NMR and EPR spectra	K1 & K2
CO5	Utilize the broad knowledge in understanding the principles of Mass spectra and apply it for the structural characterizations of compounds	K1, K2 & K3

K1-Knowledge   K2-Understand   K3-Apply

Mapping of CO with PO

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7
CO 1	9	3	3	3	1	1	3
CO 2	9	3	3	3	1	1	3
CO 3	9	3	3	3	1	1	3
CO 4	9	3	3	3	1	1	3
CO 5	9	3	3	3	1	1	3
Weight of the course	45	15	15	15	5	5	15

9-Strong;   3-Medium;   1-Low

Mapping of CO with PSO

	PSO 1	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**
CO 1	3	3	1	1	9
CO 2	3	3	1	1	9
CO 3	3	3	1	1	9
CO 4	3	3	1	1	9
CO 5	3	3	1	1	9
Weight of the course	15	15	5	5	45

9-Strong;   3-Medium;   1-Low

Syllabus

UNIT : I MOLECULAR SPECTROSCOPY

Electromagnetic radiation – interaction with molecules - types of molecular spectroscopy - factors affecting line width and intensity - signal to noise ratio and resolving power - Microwave Spectroscopy - Linear & symmetric top molecules - Stark effect-Applications of microwave spectroscopy.

UNIT : II INFRARED AND RAMAN SPECTROSCOPY

Infrared Spectroscopy: vibrating diatomic molecule - harmonic and an harmonic oscillators - diatomic vibrating rotator - vibrations of polyatomic molecules - molecular vibrations, types of molecular vibrations, rotational vibrational spectra of linear and symmetric top molecules.

Raman spectroscopy: classical and quantum theory of Raman effect- rotational Raman spectra- linear, symmetric top molecules-vibrational Raman spectra- Raman activity of vibrations, rule of mutual exclusion, polarizability ellipsoids- rotational Fine structures.

UNIT : III UV-VISIBLE SPECTROSCOPY

The Electromagnetic spectrum- Basic Principles- Instrumentation and sample handling- Chromophore, auxochromes and conjugation- Various shifts in absorption maxima- Beer lamberts law(Deviations from it)- Empirical rules (Woodward Fieser) formula to calculate the absorption maxima- Factors affecting the absorption maxima(intensity and wavelength)

UNIT : IV NMR AND ESR SPECTROSCOPY

Nuclear Magnetic Resonance Spectroscopy

NMR active nuclei- nuclear spins in a magnetic field - magnetic moments- mechanism of resonance absorption – shielding and chemical shift - Zeeman effect -Larmor precession -resonance phenomenon - bloch equations -spin - lattice and spin-spin relaxation times.

Electron Spin/Paramagnetic Resonance Spectroscopy

Electron spin - EPR instrumentation- Electronic Zeeman effect - g factors - Hyperfine splitting and coupling constants - Mc Connell's relation –-zero field splitting – Kramer's degeneracy - Applications of EPR spectra.

UNIT : V MASS SPECTROMETRY

Mass spectrometry: basic principles – molecular ion peak – parent peak – fragments –meta stable ion – isotope peaks – determination of molecular weight and molecular formula – fragmentation pattern of simple organic molecules – McLafferty rearrangement – retro Diels Alder reaction- Determination of molecular structure by mass spectra, problems.

Text Books

1. Fundamentals of Molecular Spectroscopy, C.N.Banwell, Tata McGraw-Hill, 3rd Edn.
2. Spectroscopy by Donald, L. Pavia and Gray M. Lampan., 2009.

Reference Books

1. R.Chang, Basic Principles of Spectroscopy, McGraw Hill.
2. NMR Spectroscopy: Basic Principles, Concepts and Applications in Chemistry by Harald Günther, 3rd Edition., 2013.
3. Principles and Applications of ESR Spectroscopy by Anders Lund, Masaru Shiotani, and Shigetaka Shimada
4. Infrared and Raman Spectroscopy: Principles and Spectral Interpretation by Peter Larkin.
5. Introductory Raman spectroscopy by John R. Ferraro
6. Hill, H.C., Introduction to Mass Spectrometry, 2nd edn., London, 1972.
7. Howe, I., D.H. Williams, and R.D. Bowden, principles of Mass Spectroscopy, 2nd edn., London, 1980.
8. Puri, B.R., Sharma, L.R., and Pathania, M.S. Principles of Physical Chemistry, 47th edn, 2017

Skill Based:

DEPARTMENT OF CHEMISTRY

Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2020-21 and after)

PART – IV **: Skill Based Theory**	SEMESTER **-VI**

Course Title **:** Industrial Chemistry And Clinical Chemistry		
Course Code: 07SB61	Hours per week: 2	Credits: 2
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

Preamble

Students are enabled to

- ✓ To gain knowledge about utilities in chemical industries
- ✓ To study the industrial process of sugar and paper industry
- ✓ To develop skill in industrial chemistry preparation
- ✓ To learn about the clinical hygiene and biochemical analysis

Course Outcomes (CO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Familiarizes with sugar and paper industries	K1 & K2
CO 2	Study the synthetic methods of oils, soaps, detergents and employ the oils, soaps, detergents in various applications.	K1, K2 &K3
CO 3	Understand the chemistry behind articles used in day-to-day life	K1, K2& K3
CO 4	Acquire knowledge about clinical hygiene	K1 & K2
CO 5	Ability to execute urine and blood analysis	K1 & K3

K1-knowledge   K2-Understand   K3-Apply

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-survey.

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 of health-WHO standard-importance of hygiene-Personal and domestic hygiene-types of hygiene-sterilization of surgical instruments-disinfectants, antiseptics, sanitation.

Unit V- Biochemical analysis
Urine analysis: Determination of sugar in urine, albumin in urine, bile salt in urine 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.

Study material will be provided by the Department of Chemistry

Reference books

1. B. K. Sharma, Industrial Chemistry, Goel Publishing House, Meerut.
2. Jeyashree Gosh, A text book of Pharmaceutical Chemistry, S. Chand and Company, NewDelhi.
3. B. N. Chakrabarty, Industrial Chemistry, Oxford and IBH Publishing Co. Pvt.Ltd., Calcutta.
4. D. Plummer,Practical Biochemistry-2005, Tata McGraw-Hills Publishing Company.

Skill Based:

DEPARTMENT OF CHEMISTRY
Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2020-21 and after)

PART – IV : **Skill Based Theory**		SEMESTER -VI
Course Title **:** Chemistry For Competitive Examinations		
Course Code: 07SB62	Hours per week: 2	Credits: 2
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

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 Outcomes (CO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Study, understand and apply the periodic properties and chemical bonding of elements	K1& K2
CO 2	Learn and understand stereochemistry, electronic effects, natural products and heterocyclic compounds	K1, K2 & K3
CO 3	Recall the basic chemistry of chemical thermodynamics,	K1, K2 & K3

	chemical kinetics and electrochemistry	
CO 4	Understand the fundamentals of atomic structure and apply this knowledge to predict the stability of atom	K1 & K2
CO 5	Discuss the Organic Reaction Mechanism and Synthetic Applications / apply to qualitative analysis	K1,K2 & K3

Syllabus

Unit I: INORGANIC CHEMISTRY

Periodic Table: Periodic classification of elements and periodicity in properties; generalmethods of isolation and purification of elements.

Chemical Bonding and Shapes of Compounds: Types of bonding; VSEPR theory and shapesof molecules; hybridization; dipole moment; ionic solids; structure of NaCl, CsCl, diamond andgraphite; lattice energy.

Main Group Elements (s and p blocks): Chemistry with emphasis on group relationship andgradation in properties; structure of electron deficient compounds of main group elements andapplication of main group elements.

Transition Metals (d block): Characteristics of 3d elements; oxide, hydroxide and salts of firstrow metals; coordination complexes; VB and Crystal Field theoretical 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 toexplain bonding in metal-carbonyl, metal-nitrosyl and metal-phosphine complexes.

Bioinorganic Chemistry: Essentials and trace elements of life, basic reactions in the biologicalsystems and the role of metal ions especially Fe^{2+}, Fe^{3+}, Cu^{2+} and Zn^{2+}, function of hemoglobinand myoglobin.

Unit II: ORGANIC CHEMISTRY-I

Basic Concepts in Organic Chemistry and Stereochemistry: Electronic effect (resonance,inductive, hyperconjugation) and steric effects and its applications (acid/base property). Opticalisomerism in compounds without any stereocenters (allenes, biphenyls), conformation of acyclicsystems (substituted ethane/n-propane/n-butane) and cyclic systems (mono and di substitutedcyclohexanes).

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, Wittingreaction, 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 interconversions, structural problems usingchemical reactions, identification of functional groups by chemical tests, elementary 1H NMRand 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 theoryof gases. Maxwell-Boltzmann distribution law; equipartition of energy.

Solid state: Crystals, crystal systems, X-rays, NaCl and KCl structures, close packing, atomicand ionic radii, radius ratio rules, lattice energy, Born-Haber cycle, isomorphism, heat capacityof solids.

Adsorption: Gibbs adsorption equation, adsorption isotherm, types of adsorption, surface area ofadsorbents, surface films on liquids.

Chemical and Phase Equilibria: Law of mass action; K_p, K_c, K_x and K_n; Effect oftemperature on K; Ionic equilibria in solutions; pH and buffer solutions; Hydrolysis; Solubilityproduct; Phase equilibria–Phase rule and its application to one-component and two-componentsystems; Colligative properties.

Unit-V: PHYSICAL CHEMISTRY-II

Chemical Thermodynamics: Reversible and irreversible processes; First law and its applicationto ideal and non-ideal gases; Thermochemistry; Second law; Entropy and free energy, Criteriafor spontaneity.

Chemical Kinetics: Reactions of various order, Arrhenius equation, Collision theory; Theory ofabsolute reaction rate; Chain reactions – Normal and branched chain reactions; Enzyme kinetics;photochemical processes; Catalysis.

Electrochemistry: Conductance and its applications; Transport number; Galvanic cells; EMFand Free energy; Concentration cells with and without transport; Polarography; Concentrationcells with and without transport; Debey-Huckel-Onsagar theory of strong electrolytes.
Self Study:

Instrumental Methods of Analysis: Basic principles, instrumentations and simple applicationsof conductometry, potentiometry, UV-visspectro-photometry, analysis of water, air and soilsamples.

Analytical Chemistry: Principles of qualitative and quantitative analysis; acid-base, oxidation-reductionand EDTA and precipitation reactions; use of indicators; use of organic reagents ininorganic analysis; radioactivity; nuclear reactions; applications of isotopes.

TEXT BOOK:
1. IIT JAM Chemistry Solved Papers and Practice Sets 2020 by Raj Kumar, Arihant Publications.

REFERENCE BOOKS:
1. Concise AIEEE Chemistry Crash Course Tata McGraw Hill Company. Ltd., New Delhi, 2012
2. Objective Chemistry by M.Sivakumar Sura's publication, 2005.
3. Objective Chemistry by M.L Srivastava, Rastogi publication 2000.

Skill Based:

DEPARTMENT OF CHEMISTRY
Programme: B.Sc. Chemistry, (CBCS and Outcome Based Education (OBE)
(For those students admitted during the Academic Year 2020-21 and after)

PART – IV **: Skill Based Theory**		SEMESTER **-VI**
Course Title **: Nanochemistry and Green Chemistry**		
Course Code: 07SB63	Hours per week: 2	Credits: 2
CIA Marks: 25	ESE Marks: 75	Total Marks: 100

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 Outcomes (CO)

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

No.	Course Outcome	Knowledge Level (according to Bloom's Taxonomy)
CO 1	Define and Understand the classification and properties of nanomaterials.	K1 & K2
CO 2	Classify and develop various methods for synthesis of nanoparticles.	K2 & K3
CO 3	Apply the concepts and principles of spectroscopic methods for characterization of nanomaterials.	K3
CO 4	Analyze a process and identify how to may be made more environmentally friendly/sustainable/green	K3 & K1
CO 5	Recall the basic twelve principles and Explain the scope of green chemistry	K1 & K2

K1-knowledge   K2-Understand   K3-Apply

Syllabus

UNIT-I: Introduction – Nanotechnology – Nanomaterials – Types of nanomaterials – Properties of nanomaterials.

UNIT-II: Growth techniques of nanomaterials – Role of Bottom-up and Top-Down approaches in nanotechnology – Sol-gel process – Electrodeposition – Sputtering – Spraypyrolysis.

UNIT- III: Characterization tools of nanomaterials – XRD – SEM – TEM – UV-Visible spectroscopy – Photoluminescence Spectroscopy.

UNIT-IV: Introduction to Green chemistry – The 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

1. Chattopadhyay, K.K. and Banerjee, A.N., *Introduction to Nanoscience and Nanotechnology*, PHI Learning Pvt. Ltd – 2012.
2. Pradeep, T. *Nano the essential*, Tata Mc Graw Hill Company, Ltd., New Delhi. 2007.
3. Sanghi, R. and Srivastava, M.M. *Green Chemistry*, Narosa publilshing House 2003.

SEMESTER – VI
(For those who joined in June 2014 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 2008 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