(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
B.Sc. CHEMISTRY- COURSE PATTERN
2018-2019

Semester	Part	Course	Title of the Course	Code	Hrs./wk.	Credits	Marks
I	I	Language	Tamil paper I/ Hindi Paper I/ French Paper I	U15TL1TAM01/ U18HN1HIN01/ U16FR1FRE01	6	3	100
	II	English	English Paper I	U15EL1GEN01	6	3	100
	III	Major Core - 1	General Chemistry I	U15CH1MCT01	7	6	100
		Allied – 1 (Compulsory)	Allied Chemistry Paper I [For Botany and Zoology	U15CH1AOT01	4	4	100
		Allied – 2 (Compulsory)	Allied Chemistry Paper II [For Botany and Zoology	U15CH1AOP02	4	3	100
	IV	Environmental Studies	Environmental Studies	U15RE2EST01	2	2	100
		Value Education	Ethics-I/ Bible Studies-I/ Catechism-I	U15VE2LVE01/ U15VE2LVB01/ U15VE2LVC01	1	-	-
		Service oriented courses			1	-	-
TOTAL					30	21	600
II	I	Language	Tami Paper II/ Hindi Paper II /French Paper II	U15TL2TAM02/ U18HN2HIN02/ U16FR2FRE02	5	3	100
	II	English	English Paper II	U15EL2GEN02	6	3	100
	III	Major Core –2	General Chemistry II	U15CH2MCT02	7	6	100
		Major Core –3	Practical – 1: Semi micro Analysis	U15CH2MCP03	3	2	100
		Allied – 3	Allied Chemistry Paper III [For Botany and Zoology	U15CH2AOT03	4	3	100
	IV	Skill-based Elective – 1	Soft Skill Development	U15RE2SBT01	2	2	100
		Skill-based Elective – 2	Rural Enrichment and Sustainable Development	U15RE2SBT02	1	1	100
		Value Education	Ethics I/ Bible Studies I/ Catechism I	U15VE2LVE01/ U15VE2LVB01/ U15VE2LVC01	1	1	100

		Service oriented courses			1	-	-
		Internship/Field Work/Field Project 30 hours Extra Credit		U18SP2ECC01	-	2	100
Total					30	22	800
Semester	Part	Course	Title of the Course	Code	Hrs./wk	Credits	Marks
III	I	Language	Tamil Paper III/ Hindi Paper III/ French Paper III	U15TL3TAM03/ U18HN3HIN03/ U16FR3FRE03	6	3	100
	II	English	English Paper III	U15EL3GEN03	6	3	100
	III	Major Core –4	General Chemistry – III	U15CH3MCT04	6	6	100
		Major Core –5	Volumetric Analysis - Theory Cum Lab - I	U15CH3MCP05	4	4	100
		Allied – 4	Allied Optional Paper I (For Physics)	U15CH3AOT01	4	3	100
	IV	Skill-based Elective–3	Experimental Chemistry For Life Science [For Botany]	U15CH3SBP04	2	2	100
		Value Education	Ethics-II/ Bible Studies-II/ Catechism -II	U15VE4LVE02/ U15VE4LVB02/ U15VE4LVC02	1	-	-
		Service oriented courses			1	-	-
		Gender studies	Gender studies	U15WS3GST01	1	1	100
Total					30	22	700
IV	I	Language	Tamil Paper IV/ Hindi Paper IV/ French Paper IV	U15TL4TAM04/ U18HN4HIN04/ U16FR4FRE04	5	3	100
	II	English	English Paper – IV	U15EL4GEN04	6	3	100
	III	Major Core –6	General Chemistry – IV	U15CH4MCT06	5	5	100
		Major Elective - 1	Physical Chemistry - Theory Cum Lab – II (Separation Techniques and Virtual Lab Experiments) Physical Chemistry Theory Cum Lab – III(Verification of Colligative properties)	U17CH4MEP01/ U17CH4MEP02	5	5	100

		Allied – 5	Allied Optional Paper II (For Physics)	U15CH4AOT02	4	4	100
		Allied – 6	Allied Optional Paper III (For Physics)	U15CH4AOP03	4	3	100
	IV	Value Education	Ethics II/ Bible Studies II/ Catechism II	U15VE4LVE02/ U15VE4LVB02/ U15VE4LVC02	1	1	100
	VI	Service oriented courses (180 hrs) outside the class hours from the Semester I -IV		Any one activity based on the Student's choice (15Activity)	-	1	100
	Total				30	24	700
Semester	Part	Course	Title of the Course	Code	Hrs./ wk.	Credits	Marks
V	III	Major Core –7	Inorganic Chemistry	U15CH5MCT07	4	4	100
		Major Core –8	Organic Chemistry	U15CH5MCT08	4	4	100
		Major Core – 9	Physical Chemistry – I [Electro Chemistry And Phase Rule]	U15CH5MCT09	4	4	100
		Major Core – 10	Practical II – Gravimetric, Organic analysis and Organic Preparation/ III – Physical Chemistry	U15CH5MCP10/ U15CH5MCP11	8	5	100
		Major Elective – 2	Dairy Chemistry / Polymer Chemistry/ Chemistry of Biomolecules Food Chemistry	U15CH5MET01/ U15CH5MET02/ U15CH5MET03/ U17CH5MET03	5	4	100
	IV	NME – 1	Home Care/ Cosmetology	U15CH5NMT01/ U15CH5NMT02	2	2	100
		SBE – 4	Experimental Chemistry for Life Science [For Zoology]	U15CH5SBT04	2	2	100
		Value Education	Ethics III/ Bible Studies III/ Catechism III	U15VE6LVE03/ U15VE6LVB03/ U15VE6LVC03	1	-	-
Total					30	25	700
VI	III	Major Core –11	Organic Chemistry	U15CH6MCT12	5	5	100
		Major Core –12	Physical Chemistry– II [Spectroscopy]	U15CH6MCT13	5	5	100
		Major Core – 13	Practical III - Physical Chemistry/ II -	U15CH6MCP11/ U15CH6MCP10	8	5	100

			Gravimetric, Organic analysis and Organic Preparation				
		Major Elective – 3	Environmental Pollution / Dye Chemistry/ Health and Hygiene/ Analytical Chemistry	U15CH5MET01/ U15CH6MET02/ U15CH6MET03/ U15CH6MET04	5	5	100
	IV	NME – 2	Home Care/ Cosmetology	U15CH6NMT01/ U15CH6NMT02	2	2	100
		SBE – 5	Industrial Chemistry	U17CH6SBT05	2	2	100
		SBE – 6	Research Methodology	U15DS6SBT06	2	2	100
		Value Education	Ethics III/ Bible Studies III/ Catechism III	U15VE6LVE03/ U15VE6LVB03/ U15VE6LVC03	1	-	-
		Internship/Field Work/Field Project 30 hours Extra Credit		U18SP6ECC01	-	2	100
		Total			30	26	700
Grand Total					180	141	4300

Program Outcomes:

Upon completion of the B.Sc. Degree Programme, the graduate will

PO1: Understand the basic concepts, fundamental principles, and the scientific theories related to various scientific phenomena and their relevancies in the day-to-day life.

PO2 : Acquire the skills in handling scientific instruments, planning and performing in laboratory experiments

PO3 : Tackle issues and problems related to the field of chemistry through their analytical skills.

PO4: communicate scientific information and research results in written and oral formats effectively.

PO5: understand the interdisciplinary nature of chemistry and to integrate knowledge of mathematics, physics and other disciplines to a wide variety of chemical problems
.

PO6 : gain Knowledge and skills required to get placements in schools, the chemical industries etc.

Programme Specific Outcomes:

Upon completion of the B.Sc. Degree Programme, the graduate would

PSO1 : have a firm foundation in the fundamentals and application of current and scientific theories in various branches of chemistry.

PSO2 : present the concepts of chemistry effectively and efficiently.

PSO3 : predict the structure and mechanism of Chemical compounds.

PSO4 : recognise and analyse qualitative and quantitative problems and plan strategies for their solution.

PSO5 : explain the laboratory skills needed to design and interpret chemical research.

PSO6 : carry out scientific experiments as well as record and analyze the results of such experiments.

HOLY CROSS COLLEGE (Autonomous), Tiruchirappalli - 620 002.

TAMIL DEPARTMENT

For Candidate admitted from 2015 onwards

First Year - Semester – I

Course Title	**முதலாமாண்டு – முதற்பருவம்**
Total Hours	**90**
Hours/Week	**6 Hrs Wk**
Code	**U15TL1TAM01**
Course Type	**Theory**
Credits	**3**
Marks	**100**

General Objectives:

தமிழ் இலக்கியப் பரப்பையும், பாரம்பரியத்தையும் அறிமுகப்படுத்துதல்.

- To find out the ways to handle the Tamil language effectively and productively.
- To introduce the tradition and the grammar of Tamil language.
- To encourage the creatively development.
- Creating curiosity to make life according to high moral.
- Helping to create healthy thoughts among themselves.

Course Objectives:

CO No.	Course Objectives
CO-1	தமிழ் இலக்கியப் பரப்பையும்,விழுமியங்களையும் அறிமுகப்படுத்துதல்.
CO-2	தமிழ் மொழியின் தொன்மை, தாய்மொழிப்பற்று, தன்னம்பிக்கை சூழல்களை எதிர்கொள்ளும் திறன் முதலியவற்றை அறிந்து கொள்வர்.
CO-3	கவிதையின் வாயிலாக அன்பு உணர்வினை வளர்க்கச் செய்தல்.
CO-4	கலைச்சொற்கள் வாயிலாக பிறமொழிச் சொற்களை ஆராயும் தன்மைப் பெறுவர்.
CO-5	படைப்பாற்றல் திறனை வளர்த்துக்கொள்வர்.

அலகு:1 செய்யுள்

1. பாரதியார் கவிதைகள் - தமிழ் கண்ணன் என் சேவகன்
2. பாரதிதாசன் கவிதைகள் - உலகம் உன்னுடையது
3. உமர்கய்யாம் - உமர்கய்யாம் பாடல்கள்
4. பட்டுக்கோட்டையார் - செய்யும் தொழிலே தெய்வம் **18 Hrs**
5. ந. பிச்சமூர்த்தி – ஒளியின் அழைப்பு
6. வைரமுத்து – ஐந்து பெரிது ஆறு சிறிது
7. சிற்பி – ஒரு கிராமத்து நதி

key Words (Extra Reading)

1. ந. காமராசு கவிதைகள்

2. தமிழன்பன் கவிதைகள்

அலகு:2 செய்யுள்

1. கல்யாண்ஜி -பேசும்பார் என் கிளி
2. நிர்மலா சுரேஷ் -தைலச்சிமிழும் தச்சன் மகனும்
3. இரா. மீனாட்சி -ஒரு கோதை **18Hrs**
4. விஜி -குரங்கு மனிதன்
5. பா. சத்திய மோகன் -எங்கெங்கு காணினும்
6. ஹைகூ கவிதைகள்

key Words (Extra Reading)

1. ந.முத்துக்குமார் கவிதைகள்
2. செனட்ரியூ கவிதைகள்

அலகு:3 **18Hrs**

தமிழ் இலக்கிய வரலாறு
தமிழாய்வுத்துறை வெளியீடு 20-ஆம் நூற்றாண்டு (தற்காலம்)

key Words (Extra Reading)

தமிழ் இலக்கிய வரலாறு -மு.வரதராசன்

அலகு:4

படைப்பிலக்கியம் - சிறுகதைத் தொகுப்பு(துறை வெளியீடு) **18Hrs**

அலகு:5

பொதுப்பகுதி - கலைச்சொற்கள் **18Hrs**

Note: Texts given in the Extra reading /Key words must be tested only through Assignment and Seminars.

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	தமிழ் மொழியின் மேன்மை, தாய்மொழிப்பற்று, வாழ்வின் அனைத்து நிலைகளிலும் நிலைத்து நிற்கும் தன்மை, சுய ஒழுக்கம், ஒற்றுமை உணர்வு, நாட்டு வளர்ச்சிக்கான முன்னேற்றப் பாதை போன்றவற்றை திறனாய்வு செய்வர்.	PSO 1	U
CO-2	கவிதையின் வாயிலாக இறைப்பற்று, இயற்கையைப் பாதுகாக்கும் உணர்வு, சமூகம் பெண்ணுக்கு இழைக்கும் அநீதியை எதிர்த்துப் போராடும் மனநிலை முதலியவற்றை மதிப்பிடுவர்.	PSO 2	E
CO-3	தற்காலத் தமிழ் இலக்கியங்களின் வழி மாணவர்கள் தங்கள் படைப்பாற்றல் திறனை வளர்த்துக்கொள்வர்.	PSO 2	AN
CO-4	பல்வேறு சிறுகதைகளின் வழியாக மனித உரிமைகளை வலியுறுத்தி மனிதநேயத்தை மீட்டெடுக்கும், விழிப்புணர்வினைப் பெறுவர்.	PSO 3	AP

CO-5	துறைச் சார்ந்த கலைச்சொற்களை மாணவர்களுக்கு அறிமுகப்படுத்துவதோடு ஆங்கிலச்சொல்லுக்கு நிகரான தமிழ்ச் சொல்லையும் கற்று இருமொழிப் புலமை பெறுவர்.	PSO 4	U

PO – Programme Outcomes; CO – Course Outcome; R- Remember; U- Understand; Ap – Apply;

பார்வை நூல்கள்	**பாட நூல்கள்**
செய்யுள்	- தமிழாய்வுத்துறை வுத்துறை வெளியீடு
தமிழ் இலக்கிய வரலாறு	- தமிழாய்வுத்துறை வெளியீடு
சிறுகதைத் தொகுப்பு	- தமிழாய்வுத்துறை வெளியீடு
கலைச்சொற்கள்	- தமிழாய்வுத்துறை வெளியீடு

(For the candidates admitted from June 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-620002

DEPARTMENT OF HINDI

SEMESTER – I

Course Title	**PART – I LANGUAGE HINDI – I PROSE, SHORT STORY AND GRAMMAR –I**
Total Hours	**90**
Hours/Week	**6Hrs/Wk**
Code	**CODE: U18HN1HIN01**
Course Type	**Theory**
Credits	**3**
Marks	**100**

General Objective : To enable the students to understand the importance of human values and patriotism

Course Objectives (CO):

The learner will be able to:

CO No.	**Course Objectives**
CO -1	Evaluate Self Confidence, Human values
CO- 2	Understand and analyze Gandhian Ideology
CO- 3	Understand Indian Culture, custom
CO- 4	Analyze communal Harmony and Unity in Diversity
CO- 5	Evaluate Friendship

UNIT – I **(18 Hours)**

1. Aatma Nirbharatha
2. Idgah
3. Sangya

Extra Reading (Key Words): Takur ka kuvam, Bhuti Kaki

UNIT- II ***(18 Hours)***

1. Mahatma Gandhi
2. Vusne Kaha Tha
3. Sarva Naam

Extra Reading (Key Words): Chandradhar Sharma Guleri, Gandhian Ideology

UNIT- III ***(18 Hours)***

1. Sabhyata Ka Rahasya
2. Karva Va Ka Vrat
3. Visheshan

Extra Reading (Key Words): Sabhyata Aur Sanskriti, Yashpal ki Sampoorna khaniyan

UNIT- IV ***(18 Hours)***

1. Bharat Ek Hai
2. Sharandhata
3. Kriya

Extra Reading (Key Words): Ramante Tatra Deavata, Badala

UNIT- V ***(18 Hours)***

1. Mitrata
2. Vapasi
3. Ling Aur Vachan

Extra Reading (Key Words): Aacharya Ramachandra Shukla,Usha Priyamvadha ki kahaniyan

Note : Texts given in the Extra Reading (Key Words) must be tested only through Assignment and Seminars.

Course Outcomes:

The learner will be able to:

CO No.	Course Outcomes	Cognitive Level
CO -1	Compare human values of present and past generations	E
CO- 2	Test for Gandhian Ideology in the literary works.	U, An
CO- 3	Interpret Indian Culture in a scientific manner	U
CO- 4	Assess casteless and classless India	An
CO- 5	Value the interests of one's friend.	E

CO- Course Outcome; R- Remember; U- Understand; Ap- Apply; An- Analyze; E- Evaluate; C- Create

Reference Books :

- GadyaSudha: Edt. Dr. M. SaleemBaig; RakaPrakashan; Ilahabad. U.P.
- Hindi GadyaPrabhakar:Edi. Dr.Hiranmay; ShikshaBharathi; Kashmiri Gate; Delhi .
- KahaniVividha;RajkamalPrakashan; Ilahabad.; New Delhi.
- Vyakaranpradeep; Dr. Ram Dev. M.A; LokBharathiPrakashan ;Illahabad

(For candidates admitted 2016 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2

DEPARTMENT OF FRENCH

SEMESTER I

Course Title	**PART I – LANGUAGE - FRENCH PAPER I (**GRAMMAR & CIVILISATION (ÉCHO A1 2e édition)
Total Hours	90
Hours/Week	6Hrs/Wk
Code	U16FR1FRE01
Course Type	Theory
Credits	3
Marks	100

General Objective: To enable the students to learn the fundamentals of French Grammar and Cultural aspects of France.

Course Objectives (CO):

The learner will be able to

CO1	remember alphabets, numbers, nationalities and professions; understand the term Francophone, a brief introduction of France and oneself.
CO2	remember and understand verb conjugation and articles and apply the same in first contact
CO3	remember the pronouns placed after prepositions; analyse and evaluate leisure time activities in France and across the world.
CO4	apply past tense in writing personal diaries; comparison and adjectives in sketching traveljournals
CO5	understand the usage of articles and inversion in interrogation and analyse the food habit of the French.

Unit 1 Parcours d'initiation ; Vous comprenez (15 Hours)

La différence entre le prénom et le nom, les nationalités, les nombres, les professions

La présentation, le genre et le nombre d'un nom, l'interrogation et la négation – l'identité, les lieux de la ville, les mots du savoir-vivre – saluer, remercier – l'espace francophone.

Extra Reading (Key Words): La carte de la France et La carte du monde francophone

Unit 2 Au travail! (15 Hours)

La conjugaison des verbes du 1er groupe, des accords, les articles – l'état civil, des personnes et des objets caractéristiques d'un pays – exprimer ses gouts – première approche de la société française.

Extra Reading (Key Words): *Fiches de renseignement de ses parents*

Unit 3 On se détend! (15 Hours)

La conjugaison des verbes irréguliers, le future proche, les pronoms après une préposition – les loisirs – proposer, accepter, refuser, demander une explication – première approche de l'espace de France, repérages de quelques lieux de loisirs

Extra Reading (Key Words): Lieux de loisirs que l'étudiant apprécie

Unit 4 Racontez-moi ! ; Bon voyage ! (30 Hours)

Le passé composé, la date et l'heure – les moments de la journée, de l'année, les événements liés au temps – dire ce qu'on a fait – les rythmes de vie en France, des personnalités du monde francophone.

La comparaison, les adjectifs démonstratifs et possessifs – les voyages et les transports – négocier une activité, faire les recommandations – les transports en France

Extra Reading (Key Words):La vie des personnalités célèbres

Unit 5 Bon appétit! (15 Hours)

L'emploi des articles, la forme possessive – la nourriture, les repas, la fête – les situations pratiques à l'hôtel et au restaurant – les habitudes alimentaires en France.

Extra Reading (Key Words): Recette de la crêpe et des tartes

Course outcomes	**Cognitive level**
Introduce oneself to the class and classify Francophone countries in the world map.	Ap, E
Demonstrate regular verb conjugation	U, Ap
List out pronouns placed after prepositions	R, U
Survey leisure time activities in European countries	An
Develop personal diary	C
Outline the food habits of the French.	An

TEXT BOOKS :

ECHO A1 – METHODE DE FRANÇAIS & CAHIER PERSONNEL D'APPRENTISSAGE
Authors: J. Girardet and J. Pécheur Publication: CLÉ INTERNATIONAL, 2013.

Books for Reference:

La Conjugaison – Nathan
French made easy – Beginners level - Goodwill Publishing House
Je parle français I –Abhay Publications
Le français avec des jeux et des activités - ELI
Langue et la civilisation – I – Mauger Bleu

Note : Texts given in the Extra Reading (Key Words) must be tested only through Assignment and Seminars.

(for candidates admitted from June 2018 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), Tiruchirapalli – 620002
PG AND RESEARCH DEPARTMENT OF ENGLISH
I YEAR UG – SEMESTER I
PART II – ENGLISH 1 - GENERAL ENGLISH I

HOURS : 6 **CODE : U15EL1GEN01**
CREDIT : 3 **MARKS: 100**

OBJECTIVES

- Students learn to use LSRW skills and advanced communication skills in the context required in their daily life.
- The students learn to analyze and express their self and their concern and responsibilities to the world around.
- The students learn how English is used in literary writing so as to imbibe the spirit of using the standard language for communication.

UNIT I - I, ME, MYSELF
Listening for **s**pecific information in instructions and directions
Speaking about oneself, family and friends, likes, dislikes, strengths, weaknesses, profession, talents, emotions, feelings, incidents, reactions, opinions, views, aim, vision.
Reading for comprehension of routine work.
Writing -Paragraph guided
Grammar- Articles, Prepositions, Punctuation
Vocabulary-Meanings, Synonyms, Antonyms
Composition –Guided Creative writing

TEXTS

This is the Photograph of me by Margaret Atwood - Poem **(Internal Testing)**

1. *The Mayonnaise Jar*
2. *In Prison* by Jawaharlal Nehru (edited)
3. An extract from Shakespeare's *Othello* Act V Scene II

UNIT II - MY FAMILY AND FRIENDS
Listening to identify the persons/ places/ things from descriptions
Speaking -Describing incidents, favorite places, traits of a person, analyzing the nature of a person.
Reading to get specific information and to analyze characters
Writing -Letters (personal),paragraphs-family profile and history
Grammar -adjectives and verbs
Vocabulary-synonyms and antonyms in context
Composition - Guided paragraph

TEXTS

Night of the Scorpion by Nissim Ezekiel - Poem **(Internal Testing)**

1. *The Old Folks at Home* by Alphonse Daudet (edited)
2. *Will you, Daddy?* (Story from Reader's Digest)
3. An extract from Shakespeare's *King Lear Act I Scene I*

UNIT III - THE WORLD AROUND ME
Listening To identify specific information
Speaking –Discussing and expressing opinions
Reading To infer meaning

Writing Descriptive and Diary writing
Grammar Uses of 'be' Verbs – subject verb concord
Vocabulary Coining new words with Prefix and suffix- converting one part of speech to another
Composition - Essay writing

TEXTS

Snake by D.H. Lawrence – Poem **(Internal Testing)**

1. *Floating Fantasy* by Vinu Abraham (Prose)
2. *Discovery by Herman Ould* (Play)
3. *A Handful of Dates* by Tayeb Salih (Short story)

UNIT IV - MY CONCERN AND RESPONSIBILITIES
Listening to short speeches and getting main concern- Global comprehension
Speaking Expressing opinions, concerns and responsibilities
Reading To detect one's perspective
Writing Debate and Dialogue
GrammarSentence patterns (5 basic types)
VocabularyAppropriate words in the context ,coinage of new words , use of phrases
Composition-Imaginative writing

TEXTS

I have a Dream by Martin Luther King Jr - **(Internal Testing)**

1. *What I have lived for?* by Bernard Russell
2. *Three days to see* by Helen Keller(edited)
3. An extract from Shakespeare's *The Merchant of Venice Act IV Scene I*

UNIT V - MY PROFESSIONAL WORLD
Listening to short profile to get details –global comprehension
Speaking Discussion on secrets of success learnt from success stories
Reading to infer meaning – to trace the development and analyze the ratio of development
Writing resume and E-mail writing
Grammar- Four Types of sentences
Vocabulary-Idioms and phrases- meaning
Composition – Formal and imaginative writing

TEXTS

Profile of a successful personality **(Internal Testing)**

1. Extract from a profile and an Interview of Indra Krishnamoorthy Nooyi
2. *The Verger* by Somerset Maugham
3. Profile of Bill Gates

PRESCRIBED BOOK:
English for Communication –PoGo publication Trichy

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
First Year - Semester – I

Course Title	**Major Core 1 – General Chemistry-I**
Total Hours	**70Hrs(T) + 30Hrs (P)**
Hours/Week	**5(T) + 2(P) Hrs Wk**
Code	**U15CH1MCT01**
Course Type	**Theory**
Credits	**6**
Marks	**100**

General Objectives:

To make the students understand and learn about the properties of atoms, periodic table and variation in periodic properties, gaseous state, principles involved in qualitative analysis and fundamental concepts in organic chemistry.

Course Objectives:

CO No.	Course Objectives
CO-1	apply the fundamental principles of atomic theory to explain the structure of the atom and postulates of quantum mechanics
CO-2	describe the position of elements in the modern periodic table and assess the trend in periodic properties.
CO-3	understand the law of gases, explains the molecular speeds and molecular energies and classify the molecular velocities.
CO-4	analyse the unknown inorganic substance using systematic procedure based on solubility product and common ion effect principles.
CO-5	apply IUPAC system of nomenclature, classify covalent bonds, reactions of organic compounds and reaction intermediates

UNIT 1- ATOMIC STRUCTURE **15 Hrs**

1.1 Rutherford's nuclear model of atom. Planck's Quantum theory of radiation. photoelectric effect and quantum theory.

1.2 Bohr's model of an atom. Bohr's theory and the origin of hydrogen spectrum. Somerfield's extension of Bohr's theory.

1.3 Particle and wave character. de Broglie's equation. Heisenberg's uncertainty principle.

1.4 Compton effect. Postulates of Quantum mechanics. Schrodinger wave equation. Significance of ψ and ψ^2, Radial and angular functions. Quantum Numbers – wave picture of electron. Concept of atomic orbitals – shapes of s, p & d orbitals, nodal planes and nodal points in atomic orbitals.

Extra reading/Keywords:*Problems in Planck's quantum theory and photoelectric effect*

UNIT 2 - PERIODIC TABLE AND PERIODIC PROPERTIES 15 Hrs

2.1 Modern periodic table- cause of periodicity, division of elements into s,p,d & f block elements.
2.2 Slater's rule. Filling up of atomic orbitals- Pauli's exclusion principle, Hund's rule of maximum multiplicity, Aufbau principle. electronic configuration.
2.3 Periodic variation of properties of elements – Size of atoms and ions, Atomic volume, Ionization potential, Electron affinity, Electro negativity, Metallic character.
Extra reading/Keywords*:**Comparative study of periodic properties*

UNIT 3- THE GASEOUS STATE 15 Hrs

3.1 Gases – Boyle's law. Charle's law. Avogadro's law. ideal gas equation. deviation from ideal behavior.
3.2 Maxwell's distribution of molecular speeds and molecular energies. effect of temperature in distribution of molecular velocities.
3.3 Types of molecular velocities – most probable, average and root mean square velocity, Collision number, Collision diameter, Collision frequency, Mean free path. Transport phenomena in gases. vanderwaal's equation of state – derivation.
Extra reading/Keywords*:**Problems in molecular velocities, collision diameter and collision frequency*

UNIT 4- THEORY OF CHEMICAL ANALYSIS 15 Hrs

4.1 Basic principles of Chemical analysis - Solubility product, Common ion effect, Complexation, oxidation and reduction.
4.2 Reactions involved in identification of anions and cations.
4.3 Interfering acid radicals and their removal – oxalate, fluoride, phosphate and arsenate. Separation of cations into groups.
4.4 Semimicro analysis of simple salts- **Practicals. (30 Hrs)**
Extra reading/Keywords*:**Analysis of rare earth cations*

UNIT 5- FUNDAMENTAL CONCEPTS IN ORGANIC CHEMISTRY 15 Hrs

5.1 IUPAC system of Nomenclature – Longest chain rule, lowest number rule, Prefixes arrangement, lowest number for functional group, writing names for compounds containing more than one functional group. Writing the structural formulae from given IUPAC names.
5.2 Types of covalent bonds – σ,π bond, Polarity of covalent bonds, Homolytic and heterolytic fission of bonds.
5.3 Types of reactions of organic compounds – Substitution reaction, Addition reactions, Elimination reactions, Rearrangement reactions and Polymerization reactions.
5.4 Free radicals – Formation, detection, properties and stability. Carbocations, carbanion, carbenes – Formation, stability and reactions.
Extra reading/Keywords*:**Writing the IUPAC Name of organic compoundsand identifying the type of organic reactions*

Note: Texts given in the Extra reading /Key wordsmust be tested only through Assignment and Seminars.

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Describe the shapes of atomic orbitals	2	R
CO-2	Compare and contrast the periodic properties of elements	1	Ap
CO-3	Describe the molecular velocities and molecular energies	1	U
CO-4	Analyse the acid and basic radicals through semi micro qualitative tests	6	An
CO-5	Compare the stabilities of the intermediates	3	K
CO-6	Apply the IUPAC system of nomenclature for naming organic compounds	3	Ap

PO – Programme Outcomes; CO – Course Outcome; R- Remember; U- Understand; Ap – Apply; An – Analyse; E- Evaluate; C – Create

TEXT BOOKS:

1. Soni P.L. and Chawla H.M. *Text Book of Organic Chemistry,* 26th edn., New Delhi: Sultan Chand and sons, 2014.
2. Puri B.R., Sharma L.R. and Madan S. Pathania, *Principles of Physical Chemistry,* 35th edn.,New Delhi:Shoban Lal Nagin chand and Co., 2013.
3. Puri B.R., Sharma L.R. and Madan S. Pathania, *Principles of Inorganic Chemistry* 35th edn., New Delhi: Shoban Lal Nagin chand and Co., 2013.

BOOKS FOR REFERENCE:

1. Gopalan R., Subramanian P.S. and Rengarajan K, *Elements of Analytical Chemistry.* 3rd edn.,New Delhi: Sultan Chand and sons, 2013.
2. Robert Thornton Morrison, Robert Neilson Boyd , Saibal Kanti Bhattacharjee, *Organic Chemistry*, 7th edn., Chennai: Pearson Education India, 2011.
3. Raj K. Bansal, *A Text Book of Organic Chemistry*, 5th edn., New Age, 2007.
4. Bahl B.S, Arun Bahl, *A Textbook of Organic Chemistry.* New Delhi: Sultan Chand and sons, 2010.
5. Soni P.L. and Mohankatyal ,*Text book of Inorganic Chemistry,* 20th revised edn., New Delhi: Sultan Chand and sons, 2013.
6 . Bahl B.S, Arun Bahl and Tuli G.D., *Essentials of Physical Chemistry,* New Delhi: Sultan Chand and sons, 2012.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
First Year – Semester- I

Course Title	Allied – 1: Allied Chemistry Paper I [For Botany and Zoology]
Total Hours	60
Hours/Week	4 Hrs Wk
Code	U15CH1AOT01
Course Type	Theory
Credits	4
Marks	100

General Objective:

To make the students to understand the basic concepts in organic chemistry, carbohydrates and heterocyclic compounds, periodic properties, quantum numbers, chemical equilibrium and kinetics, chromatography and osmosis.

Course Objectives:

CO No.	Course Objectives
CO-1	categorize, discuss and apply the different types of organic reactions- effects operating in them and the types of isomerism.
CO-2	recall, classify and identify the different types of carbohydrates and heterocyclic compounds**.**
CO-3	recognise and understand the quantum numbers, periodic table and periodic properties
CO-4	understand, apply and determine the equilibrium conditions, Le chatlier's principle and order of the reaction.
CO-5	understand and apply the concepts of chromotagraphy and osmosis in day today life

UNIT 1 - FUNDAMENTAL CONCEPTS OF ORGANIC CHEMISTRY 12Hrs

1.1 Types of organic reactions - substitution, addition, elimination, rearrangement and polymerization reactions and reagents. Common elelctrophiles, nucleophiles and free radicals.

1.2 Inductive, resonance, hyper conjugation and steric effects – an elementary idea. States of hybridization of carbon.

1.3 Isomerism –structural isomerism, types, definition and example.

Extra Reading/Keywords:*Stability and feasibility of organic reactions*

UNIT 2- CARBOHYDRATES AND HETEROCYCLIC COMPOUNDS 12Hrs

2.1 Carbohydrates – classification, glucose, fructose and sucrose – Structure only, Properties, Mutarotation, Test to identify Carbohydrates- Elementary idea of Starch and Cellulose.

2.2 Aromatic Hydrocarbons-General methods of preparation of Benzene and its homologous. General properties of benzene and its homologous. Aromatic character – Huckel's rule.

2.3 Heterocyclic compounds: Furan, Pyrrole, Thiophene, Pyridine – Preparation, properties and uses.

Extra Reading/Keywords:*Chemistry behind Natural products*

UNIT 3- PERIODIC TABLE 12Hrs

3.1 Quantum numbers:- Principal, Azimuthal, Magnetic and Spin quantum numbers. Electronic configuration of elements – Aufbau principle, Hund's rule and Pauli's exclusion principle.

3.2 Long form of periodic table, division of elements into s, p, d and f blocks, cause of periodicity.

3.3 Periodic properties – Atomic radius, Ionic radius, Ionization energy, Electron affinity and Electronegativity – definition and variation along a group and a period.

Extra Reading/Keywords:*Applications of metals and non metals in day today life.*

UNIT 4 - CHEMICAL KINETICS AND CATALYSIS 12Hrs

4.1 Rate of reactions, order, molecularity, kinetic equations for I and II order, order of reactions and their determination.
4.2 Catalysis – Positive and negative catalysis, auto catalysis, induced catalysis, enzyme catalysis, promoters, catalytic poisons with examples only, characteristics of catalysis.
4.3 Types of catalysis – Homogeneous catalysis – the intermediate compound formation theory. Heterogenous catalysis – the adsorption theory.

Extra Reading/Keywords: *Industrial applications.*

UNIT 5- CHROMATOGRAPHY AND OSMOSIS 12Hrs

5.1 Chromatography – Column and Paper.
5.2 Thin layer chromatography, Electrophoresis.
5.3 Osmosis – Osmotic pressure and its determination, reverse osmosis- Desaliantion.

Extra Reading/Keywords:*Applications in Chromatographic techniques*

Note: Texts given in the Extra reading /Key wordsmust be tested only through Assignment and Seminars.

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Discuss the effects operating in the organic compounds.	PSO2	U
CO-2	Classify the organic compounds according to Huckel's rule of aromaticity.	PSO1	U
CO-3	Compare and contrast the periodic properties of the elements.	PSO2	A
CO-4	Distinguish the first order and second order kinetics with examples.	PSO2	An
CO-5	Explain the different types of chromatographic techniques.	PSO4	An

TEXT BOOKS:

1. Soni P.L. and Chawla H.M, *Text Book of Organic Chemistry(* 26th edn). New Delhi: Sultan Chand and sons., 2014.
2. Puri B.R., Sharma L.R. and Madan S. Pathania, *Principles of Physical Chemistry (*35th edn).New Delhi:Shoban Lal Nagin chand and Co, 2013.
3. Puri B.R., Sharma L.R. and Madan S. Pathania, *Principles of Inorganic Chemistry (*35th edn).New Delhi:Shoban Lal Nagin chand and Co,. 2013.

BOOKS FOR REFERENCE:

1. Soni P.L. and Mohankatyal, *Text book of Inorganic Chemistry* , 20th revised edition, sultan chand,. 1992.
2. Bahl B.S, Arun Bahl and Tuli G.D, *Essentials of Physical Chemistry,* New Delhi: Sultan Chand and sons,. 2012.
3. Robert Thornton Morrison, Robert Neilson Boyd , Saibal Kanti Bhattacharjee, *Organic Chemistry* (7th Edition), Chennai: Pearson Education India, 2011.
4. Jain M.K, Sharma S.C, *Modern Organic Chemistry* , Vishal Publishing Co,. 2007

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
First Year - Semester – I

Course Title	**ALLIED 2: ALLIED CHEMISTRY PRACTICAL PAPER II**
Total Hours	**60**
Hours/Week	**4 Hrs /Wk**
Code	**U15CH1AOP02**
Course Type	**Practical**
Credits	**3**
Marks	**100**

General Objective:

To expose the students to various concepts in volumetric analysis and to gain skill in volumetric analysis.

Course Objective:

CO No.	**urse Objectives**
)-1	Understands the terminologies and principle involved in volumetric analysis
)-2	Define a primary standard ,standard solution and determine the equivalence point
)-3	determine the concentration of solution in various units and prepare standard solution and dilute solution
)-4	determine the strength of the given solution from different types of titrations like acid base, redox,and precipitation
)-5	Solve volumetric problems using formula method

UNIT 1 - VOLUMETRIC ANALYSIS: 12 Hrs

1.1 Definitions:- Titration, Back Titration, End point, Equivalence point, Indicator, Normality, Molality, Molarity, Mole Fraction, Equivalent weights of acid, base, salt, oxidizing and reducing agents.

1.2 Standard solution, requirements of a primary standard, preparation of standard solution, secondary standard, principle of volumetric analysis.

1.3 Acid-Base titrations – HCl with NaOH, CH_3COOH against NaOH, Na_2CO_3 with HCl. Acid-Base indicators – Ostwald's theory and quinonoid theory.

1.4 Redox titrations – Mohr salt against $KMnO_4$, Oxalic acid with $KMnO_4$, $FeSO_4$ against $K_2Cr_2O_7$. Redox indicator – Diphenyl amine, Iodometry - Estimation of copper sulphate

Extra reading/Keywords:*EDTA Titrations*

VOLUMETRIC ANALYSIS (DOUBLE TITRATION WITH WEIGHING):

(3 hrs. External)

I Acidimetry and Alkalimetry:

1. Estimation of sodium hydroxide.
2. Estimation of hydrochloric acid.

II Permanganometry:

3. Estimation of Mohr's Salt.
4. Estimation of Oxalic acid.

III Iodometry:

5. Estimation of copper sulphate

IV Dichrometry:

6. Estimation of iron (internal indicator)

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Critical capacity to understand the procedures in order to define the common methods of analysis..	PSO 2	U
CO-2	Use correct titrimetric procedure when carrying out titrations	PSO 5	An
CO-3	Prepare the standard solution of different strength.	PSO 5	U
CO-4	Explain the acid base, redox and complexometric titrations with examples.	PSO 6	An
CO-5	Apply knowledge of concentrations of solutions to everyday examples and estimate the strength of the given unknown solution	PSO 6	App

TEXT BOOKS:

1. Puri B.R. and Sharma L.R. *Principles of Inorganic Chemistry*. New Delhi: Shoban Lal Nagin Chand and Co., 2002.
2. Venkateswaran V., Veeraswamy R. and Kulandaivelu A.R. *Basic Principles of Practical Chemistry*. New Delhi: 2nd edn, Sultan Chand & Sons, 1997.

BOOKS FOR REFERENCE:

1. Svehla G. *Vogel's Qualitative Inorganic Analysis.* US: 7th Edition, Prentice Hall, 1996.
2. Mendham J., Denney R. C., Barnes J. D. and Thomas M. J. K. *Vogel's Prescribed Book of Qualitative Chemical Analysis*, US: 6th Edition, Prentice Hall, 2000.

(For candidates admitted from 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
B.A /B.Sc./B.Com/B.R.SC/B.C.A/ B.B.A DEGREE EXAMINATION
SEMESTER I / V

Course Title	**ENVIRONMENTAL STUDIES**
Total Hours	**15**
Hours/Week	**1**
Code	**U18RE1EST01/ U18RE5EST01**
Course Type	Theory
Credits	**1**
Marks	**100**

General Objectives:
The Student will be able to understand the concept of ecosystem, biodiversity, conservation, disaster management, analyse the prospects of natural resources, evaluate the effect and control of pollution

Course Objectives:

The student will be able to

1. understand the prospects of the various natural resources.
2. analyse the concept and need for biodiversity
3. evaluate the effect of the different types of pollution.
4. understand the need for disaster management
5. understand the Environment and Social Issues

Unit I – Awareness and Natural Resources **3hrs**

Awareness of Environmental issues and management strategies – need of the hour. Renewable and non-renewable resources - uses, present status and management of forest, water, land and energy resources.
Extra reading (Key Words):*Non renewable sources- location in India*

Unit II – Ecosystems and Biodiversity **3hrs**

Ecosystem – concepts, structure and types – concept of food chains and food web – causes and effects of weakening food chains - Biodiversity – concept of genetic, species and ecological biodiversity – ecological and economic values – India, a megadiversity country, hotspots – threats to biodiversity and conservation measures
Extra reading (Key Words): *Red list (any 10 plants and animals)*

Unit III – Environmental Pollution **3hrs**

Causes, effects and control of water, and air pollution – global warming – ozone depletion – nuclear hazards. Population growth at national and global level
World food production – effects of modern agriculture on land ecosystems – GMOs and related issues .Environmental pollution and diseases – malaria, chikungunya
Extra reading (Key Words): *Environmental factors affecting human behaviour*

Unit IV – Disaster Management **3hrs**

Bomb Threat – Earthquake – Explosion – Hazardous material spill / release – campus shooting – Terrorist incidence – Financial emergency – a sudden health emergency, unexpected loss of income, death in the family or other family emergency. Rent in arrears and risk of eviction. Natural disasters
Extra reading (Key Words): *Causative factors of any 2 disasters*

Unit V – Environment and Social Issues **3hrs**

Rich – poor wide – at national and global levels
Urbanization – slums
Changing value systems – AIDS Family welfare programs
Extra reading (Key Words): *Scholarships and funds benefitting the welfare of the family*

Note: Texts given in the Extra reading /Key words must be tested only through Assignment and Seminars.

Course Outcomes:

1. Explain the importance of the various natural resources.
2. Analyze the concepts, structure and types of ecosystem.
3. Add note on the biodiversity concepts
4. Evaluate the effect of the different types of pollution
5. Explains the various disaster management.
6. Discuss the need of environment and the social issues

REFERENCES:

1. Agarwal, K.C. (2001). Environmental Biology, Nidi Publication Ltd. Bikaner.
2. Chairas, D.D. (1985). Environmental Science. The Benjamin Cummings Publishing company., Inc.
3. Clarke George, L. (1954). Elements of Ecology. Hohn Wiley and SONS, Inc.
4. Hodges, L. (1977). Environmental Pollution, II Edition. Holt, Rinehart and Winston, New York. Krebs, C.J. (2001).Ecology.VI Edition.Benjamin Cummings.
5. Nebel, B.J. and Wright, R.T.(1996). Environmental Science, Prentice Hall, New Jersey

6. Odum, E.P.(2008) Fundamentals of Ecology.Indian Edition. Brooks / Cole.
7. Sharma, B.K. and Kaur (1997). Environmental Chemistry. Goel Publishing House, Meerut. Sharma,
8. B.K. and Kaur, (1997). An Introduction to Environmental Pollution. Goel Publishing House, Meerut.
9. Sinhe, A.K. Boojh, R. and Vishwanathan, P. N. (1989). Water Pollution Conservation and Management, Gyansdaya Prakashan, Nainital.

HOLY CROSS COLLEGE (Autonomous), Tiruchirappalli - 620 002.

TAMIL DEPARTMENT

For Candidate admitted from 2015 onwards

First Year - Semester – II

Course Title	முதலாமாண்டு – இரண்டாம் பருவம்
Total Hours	75
Hours/Week	5 Hrs Wk
Code	U15TL2TAM02
Course Type	Theory
Credits	3
Marks	100

General Objectives:

இறைச்சிந்தனை வழி மாணவர்களை ஒருமுகப்படுத்துதல்.

- To harmonize the students in Religious thoughts.
- To Introduce the specialties of Tamil caureates
- To infuse the friendly nature in to the students
- To improvise the good habits among students

Course Objectives:

CO No.	Course Objectives
CO-1	இறைச்சிந்தனை வழி மாணவர்களை ஒருமுகப்படுத்துதல்.
CO-2	மதநல்லிணக்கத்தை உருவாக்குதல்.
CO-3	ஆளுமைத்திறனை வளர்த்தல்
CO-4	படைப்பாற்றல் திறனை ஊக்கப்படுத்துதல்.
CO-5	பிழையின்றி எழுதவும் படிக்கவும் மாணவர்களை தயார்ப்படுத்துதல்.

அலகு:1 செய்யுள் **15 Hrs**

1. தேவாரம் - சுந்தரர் (திருமழப்பாடி)
2. திருவாசகம் - மாணிக்கவாசகர் (குயில் பத்து)
3. திருமந்திரம் - திருமூலர்
4. திருப்பாவை - ஆண்டாள்
5. நாலாயிர திவ்யப்பிரபந்தம் - குலசேகராழ்வார் (பெருமாள் திருமொழி)

key Words (Extra Reading)

1. அற்புதத்திருவந்தாதி - காரைக்கால் அம்மையார்
2. திருவாய்மொழி - நம்மாழ்வார்

அலகு:2 செய்யுள் **15 Hrs**

1. மீனாட்சியம்மை பிள்ளைத்தமிழ் - குமரகுருபரர்
2. இரட்சணிய யாத்திரிகம் (சிலுவைப்பாடு) - எச்.ஏ.கிருட்டிணப்பிள்ளை
3. வேதநாயக சாஸ்திரியார் பாடல்கள் - வேதநாயசாஸ்திரியார்
4. நபிகள்நாயக மான்மியமஞ்சரி - செய்குதம்பிப்பாவலர்

key Words (Extra Reading)

1. நந்திக்கலம்பகம்
2. குற்றாலக்குறவஞ்சி –திரிகூடராசப்பக்கவிராயர்

அலகு:3 **15 Hrs**

தமிழ் இலக்கிய வரலாறு –

பல்லவர்காலம்

நாயக்கர்காலம்

அலகு:4 **15Hrs**

படைப்பிலக்கியம் - புதினம்

கல்கி - பார்த்திபன் கனவு

key Words (Extra Reading)

வில்லோடு வா நிலவே – வைரமுத்து

அலகு:5 **15 Hrs**

கடிதம் எழுதுதல்

Note: Texts given in the Extra reading /Key words must be tested only through Assignment and Seminars.

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	பல்லவர்கள் காலத்து சமயப்பணியையும் சமய இலக்கியங்களின் வளர்ச்சியையும் திறனாய்வு செய்வர்.	PSO 1	U
CO-2	பல்வேறு மதங்களும் கற்பிக்கின்ற சமயக் கொள்கை ஒன்றுதான் என்பதனை உணர்த்தி, மதக்காழ்ப்புணர்வை அகற்றி ஒற்றுமையுணர்வை வளர்த்துக் கொள்வர்.	PSO 2	AN
CO-3	அரசர்கள் முதல் உழவர்கள்வரை பலதரப்பட்ட மாந்தர்களின் உயரியச் செயல்களை அறிந்து கொண்டு ஆளுமைமிக்கவர்களாக உருவாகுவர்.	PSO 2	AP
CO-4	நாவல் வாசிப்பதால் படைப்பாற்றல் திறனும் சொற்களஞ்சியப் பெருக்கமும் பெறுவர்.	PSO 3	U
CO-5	விண்ணப்பக் கடிதம் எழுத நேரிட்டால் தானாக முன்வந்து தடையில்லாமல் எழுதுவர்.	PSO 4	U

PO – Programme Outcomes; CO – Course Outcome; R- Remember; U- Understand; Ap Apply; An – Analyse; E- Evaluate; C – Create

பார்வை நூல்கள்

செய்யுள் - தமிழாய்வுத்துறை வெளியீடு

தமிழ் இலக்கிய வரலாறு - தமிழாய்வுத்துறை வுத்துறை வெளியீடு

நாவல்

கல்கி - பார்த்திபன் கனவு

கடித இலக்கியம் - பயிற்சி ஏடு

(For the candidates admitted from June 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-620002

DEPARTMENT OF HINDI

SEMESTER – II

Course Title	**PART – I LANGUAGE** HINDI – II DRAMA , NOVEL AND GRAMMAR –II
Total Hours	**75**
Hours/Week	**5Hrs/Wk**
Code	**CODE: U18HN2HIN02**
Course Type	**Theory**
Credits	**3**
Marks	**100**

General Objective : To enable the students to appreciate and critically evaluate the prescribed literary works.

Course Objectives (CO):

The learner will be able to:

CO No.	**Course Objectives**
CO -1	Critically evaluate moral values in the drama
CO- 2	Critically appreciate and evaluate the novel in an ethical perspective.
CO- 3	Understand and apply tense and case
CO- 4	remember and apply adverbs and prepositions
CO- 5	comprehend the usage of conjunctions and interjections

UNIT – I **(15 Hours)**

1. Ashad ka ek dhin
2. Gaban
3. Kaal

Extra Reading (Key Words): Mohan Rakesh, Laharon Ke Rajahams

UNIT- II ***(15 Hours)***

1. Ashad ka ek dhin
2. Gaban
3. Karak

Extra Reading (Key Words): *Premchand, Nirmala*

UNIT- III ***(15 Hours)***

1. Ashad ka ek dhin
2. Gaban

3. Kriya Visheshan

Extra Reading (Key Words): Seva Sadhan, Aadhe Adhure

UNIT- IV ***(15 Hours)***

1. Ashad ka ek dhin
2. Gaban
3. Sambandha Bodhak

Extra Reading (Key Words): Andhere Bandh Kamare, Mispal

UNIT- V ***(15 Hours)***

1. Ashad ka ek dhin
2. Gaban
3. Yojak(Samuchaya Bhodak) Aur Dhyodak (Vismyadhi Bhodak)

Extra Reading (Key Words): Poos Ki Raat, Shatranj Ke Khiladi

Note : Texts given in the Extra Reading (Key Words) must be tested only through Assignment and Seminars.

Course Outcomes:

The learner will be able to:

CO No.	Course Outcomes	Cognitive Level
CO -1	Appraise moral values in the Society	E
CO- 2	Distinguish necessity and luxury	E
CO- 3	To make use of present, past and future tense and build stories.	U, Ap
CO- 4	Utilize adverbs and prepositions in a text.	R, Ap
CO- 5	Rephrase using conjunctions and interjections.	U

CO- Course Outcome; R- Remember; U- Understand; Ap- Apply; An- Analyze; E- Evaluate; C- Create

Reference Books :

- Ashadka ek dhin : Mohan Rakesh;Rajpal and Sons,Delhi.
- Nirmala: Premchand;Sri Jwalaji Books Educational Enterprises,New Delhi.
- Vyakaran pradeep; Dr. Ram Dev. M.A; LokBharathiPrakashan ;Illahabad.
- Manak Hindi Vyakaran: ChandraBhan ‘Rahi’;SreyaPrakashan, Illahabad

(For candidates admitted 2016 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2

DEPARTMENT OF FRENCH

SEMESTER II

Course Title	**PART I – LANGUAGE - FRENCH PAPER II** **(**GRAMMAR, CIVILISATION & TRANSLATION (ÉCHO A1 2e édition)
Total Hours	75
Hours/Week	5 Hrs/Wk
Code	U16FR2FRE02
Course Type	Theory
Credits	3
Marks	100

General Objective: To enable the students to learn French Grammar and Cultural aspects of France.

Course Objectives (CO):

The learner will be able to

CO1	understand pronominal verbs and apply the same in narrating one's own everyday activities.
CO2	remember prepositions and understand climate in France and dwelling place.
CO3	apply past tenses in a biography and analyse relationships and family structure in France
CO4	understand object pronouns and evaluate savoir-vivre in France.
CO5	understand the usage of relative pronouns and secondary tenses and remember SOS and evaluate French style

Unit 1 Quelle journée ! (15 Hours)

La conjugaison pronominale, l'impératif, l'expression de la quantité – les activités quotidiennes, les achats et l'argent – demander des nouvelles de quelqu'un – le comportement en matière d'achat et d'argent.

Extra Reading (Key Words): lettre amicale, compléter un dialogue

Unit 2 Qu'on est bien ici ! (12 Hours)

Les prépositions et les adverbes, les verbes exprimant un déplacement – le logement, la localisation, l'orientation, l'état physique, le temps qu'il fait – demander de l'aide, exprimer une interdiction – le climat en France, les cadres de vie (ville et campagne)

Extra Reading (Key Words): des affiches et des panneaux

Unit 3 Souvenez-vous ? (12 Hours)

Emplois du passé composé et de l'imparfait – les moments de la vie, la famille, les relations amicales, amoureuses, familiales – demander/donner des informations sur la biographie d'une personne – le couple et la famille.

Extra Reading (Key Words): la biographie d'une personne importante

Unit 4 On s'appelle ? (12 Hours)

Les pronoms compléments directs et indirects – les moyens de la communication – aborder quelqu'un, exprimer une opinion sur la vérité d'un fait – les conseils de savoir-vivre en France.

Extra Reading (Key Words):le savoir vivre en Inde

Unit 5 Un bon conseil ! ; Parlez-moi de vous ! (24 Hours)

L'expression de déroulement de l'action, les phrases rapportées – le corps, la santé et la maladie – téléphoner, prendre rendez-vous, exposer un problème – les conseils pour faire face aux situations d'urgence.

La place de l'adjectif, la proposition relative, la formation des mots – la description physique et psychologique des personnes, les vêtements et les couleurs – demander/donner une explication – quelques styles comportementaux et vestimentaires en France.

Extra Reading (Key Words): SOS en Inde, les marques internationales des vêtements.

Course outcomes:	**Cognitive level**
Make use of pronominal verbs to sketch one's routine.	U, Ap
Illustrate habitat in France.	An
Utilize a biography to identify past tenses.	E
Compare family structure in France and in India.	E
Apprise savoir-vivre in class room.	Ap, An
Examine « Style » in a French context.	An
Relate SOS in India and in France.	E

TEXT BOOKS :

ECHO A1 – METHODE DE FRANÇAIS & CAHIER PERSONNEL D'APPRENTISSAGE
Authors: J. Girardet and J. Pécheur Publication: CLÉ INTERNATIONAL, 2013.

Books for Reference:

La Conjugaison – Nathan
French made easy – Beginners level - Goodwill Publishing House
Je parle français II - Abhay Publications
Le français avec des jeux et des activités – ELI
Langue et la civilisation – I – Mauger Bleu

Note : Texts given in the Extra Reading (Key Words) must be tested only through Assignment and Seminars.

(for candidates admitted from June 2018 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), Tiruchirapalli – 620002
PG AND RESEARCH DEPARTMENT OF ENGLISH
I YEAR UG – SEMESTER II
PART II – ENGLISH 2 - GENERAL ENGLISH II

HOURS : 6 **CODE : U15EL2GEN02**
CREDIT : 3 **MARKS: 100**

OBJECTIVES

- Students learn to use LSRW skills and advanced communication skills in the context required in their daily life.
- The students learn to analyze and express their self and their concern and responsibilities to the world around.
- The students learn how English is used in literary writing so as to imbibe the spirit of the standard language for communication.

UNIT I – SELF

Listening- Specific information from demonstration and instructions, transfer of information.
Speaking - Sharing expressions, dreams and expressing opinions.
Reading -Skimming and Scanning for specific information, reading for local comprehension.
Writing - Story Writing
Grammar - Articles and Sentence Pattern
Vocabulary - Meanings, Synonyms, Antonyms
Composition - Transfer of information: Paragraph to Bar graph/pie chart
General Essay - Courage is the key to success

TEXTS
1. *The Far and the Near* by Thomas Wolfe (Short Story)
2. *The Owl who was a God* by James Thurber (Short Story)
3. *Wings of Fire – Chapter I* by Dr. A.P.J. Abdul Kalam (Prose)

UNIT II – STRENGTHS

Listening - Listening to a process
Speaking - Telephone Etiquette
Reading - Loud reading with pause, intonation and expression in dialogue form
Writing - Writing about oneself (strengths& weaknesses, Have's & Have not's)
Grammar- Subject verb agreement, Prepositions
Vocabulary- One word substitute in the context
Composition- Letter Writing - informal letters
General essay – A bird in hand is worth two in bush.

TEXTS
1. *The Robe of Peace* by O' Henry (Short Story)
2. An extract from *Androcles and the Lion* by George Bernard Shaw (Play)

UNIT III - POSITIVE SHORTCOMINGS

Listening - Listening to facts and opinions and trying to differentiate it
Speaking - Pair Work – about have's & have not's, understanding the strengths and overcoming the weaknesses
Reading - Reading newspapers, articles, magazines, anecdotes for global and specific in analytical thinking
Writing - Filing Complaints, Travelogues
Grammar - Tenses, Direct and Indirect Speech
Vocabulary - Compound words
Composition - Dialogue Writing
General essay – Adversity is the seed of success.

TEXTS
1. *Six Thinking Hats* by Edward de Bono (Prose)
2. *A Cup of Tea* by Katherine Mansfield (Short Story)
3. An Extract from Shakespeare's *As You Like It (Act II Scene I lines 12 -17)*

UNIT IV POTENTIALS

Listening - Listening to the description of personalities, historical places and monuments
Speaking - Group Discussion – Totally controlled, partially controlled, Free
Reading - Parallel Reading, reading for pleasure
Writing - Letter writing – formal letters
Grammar - Adjectives, Degrees of Comparisons
Vocabulary - Idioms and Phrases
Composition - Debates and Discussions
General essay – My potentials

TEXTS
1. *Easy Ways to Avoid an Argument* by Sam Horn (Prose)
2. *Pygmalion* by George Bernard Shaw (Play)
3. My Heart Leaps up when I behold by William Wordsworth (Poem)
4. The Flower by Alfred Lord Tennyson (Poem)

UNIT V ACHIEVEMENTS
Listening - Listening to comparisons and arguments
Speaking - Performance
Reading - In-depth reading
Writing - Script writing of story to play
Grammar - Question Tags
Vocabulary - Homophones
Composition - Essay Writing
General essay - The reward of hard work.

TEXTS
1. *On Saying Please* by A.G. Gardiner (Prose)
2. *A Time of Green* by Anna Stillaman (Play)

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
First Year - Semester – II

Course Title	Major Core 2 – General Chemistry-II
Total Hours	105
Hours/Week	7 Hrs Wk
Code	U15CH2MCT02
Course Type	Theory
Credits	6
Marks	100

General Objectives:

To understand the concept of hybridization and various effects operating in organic compounds, learn about alilphatic hydrocarbons, the first law of thermodynamics, thermochemistry, fundamental concepts of bonding and the shapes of molecules.

Course Objectives:

CO No.	Course Objectives
CO-1	interpret the hybridization pattern, explain the polar effect operating in organic compounds and reactions of alkanes and alkenes
CO-2	classify dienes and understand its stability, explain the elimination reactions and properties of alkynes, applies the reagents of synthetic importance to organic reactions.
CO-3	interpret the first law of thermodynamics, relates heat, work and energy and applies the first law to chemical reactions, explain the heat changes.
CO-4	understands Joule-Thomson effect , classifies heat of reaction and thermo chemical laws and applies the concept of bond energies.
CO-5	understands the fundamental concepts of ionic, covalent and hydrogen bonding and predict the shapes of molecules using VSEPR, VBT and draw the molecular orbital diagram for homonuclear and heteronuclear diatomic molecules

UNIT 1- ALIPHATIC HYDROCARBONS – I **21 Hrs**

1.1 Atomic orbitals involved in organic molecules. Quadrivalency of carbon. Hybridization – sp, sp^2, sp^3.

1.2 Effects operating in organic compounds – Inductive, Electromeric, Resonance, hyperconjugation, Mesomeric and Steric effect.

1.3 Alkanes; Substitution reactions –Free radical substitution reaction (mechanism).Thermal and Catalytic reactions – Oxidation and pyrolysis. Application of cracking.Octane number, Cetane number, Flash point – definitions. Anti- knocking properties. Petroleum as a source of aromatics.

1.4 Alkenes: Nomenclature. Addition reactions. Markownikoff's and Anti Markownikoff's rule – explanation. Problems related to alkenes. Reactions showing stereo specificity and non stereo specificity.

Extra reading/Keywords:*Identifying the hybridization pattern in organic compounds*

UNIT 2- ALIPHATIC HYDROCARBONS –II & SYNTHETIC REAGENTS 21 Hrs

2.1 Dienes – conjugated, isolated and cumulated dienes. Diels Alder reaction – endo rule. 1,2 and 1,4 addition. Kinetic and thermodynamic control. Stabilities of isolated and conjugated diene.

2.2 Elimination reactions: Dehydration of alcohols, dehalogenation of vicinal dihalides and dehydro halogenations. Mechanism of E_1 and E_2. Hofmann and Saytzeff's rule of elimination. Problems related to elimination reactions.

2.3 Alkynes – Acidity of acetylene. Properties - oxidation, ozonolysis. Problems related to alkynes.

2.4 Applications of reagents of synthetic importance – SeO_2, Lead tetraacetate, OsO_4, HIO_4, DCC, Crown ethers and cyclodextrins.

Extra reading/Keywords:*Synthetic applications of oxidizing and reducing agents*

UNIT 3- THERMODYNAMICS – I 21 Hrs

3.1 Importance and Limitations of Thermodynamics. Terms and definitions – system, macroscopic properties, state variables, thermodynamic equilibrium, extensive and intensive properties, processes and their types, exact and inexact differentials, concept of heat and work.

3.2 First Law of Thermodynamics: Statement, the energy content, work, heat and energy changes, thermodynamic reversibility, work of expansion against constant external pressure, isothermal reversible work of expansion.

3.3 Heat changes at constant volume and constant pressure, heat content, definitions of Cp and Cv, relationship between Cp and Cv, reversible adiabatic expansion and compression, adiabatic relationships.

Extra reading/Keywords*:Zeroth law of thermodynamics, thermodynamic irreversibility*

UNIT 4- THERMOCHEMISTRY 21 Hrs

4.1 Joule-Thomson experiment, Joule-Thomson coefficient – derivation, sign and magnitude of Joule-Thomson coefficient, inversion temperature, derivation of inversion temperature in terms of Vanderwaal's constants.

4.2 Heat of reaction, relationship between heat of reaction at constant pressure and at constant volume, types of heat of reactions – heat of formation, combustion, neutralization and solution. Effect of temperature on heat of reaction – Kirchoff's equation.

4.3 Thermochemical laws – the Lavoisier and Laplace law, Hess's law of constant heat summation and its applications, Bond energies.

Extra reading/Keywords*:Applications of Joule-Thomson effect, Enthalpy diagrams of various systems*

UNIT 5- CHEMICAL BONDING **21 Hrs**

5.1 Ionic bonding – variable electrovalency. Lattice energy, Born-Habercycle. Covalent bonding – Covalent character in ionic bond. Fajan's rule, Effects of polarization. Percent ionic character of a polar covalent bond.

5.2 VSEPR theory – geometry of molecules containing only bonded pairs of electrons – BeF_2, BF_3, PF_5, SF_6, IF_7.

5.3 Geometry of molecules containing bonded pair and lone pairs of electrons – $SnCl_2$, NH_3, H_2O, SF_4, ClF_3, XeF_4, XeF_2 and IF_5.

5.4 VBT – Principle of Hybridisation. Formation of H_2 molecule, $BeCl_2$. MOT – Basic Principles of bonding and antibonding orbitals, MO configurations of simple molecules H_2,He^+,He_2, N_2, O_2, HF, CO.

5.5 Hydrogen bond – Types, Consequences and importance of Hydrogen bonding in sustaining life.

Extra reading/Keywords:*MO configuration of Li_2, Be_2, F_2 and NO*

Note: Texts given in the Extra reading /Key words must be tested only through Assignment and Seminars.

Course outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Describe the effects operating in organic compounds	PSO1	R, U
CO-2	Discuss the mechanism of elimination reactions	PSO3	U
CO-3	Explain the first law of thermodynamics and relate the work, heat and energy	PSO2	Ap
CO-4	Analyse the thermochemical laws	PSO3	An
CO-5	Interpret the geometry of molecules using VSEPR	PSO4	An
CO-6	Sketch the MOT for N_2 and O_2	PSO3	U

PO – Programme Outcomes; CO – Course Outcome; R- Remember; U- Understand; Ap – Apply; An – Analyse; E- Evaluate; C – Create

Text Books:

1. Soni P.L. and Chawla H.M, *Text Book of Organic Chemistry*, 26th edn., New Delhi: Sultan Chand and sons, 2014.
2. Puri B.R., Sharma L.R. and Madan S. Pathania, .*Principles of Physical Chemistry* 35th edn)., New Delhi:Shoban Lal Nagin chand and Co, 2013.
3. Puri B.R., Sharma L.R. and Madan S. Pathania, .*Principles of Inorganic Chemistry* 35th edn., New Delhi:Shoban Lal Nagin chand and Co, 2013.

BOOKS FOR REFERENCE:

1. Robert Thornton Morrison, Robert Neilson Boyd , Saibal Kanti Bhattacharjee, *Organic Chemistry*, 7th edn., Chennai.: Pearson Education India, 2011.
2. Soni P.L. and Mohankatyal *Text book of Inorganic Chemistry* 20th revised edn., sultan chand, 2013.
3. Bahl B.S, Arun Bahl and Tuli G.D. , *Essentials of Physical Chemistry,* Sultan Chand andsons, New Delhi.2007.
4. Lee, J.D., *Concise Inorganic Chemistry*, 5th edn., Blackwell Science, 1996.
5. Samuel Glasstone, *Thermodynamics for Chemists* 3rd printing., East-West edn.,1974.
6. Bahl B.S, Arun Bahl and Tuli G.D. *Essentials of Physical Chemistry,* New Delhi: Sultan Chand and sons, 2012.
7. Jain M.K. *Organic Chemsitry*, 12th edn.,, New Delhi: Shoban Lal Nagin Chand and Co, 2003.
8. Raj K. Bansal, *A Text Book of Organic Chemistry*, 5th edn., New Age International Limited, 2007.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
First Year – Semester- II

Course Title	Allied – 3: Allied Chemistry Paper III [For Botany and Zoology]
Total Hours	60
Hours/Week	4 Hrs Wk
Code	U15CH2AOT03
Course Type	Theory
Credits	3
Marks	100

General Objective:

To make the students to learn about coordination chemistry, Amino acids and proteins, thermodynamics, electrochemistry and photochemistry.

Course Objectives:

CO No.	Course Objectives
CO-1	identify , propose and apply the theories of co-ordination chemistry to the mononuclear complexes.
CO-2	classify, identify and discuss the preparation , properties and structure of amino acids, proteins and nucleic acids.
CO-3	understand, relate and explain the terminologies of first and second law of thermodynamics
CO-4	understand the basic concepts of conductance and apply it to the determination of the pH, Kohlrausch's law and conductometric titration
CO-5	relate and recognize the different photochemical laws electrochemistry

UNIT 1 -CO-ORDINATION CHEMISTRY 12Hrs

1.1 Nomenclature of mono nuclear complexes, Theories of coordination compounds – Werner, Sidgwick and Pauling theories.

1.2 Chelation and its industrial importance with particular reference to EDTA. Biological role of haemoglobin and chlorophyll.

Extra reading/Keywords:*Industrial applications of Coordination compounds.*

UNIT 2- AMINO ACIDS AND PROTEINS 12Hrs

2.1 Amino acids: Classifications, preparation and properties of α- amino acids. Test for amino acids. Peptides – peptide linkage.

2.2 Proteins – definition, classification based on physical properties and biological function, primary and secondary structures (elementary treatment). Test for proteins, Elementary idea of RNA and DNA and their biological role.

Extra reading/Keywords:*coding, decoding ,bio-synthesis of proteins*

UNIT 3- THERMODYNAMICS **12Hrs**

3.1 Terminology – System, surroundings, state of a system, variables, extensive and intensive properties, isothermal and adiabatic, reversible and irreversible processes.

3.2 First law of thermodynamics – internal energy, work done in reversible isothermal and adiabatic processes, Enthalpy of a system.

3.3 Second law of thermodynamics – Carnot cycle, Carnot theorem – statement, entropy, free energy and work function (Basic concepts alone).

Extra reading/Keywords:*Applications of thermodynamics in day to day life.*

UNIT 4 - ELECTROCHEMISTRY **12Hrs**

4.1 Electrical conductance –Conductance, specific conductance, equivalent conductance and molar conductance, determination of conductance, variation of specific and equivalent conductances with dilution.

4.2 Kohlrausch's law and its application to determine Λo of a weak electrolyte, Conductometric titrations – HCl Vs NaOH, KCl Vs $AgNO_3$, CH_3COOH Vs NaOH.

4.3 Determination of pH by conductivity method, buffer solution.

Extra reading/Keywords*:**Determination of acid strength using conductometric titration*

UNIT 5 - PHOTOCHEMISTRY **12Hrs**

5.1 Photochemistry – Photochemical reactions – Lambert's law, Beer's law, Stark Einstein's law of photochemical equivalence.

5.2 Photochemical processes – fluorescence, phosphorescence and Chemiluminescence, Photosensitized reactions.

Extra reading/Keywords:*Jabonlski Diagram, singlet, triplet states*

Note: Texts given in the Extra reading /Key wordsmust be tested only through Assignment and Seminars.

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Classify the coordination compounds according to the IUPAC nomenclature.	PSO1	U
CO-2	Discuss the preparation and properties of aminoacids and proteins.	PSO2	U
CO-3	Determine the efficiency of Carnot Cycle	PSO3	A
CO-4	Analyze the variation of specific and equivalent conductance with dilution.	PSO4	An
CO-5	Explain the laws of photochemistry	PSO2	U

TEXT BOOKS:

1. Soni P.L. and Chawla H.M, *Text Book of Organic Chemistry(* 26^{th} edn). New Delhi: Sultan Chand and sons., 2014.

2. Puri B.R., Sharma L.R. and Madan S. Pathania, *Principles of Physical Chemistry (*35th edn).New Delhi:Shoban Lal Nagin chand and Co.,2013.
3. Puri B.R., Sharma L.R. and Madan S. Pathania, *Principles of Inorganic Chemistry (*35th edn).New Delhi:Shoban Lal Nagin chand and Co., 2013.

BOOKS FOR REFERENCE:

1. Jain M.K, Sharma S.C, *Modern Organic Chemistry*, Vishal Publishing Co.,m 2007.
2. Soni P.L. and Mohankatyal , *Text book of Inorganic Chemistry*, 20th revised edition, sultan chand1992.
3 . Bahl B.S, Arun Bahl and Tuli G.D , *Essentials of Physical Chemistry*, New Delhi:Sultan Chand and sons., 2012.

(For the candidates admitted from 2015onwards)

HOLY CROSS COLLEGE (AUTONOMOUS),
TIRUCHIRAPPALLI B.A/B.Sc./B.Com/B.R.SC/B.C.A/ B.B.A
DEGREE EXAMINATION SEMESTER- II

Course Title	**SKILL – BASED ELECTIVE 1: SOFT SKILL DEVELOPMENT**
Total Hours	**30**
Hours/Week	**2**
Code	**U15RE2 SBT01**
Course Type	Theory
Credits	**2**
Marks	**100**

General Objective:
The student understands the need for the development of self esteem, team spirit and communicative skills to prepare themselves for self development.

Course Outcomes:

The student will be able to
1. Understand the importance of self awareness, values and leadership skills in capacity building
2. Understand and analyze the factors affecting interpersonal skills
3. Understand and evaluate the concepts of vision, mission and goals for corporate skills
4. Understand, apply and analyze the importance of body language, time management and stress management
5. Understand the concept and need for self development plan

UNIT I: **6 hrs**

Individual Capacity Building
Self awareness- building self-esteem- importance of having a strong self – esteem – developing positive attitude-. Anchoring on principles: Universal principles and values – forming & inculcating values- Leadership skills.
Extra reading / Key Words: *Biographies of any 2 Indian leaders*

UNIT II : **6 hrs**

Interpersonal skills
Trust-trustworthiness-interpersonal communication –art of listening, reading and writing –art of writing –building relationship-empathy.
Extra reading / Key Words: *Tips for building relationship*

UNIT III: **6 hrs**

Corporate skills

Vision, mission and goals: Concepts, vision setting, goal setting, Individual and Group goals, Concept of synergy, team building, group skills.

Extra reading / Key Words: *Group dynamics and communication skills*

UNIT IV: **6 hrs**

Management skills

Developing Body Language – Practicing etiquette and mannerism –Stress Management – Time Management Prioritization Importance and urgent activities- Time management to move towards life vision.

Extra reading / Key Words: *Polite conversations and dialogue skills*

UNIT V: **6 hrs**

Self Development Plan

Concept and Need for Self Development Plan – Preparing Self Development Plan 9 Format is used to complete the self development Plan), Monitoring and Evaluation of self Development plan – Developing indicators for self development introduction to National Skill Development Mission.

Extra reading / Key Words: *Case study*

Note: Extra reading/Key words are only for internal testing(Seminar/Assignment)

Course Course Outcome:

1. explain the importance of self awareness, values and leadership skills in capacity building
2. analyze the factors affecting interpersonal skills
3. evaluate the concepts of vision, mission and goals for corporate skills
4. apply and analyze the importance of body language, time management and stress management
5. summarize the concept and need for self development plan

REFERENCES:

Alex K.(2012) Soft Skills – Know Yourself & Know the World, S. Chand & Company Ltd., New Delhi Meena K. Ayothi V. (2013). A Book on Development of Soft Skills (Soft Skills: A Road Map to Success), P.R. Publishers & Distributors, Trichy.

Francis Thamburaj S.J. (2009). Communication soft skills for Professional Excellence, 1st Ed., Grace Publishers, Rathan Reddy B.(2005). Team Development and Leadership, Jaico Publishing House, Mumbai.

(For candidates admitted from 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 2 B.A./ B.Sc.,/B.Com./BCA & BBA, DEGREE EXAMINATION

SEMESTER II / III

Course Title	**SKILL – BASED ELECTIVE 2: SUSTAINABLE RURAL DEVELOPMENT AND STUDENT SOCIAL RESPONSIBILITY**
Total Hours	**30**
Hours/Week	**2**
Code	**U18RE2SBT02/ U18RE3SBT02**
Course Type	Theory
Credits	**2**
Marks	**100**

General Objective:

The Student will be able to understand the concept of natural resources and resource mapping of villages and strengthen their leadership qualities, keeping in mind their responsibilities towards society.

Course Objectives:

The student will be able to:

1. understand the functioning of NGO's and SHG's
2. educate themselves about the different farming methods.
3. practice alternative agricultural methods
4. understand the need for social responsibility through NCC.
5. understand the Leadership and Man Management

Unit – I **6hrs**

Village – Survey of natural resources and resource mapping of villages , village level Participating Approach (VLPA) – Role of NGO'S and SHG'S – Impact of the Green Revolution.

Extra reading/Key word: *resource mapping tools*

Unit –II **6hrs**

Alternative agriculture models – Traditional Farming – Organic Farming – Zero budget farming– Precision Farming ,Terrace Farming and Kitchen garden.

Extra reading / Key word: *Practices in India*

Unit – III **6hrs**

Elements in Alternative Agriculture models ,Vermi compost, Azolla,Amirthakarasal Mulligai Puchiviratti and neem products

Extra reading/Key word*:Government policy for* Alternative Agriculture farming.

Unit IV- **6hrs**

Aims of NCC , MOTTO , Cardinal Principles, Equivalent Rank (Army, Navy ,Airforce)

Extra reading/Key word*: Benefits of being an NCC cadet.*

Unit -V **6hrs**

Leadership and Man Management – duties of citizen, leadership Training – Types, qualities – Discipline, Duty, Moral – Man Management, Civil Defense – Aims, Types, Services, Problems
Extra reading/Key word: *Defense recruitment modes.*

Note: Extra Reading/ keywords are only for Internal Testing (Seminar/ Assignments) Course Outcome:

1. Explain the functioning of NGO's and SHG's
2. Summarize themselves about the different farming methods.
3. Explain the alternative agricultural methods
4. Point out the need for social responsibility through NCC.
5. Evaluate the Leadership and Man Management

REFERENCES:

1. Packages of organic practices from Tamil Nadu Center for Indian Knowledge System(CIKS)
2. Tracey, S. and Anne, B. (2008). Sustainable development linking economy, society, environment. OECD insights.
3. www.fao.org.in

(For Candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
B.A/B. Sc/B.Com /B.C.A-DEGREE COURSES
LIFE ORIENTED EDUCATION
ETHICS – I: RELIGIONS AND VALUE SYSTEMS

HRS / WK :1 **CODE:U15VE2LVE01**
CREDITS : 1 **MARKS : 100**

OBJECTIVES:

- To enable the students to understand and appreciate all Religions and Culture
- To help the students to becom
- To aware of the negative forces of religions.

UNIT – I: RELIGION

God – Faith, Religion, Definition, Nature, Characteristics and Basic values of different religions. Impact of Globalization on religion – Importance of worship in holy places – celebration, Communion (come-union) – Socialization

UNIT – II: DIFFERENT RELIGIONS

Basic characteristics and basic thoughts of different religions: Buddhism, Christianity, Hinduism, Islam, Jainism and Sikhism

UNIT – III: UNITY OF RELIGION

Unity of Vision and Purpose- Respect for Other Religions, Inter Religious Co-operation, Religious Pluralism as a fact and Religious Pluralism as a value

UNIT – IV: FUNDAMENTALISM, COMMUNALISM AND SECULARISM

Meaning and impact of Fundamentalism, Communalism, Violence and Terrorism – Tolerance – Secularism – Individualism

UNIT – V: VALUE SYSTEMS

Value and Value Systems - Moral Values -Individuals and the need to stand for values in the context of Globalization – Consumerism - Will power to live up to your values - Healthy body for empowerment – Physical health and Mental hygiene, food and exercises

REFERENCES:

1. Social Analysis (a course for all first year UG students), 2001. Department of Foundation Courses, Loyola College, Chennai-34.
2. Special topics on Hindu Religion, 2001.Department of Foundation Courses, Loyola College, Chennai-34.
3. Religion: the living faiths of the world, 2001. Department of Foundation Courses, Loyola College, Chennai-34.
4. Sydney Am Meritt, 1997. Guided meditations for youth.
5. Marie Migon Mascarenhas,1986. Family life education- Value Education, A text book for College students.

(For Candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI -2
B.A/B. Sc /B.Com/ B.C.A-DEGREE COURSES
LIFE ORIENTED
EDUCATION CATECHISM –
I: GOD OF LIFE

HRS / WK : 1 **CODE: U15VE2LVC01**
CREDIT : 1 **MARKS : 100**

OBJECTIVES:

- To enable the students to know God and his Salvific acts through Holy Bible
- To enable the students to know about the Paschal Mystery

UNIT – I: CREATION AND COVENANT

Study from petty catechism - Genesis - God revealed himself in creation -God who preserves creation through covenants

(Pentateuch) -Our response to God's covenant -Reason for its success and failure -The relationship of God with Israel -Image of God in Old Testament-God and me

UNIT – II: GOD OF THE PROPHETS

God's care for the humanity through Prophets-Major (Isaiah, Jeremiah) Minor (Amos) and Women (Deborah) Prophets-Their life and mission - Theology of Prophets -Concept of sin and collective sins expressed by prophets and God's saving love.

UNIT – III: GOD OF WISDOM

God experience through wisdom Literature, its origin and growth

UNIT – IV: SYNOPTIC GOSPELS

Synoptic Gospels and John's Gospel – Author –historical background –Chief message of each Gospel and for whom it was written - A few passages for the study of parallelism in the Synoptic Gospels.

UNIT – V: LUKE'S GOSPEL

Study of Luke's Gospel in detail – speciality of the Gospel – main emphasis of the message
– meaning and blessing of suffering and paschal joy in one's life - Passion – Paschal Mystery

REFERENCES:

1. Catechism of the Catholic Church published by Theological Publications in India for the Catholic Hierarchy of India, 1994
2. The Holy Bible Revised Standard Version with Old and New Testaments Catholic Edition for India.
3. Vaazhvin Vazhiyil – St. John's Gospel- Fr. Eronimus
4. God's Word nourishes A catholic approach to the Scriptures Dr. Silvano Renu Rita, O.C.V. STD and Dr. Mascarenhas Fio S.J. D.mim. Catholic Bible I
5. Documents of Vatican II – St. Paul's Publications, Bombay 1966.

(For Candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE(AUTONOMOUS) TRICHIRAPALLI-2.
B.A/B.Sc/B.Com /B.C.A-DEGREE COURSES
LIFE ORIENTED EDUCATION
BIBLE STUDIES – I: NEW TESTAMENT

HRS / WK : 1 **CODE: U15VE2LVBO1**
CREDIT : 1 **MARKS : 100**

OBJECTIVE:

- To enable the students to develop the passion for the Word of God – Jesus and inculcate the thirst of Missionaries being a disciple of Christ.

UNIT – I: BIBLE – THE WORD OF GOD

- Books of the Bible – Division into Old Testament and New Testament – History of the Bible-
- Messianic Prophecies (Isaiah 9:6,40:3,53:1-12,61:1-3,Micah 5:2)
- The Birth and Ministry of John the Baptist (Luke 1:1-80,Mat 3:1-17,14:1-12)
- The Birth, Passion, Death and Resurrection of Jesus (Luke 1:26-80,2:1-52,John 1 :18-21)

UNIT – II: MINISTRY OF JESUS

- Miracles (Mark 2:1-12,Luke 4:38-41,6:6-11,7:1-17,8:26-56,John 2:1-12)
- Parables (Luke 6:46-49,8:4-15,10:25-37,15:1-32)
- Preaching
  - Sermon on the mount (Mat 5-7)
  - Lord's Prayer (Luke 11: 1-13)
  - Kingdom of God (Mat 13: 24-50)
- Prayer life of Jesus (Luke 5:12-16,John 11:41-45,17:1-26,Mark 14:32-42)
- Rich and Poor (Luke 16: 19-31,21:1-4)
- Women Liberation (John 4:1-30,8:1-4)
- Women in the New Testament
- Martha & Maria (Luke 10: 38- 42, John 11: 1-46)

UNIT – III: CHURCH – BIRTH AND GROWTH

- Early Church
- Birth (Acts 2:1-41)
- Unity and sharing (Acts 2:42-47,4:1-37,5:1-11)
- Witnessing life (Acts 3:1-26,5:12-42,8:26-40, 16:20-34)

- Comparison between early Church and present Church.

UNIT – IV: DISCIPLES AND APOSTLES

- Mother Mary (Mother of Jesus) (Luke 1: 27-35, John 2: 1-12, 19:35, Acts 1: 13-14)
- St. Peter (Luke 22:1-7,Acts 2:1-41,12:1-17)
- St. Andrew (Mat 4:18-20,John 1:35-42,6:1-14)
- St. Stephen (Acts 6,7)
- St. Paul (Acts 8,9,14,17,26 and 28)
- St. Thomas (John 20:24-31)

UNIT – V: ST. PAUL'S LETTERS AND THE MESSAGE

- I & II Corinthians
- Galatians
- Ephesians
- Philippians
- I & II Timothy
- Titus

REFERENCES:

1. Holy Bible
2. John Stott, 1994, **"Men with a Message"**, Angus Hudson Ltd. London.

HOLY CROSS COLLEGE (Autonomous), Tiruchirappalli - 620 002.

TAMIL DEPARTMENT

For Candidate admitted from 2015 onwards

Second Year - Semester – III

Course Title	**இரண்டாமாண்டு – மூன்றாம் பருவம்**
Total Hours	**90**
Hours/Week	**6 Hrs Wk**
Code	**U15TL3TAM03**
Course Type	**Theory**
Credits	**3**
Marks	**100**

General Objectives:

வாழ்வியல் நெறிகளாகிய அறம், பொருள், இன்பம், வீடுபேறு ஆகியவற்றின் சிறப்பினை எடுத்துரைத்தல்

- To explain the greatness of the values such as dharma, knowing the meaning of life attaining pleasure and household life.
- To create the awareness about social life.
- To strengthen the religious ideologies.

Course Objectives:

CO No.	Course Objectives
CO-1	வாழ்வியல் நெறிகளாகிய அறம், பொருள், இன்பம், வீடுபேறு ஆகியவற்றினை எடுத்துரைத்தல்
CO-2	சமயங்கள் உணர்த்தும் அறக்கருத்துக்களை அறிந்து கொள்ளச்செய்தல்.
CO-3	சோழர்கால காப்பிய இலக்கியங்கள் மற்றும் இலக்கண நூல்களை வகைப்படுத்துதல்.
CO-4	நாடகம் நடிப்பதன் வாயிலாக மாணவர்களின் திறன்களை வளர்த்தல்.
CO-5	தமிழக கோயில்களின் கலைநுட்பங்களையும், பண்பாட்டுச் சிறப்புகளையும் விவரித்தல்

அலகு:1 செய்யுள் **18 Hrs**

1. சிலப்பதிகாரம் - கடலாடு காதை
2. மணிமேகலை – உலகவறவி புக்க காதை
3. கம்பராமாயணம் - கங்கைப் படலம்

key Words (Extra Reading)

rPtfrpe;jhkzp

அலகு:2 செய்யுள் **18 Hrs**

1. இரட்சணிய யாத்திரிகம் - மரணப்படலம்
2. சீறாப்புராணம் - ஒட்டகை பேசிய படலம்

அலகு:3 **18 Hrs**

தமிழ் இலக்கிய வரலாறு

சோழர் காலம்

அலகு:4 **18Hrs**

நாடகம்

சத்திய வேள்வி – அய்க்கண்

key Words (Extra Reading)

யாருக்கும் வெட்கமில்லை - சோ

அலகு:5 **18 Hrs**

கோயிற்கலை

Note: Texts given in the Extra reading /Key words must be tested only through Assignment and Seminars.

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	காப்பியங்கள் வாயிலாக இயற்கையோடு இணைந்த குடிமக்களின் வாழ்க்கை நெறியினை உணர்வர்.	PSO 1	U
CO-2	சமயங்கள் உணர்த்தும் அறநெறிக்கருத்துக்களை அறிவர்.	PSO 2	AN
CO-3	சோழர்கால காப்பிய இலக்கியங்கள் மற்றும் இலக்கண நூல்களை நினைவுக்கூர்வர்	PSO 2	R
CO-4	நடிப்புத்திறனை நுட்பமாகப் புலப்படுத்துவர்.	PSO 3	U
CO-5	தமிழக கோயில்களின் கலைநுட்பங்களையும், பண்பாட்டுச் சிறப்புகளையும் மாணவர்கள் ஆராய்வர்.	PSO 4	U

PO – Programme Outcomes; CO – Course Outcome; R- Remember; U- Understand; Ap – Apply; An – Analyse; E- Evaluate; C – Create

பாட நூல்கள்

1. செய்யுள் - தமிழாய்வுத்துறை வுத்துறை வெளியீடு
2. தமிழ் இலக்கிய வரலாறு - தமிழாய்வுத்துறை வுத்துறை வெளியீடு
3. நாடகம்
   அய்க்கண் - சத்திய வேள்வி
4. கோயிற்கலை - தமிழ்நாட்டிலுள்ள ஆலயங்களைக் கலை நுணுக்கத்துடன் காணுதல்

(For the candidates admitted from June 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-620002

DEPARTMENT OF HINDI

SEMESTER – III

Course Title	**PART – I LANGUAGE** **HINDI- III-MEDIEVAL–MODERN POETRY AND HISTORY OF HINDI LITERATURE-1** **(Veergadha Kal Aur Bakthi Kal)**
Total Hours	**90**
Hours/Week	**6Hrs/Wk**
Code	**CODE: U18HN3HIN03**
Course Type	**Theory**
Credits	**3**
Marks	**100**

General Objective : To enable the students to appreciate and critically evaluate Spirituality in Hindi Literature.

Course Objectives (CO):

The learner will be able to

CO No.	**Course Objectives**
CO -1	remember, understand and evaluate the Poetry of the masters.
CO- 2	understand and analyse the history of Hindi literature in the literary works.
CO- 3	understand and analyse the cause and consequence on revolution in literature.
CO- 4	Evaluate various streams of Bhakthi kaal.
CO- 5	appreciate and analyse the works of Bihari.

UNIT – I **(18 Hours)**

1. Kabir Das
2. Todathi pathar
3. Veergatha Kal

(Pravarithiyan, Kavi, Rachanayean)

Extra Reading (Key Words): *PrithviRaj Rasoo, Jago phir ek bhar*

UNIT- II ***(18 Hours)***

1. Thulasi Das
2. Anal Kireet
3. BhaktiKal – Gnanashrayi Sakha

Extra Reading (Key Words): *Kabir, Ramdhari Singh Dinakr*

UNIT- III ***(18 Hours)***

1. Rahim Ke Dohe
2. Jhoote Patte
3. BhaktiKal – Prem Margi Sakha

Extra Reading (Key Words): *Rahim*

UNIT- IV ***(18 Hours)***

1. Raskhan
2. Aavo phir se gaaon basayen
3. BhaktiKal –Ram Bhakti Sakha

Extra Reading (Key Words):

UNIT- V **(18 Hours)**

1. Bihari Ke Dohe
2. Sipahi
3. BhaktiKal – Krishna Bhakthi Sakha

Extra Reading (Key Words): *Bihari satsai*

Note : Texts given in the Extra Reading (Key Words) must be tested only through Assignment and Seminars.

Course Outcomes:

The learner will be able to:

CO No.	Course Outcomes	Cognitive Level
CO -1	Recite the poems of Kabir Das	R, U, E
CO- 2	Distinguish necessity and luxury Place Bhakthi kaal in Hindi Literature	U, An
CO- 3	Debate on pros and cons of a revolution	U, An
CO- 4	Summarize the four streams of Bhakthi kaal	E
CO- 5	Examine the powerful words of Bihari	An

CO- Course Outcome; R- Remember; U- Understand; Ap- Apply; An- Analyze; E- Evaluate; C- Create

Prescribed Books

- History Of Hindi Literature ; Aacharya Ramachandra Shukla, Delhi.
- Kavya Surabh: Pub.Dakshina Bharat Hindi Prachar Sabha , Cheenai.

Reference Books :

- Nai Sadhi Mein Kabir- Edi. Dr. M. Firoz Khan- Krishang Publication, Delhi.
- Dharmaveer Bharathi Ki Kavitha – Dr.Vibha shukla.;Aastha associates, Illahabad.

(For candidates admitted 2016 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2
DEPARTMENT OF FRENCH
SEMESTER III

Course Title	**PART I – LANGUAGE - FRENCH PAPER III** **(**LANGUAGE & CIVILISATION (ÉCHO A2 2e édition)
Total Hours	90
Hours/Week	6 Hrs/Wk
Code	U16FR3FRE03
Course Type	Theory
Credits	3
Marks	100

-
- **General Objective**: To enable the students to understand the French cultural aspects and apply the grammar learnt in appropriate situations.
- **Course Objectives (CO):**
- **The learner will be able to**
-

CO 1	understand the French education system and evaluate the same across the world.
CO 2	understand the usage of pronouns that denote quantity and place and apply them in answers; analyse extracts from magazines and work conditions in France.
CO 3	remember the rules of construction and usage of subjunctive mode and apply the same in sentences; evaluate French politics.
CO 4	understand gerund, adverbs, relative pronouns and evaluate press and media in France.
CO 5	remember the usage of tenses and analyse the benefits of learning a foreign language.

Unit 1 Vivement demain ! (18 Hours)

Le futur, la comparaison des qualités, des quantités et des actions – la santé – le travail dans trente ans– la vie quotidienne - l'éducation et la formation (l'enseignement en France) – faire des projets.

Extra Reading (Key Words): le système éducatif en France.

Unit 2 Tu as du boulot ? (18 Hours)

Le pronom « en » et « y » - exprimer une condition : si + présent, si + passé composé, exprimer des préférences – les emplois de demain - des idées pour créer une entreprise – l'économie en France - le travail en dix points

Extra Reading (Key Words): l'organnigramme d'une enterprise.

Unit 3 Qu'en pensez-vous? (18 Hours)

L'emploi du subjonctif , l'expression de la quantité – revue de presse – entrée en politique – la naissance des départements – la région 'Poitou- Charentes' - la vie politique

Extra Reading (Key Words): étude comparée de la politique en France et en Inde

Unit 4 C'est tout un programme ! (18 Hours)

Les propositions relatives, la formation des adverbes, la forme « en + participe présent » - parler de la télévision et de la radio - comment les Français s'informent (la télévision et la presse en France)

Extra Reading (Key Words):TV5 Monde, les journaux français.

Unit 5 On se retrouve (18 Hours)

L'emploi et la conjugaison de l'indicatif – parler de son apprentissage du français langue étrangère – les rencontres : modes et comportements – une vraie vie de quartier grâce à Internet – formules pour un premier contact par écrit.

Extra Reading (Key Words): Paris, la capital de la mode!

Course outcomes	**Cognitive level**
Contrast French education system to that of India.	E
Examine press and work conditions in India	An
Label subjunctive mode and its usages	U, Ap
Interpret politics in France	E
Categorize French media and press	E
Simplify "FLE"	An

TEXT BOOKS :

ECHO A2 – METHODE DE FRANÇAIS & CAHIER PERSONNEL D'APPRENTISSAGE
Authors: J. Girardet and J. Pécheur Publication: CLÉ INTERNATIONAL, 2013.

Books for Reference:

La Conjugaison – Nathan
French made easy – Intermediate level – Goodwill Publishing House
Je parle français III – Abhay Publications
Le français avec des jeux et des activités – ELI
Langue et la civilisation – I – Mauger Bleu

Note : Texts given in the Extra Reading (Key Words) must be tested only through Assignment and Seminars.

(for candidates admitted from June 2017 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), Tiruchirapalli – 620002
PG AND RESEARCH DEPARTMENT OF ENGLISH
I YEAR UG – SEMESTER III
PART II – ENGLISH 3 - GENERAL ENGLISH III

HOURS : 6 **CODE : U15EL3GEN03**
CREDIT : 3 **MARKS: 100**

GROWING WITH VALUES

Objectives:

1. To acquaint students with fine pieces of literature thereby enhancing their communicative skills.
2. To develop both receptive (reading, listening) and productive (speaking, writing) skills through communicative classes
3. To create interest among students for self-learning
4. To create a general awareness among students regarding the importance of humanistic values in the modern world.
5. To acquire proficiency in oral and written language.

UNIT I – Love, Faith and Hope

Listening for comprehension and general significance
Speaking about one's fear and hope
Reading for specific and global comprehension.
Writing – creative writing
Grammar – reporting speeches
Vocabulary – shades of meaning, Idioms and phrases (10)
Composition – Writing Paragraphs

TEXTS

"Hope" by Emily Dickinson **(Internal Testing)**
1. An extract from the Nobel Lecture by Mother Teresa
2. Angels Never Say "Hello!" by Dottie Walters
3. The Treasure by Alice Grey (Taken from Plant the seed by Timothy Kendrick)

UNIT II – Perseverance

Listening- for distinguishing / convert / summarize/(interview)
Speaking- a role play on the theme of perseverance (enactment of fables/ folk tales based on the theme)
Reading – read the passage (from encyclopedia) and draw a flowchart / tree diagram [main idea]
Writing- parallel writing
Grammar – descriptive discourse – degrees of comparison (describing person, city, places, things, weather climate)
Vocabulary – antonyms, idioms and phrases (10)
Composition – Creative writing

TEXTS

Mother to Son by Langston Hughes **(Internal Testing)**
1. **The Perseverance of a Spider.**
2. Two Gentlemen of Verona by A.J Cronin
3. Faith of determination and perseverance (about Walt Disney)

UNIT III – Tolerance/Benevolence/Compassion

Listening- for developing / relating (speech)
Speaking- simulate any personality related to humanity
Reading – scan the passage (life of …) and write down key phrases to sum up [figurative languages]
Writing- case study / letter writing (personal)
Grammar –writing reports of events and processes (voices)
Vocabulary – Suffixes, idioms and phrases
Composition – imaginative writing

TEXTS:

Portrait of Gandhiji by Will Durant (1st Para) **(Internal Testing)**

1. Gitanjali (Poem No. 11) Leave this chanting – Rabindranath Tagore
2. The Selfish Giant – Oscar Wilde
3. The Price of a Miracle in *Rainbows follow rain* by Dan Clark

UNIT IV – Essential Life Skills/ Resilience

Listening- for deducing/ illustrating / subdivide to make notes (newspaper article)
Speaking- interviewing (gap activity) / picture description
Reading – in-depth reading to classify/ categorize [point of view]
Writing- Situational writing
Grammar – analysis of sentences – simple, compound, complex
Vocabulary – compound words, idioms and phrases
Composition – essay writing (proverb as title)

TEXTS:

The story of Rosa Parks **(Internal Testing)**

1. Life of Nelson Mandela
2. It's cool to be kechi by Juliet Hindell
3. 'Home they brought Her warrior dead' by Alfred Lord Tennyson

UNIT V – The Art of Living

Listening- for comparing and contrasting (personality/lives of two people)
Speaking- reporting from the magazine / newspaper
Reading - read the passage to draw inference / parallel reading [making connections]
Writing- creative writing
Grammar –'If' clause
Vocabulary – coinage, idioms and phrases
Composition – creative writing/imaginative writing

TEXTS:

"A Psalm of Life" by H.W. Longfellow **(Internal Testing)**

1. The Power of Limitless living - by Robin Sharma.
2. The Art of Understanding Other People by Clarence Hall
3. "Leisure" by William Henry Davies

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Second Year – Semester - III

Course Title	MAIN CORE PAPER – GENERAL CHEMISTRY – III
Total Hours	90
Hours/Week	6 Hrs /Wk
Code	U15CH3MCT04
Course Type	Theory
Credits	6
Marks	100

General Objective:
To understand the second, third law of thermodynamics and the concept of chemical potential, the general characteristics of s and p block elements and their compounds and the properties of aromatic hydrocarbons.

Course Objectives:

CO No.	Course Objectives
CO-1	understand second law of thermodynamics, analyse thermodynamic cycles, classifies entropy, interprets work function and free energy
CO-2	interpret the concept of chemical potential and partial molar properties, apply the third law of thermodynamics and relate free energy and chemical reactions.
CO-3	analyse the characteristics of s- block elements and compares the properties of alkali and alkaline earth meatls
CO-4	outline the characteristics of p- block elements and find out the anomalous behavour of Carbon, oxygen and fluorine
CO-5	formulate the preparation, properties of mononuclear and polynuclear aromatichydrocarbons and predict the products formation.

UNIT 1 - SECOND LAW OF THERMODYNAMICS **18Hrs**

1.1 The second Law of thermodynamics: Need for the second law of thermodynamics, spontaneous or irreversible processes, Statements of the II law, Conversion of heat into work – the Carnot's theorem, the Carnot cycle, maximum efficiency of heat engine, refrigeration engine, thethermodynamic scale of temperature.

1.2 Entropy – definition, entropy changes in reversible and irreversible processes, entropy change and phase change, entropy changes of ideal gases, entropy of mixing, entropy and disorder.

1.3 Variation of entropy with temperature, Maxwell's relations, the thermodynamic equations of state.

1.4 Free energy and work function – definition, Work function and Free energy relationships. The Gibb's Helmholtz equation, conditions of equilibrium.

Extra reading/Keywords:*Thermodynamic cycles, Applications of Entropy*

UNIT 2 - CHEMICAL POTENTIAL AND THIRD LAW OF THERMODYNAMICS 18Hrs

2.1 Chemical potential – partial molar properties, physical significance of partial molar property, partial molar free energy – Gibb's Duhem equation, variation of chemical potential with temperature and pressure.

2.2 Chemical potential in a mixture of ideal gases, Clausius-Clapeyron equation.

2.3 The Third law of thermodynamics – Nernst heat theorem, the third law, determination of absolute entropies of solids liquids and gases, exceptions to III law, applications of III law of thermodynamics.

2.4 Free energy and chemical reactions – Vant-Hoff reaction isotherm, standard free energy of reaction, variation of equilibrium constant with temperature – The Vant-Hoff's equation.
Extra reading/Keywords:*Concept of fugacity and its relationship to chemical potential*

UNIT 3- S – BLOCK ELEMENTS 18Hrs

3.1 General characteristics of s-block elements with respect to atomic and ionic radii, ionization energy, reducing properties, the electro positive character, hydration of ions, oxidation potentials, flame colouration, lattice energy and chemical properties.

3.2 Trends in physical and chemical properties of compounds of s-block elements:
Comparison of Li with other elements of group I. Comparison of Be with other elements of group II. Diagonal relationship between Li and Mg, Al and Be. Biological functions of Na, K, Ca and Mg ions.

3.3 Compounds of s block elements: $LiAlH_4$, $NaNH_2$, NaCN, Beryllium acetate, CaC_2, $CaCN_2$, Plaster of Paris, Epsom Salt - Preparation, properties and uses.

Extra reading/Keywords:*Isotopes of Hydrogen, Metallic Hydrides*

UNIT 4- P- BLOCK ELEMENTS 18Hrs

4.1 General characteristics of p-block elements: Characteristics of p-block elements- atomic radii, ionization potential, electronegativity, electron affinity, metallic and non-metallic properties, oxidation states, inert pair effect, allotropy, catenation, flame colouration.

4.2 Boron compounds: Diborane – structure. Borax and borazole – preparation, properties and structure. Comparison of borazole with benzene. Carbon - Anomalous behavior of carbon, structure of graphite and diamond.Nitrogen – Liquid NH_3 as non-aqueous solvent.

4.3 Oxygen compounds – Anomalous behaviour of oxygen, Classification of oxides based on their chemical behaviour – acidic oxides, basic oxides, amphoteric oxides and neutral oxides – examples.

4.4 Halogens: Unique character of fluorine, Pseudo halogens - Properties. Positive nature of iodine. Chloro fluoro carbons – applications and hazards. Biological functions and toxicity of iodine.

Extra reading/Keywords:*Industrially important compounds of p- block elements*

UNIT 5- AROMATIC HYDROCARBONS **18Hrs**

5.1 Aromatic hydrocarbons: Nomenclature. Structure of benzene. Stability of benzene ring. Molecular orbital picture of benzene. Aromaticity- Huckel's rule and its applications.

5.2 Effect of substituent groups - Activating and deactivating groups, directiveinfluence, orientation. Hammett equation - Substituent effect.

5.3 Reactions of benzene ring. Electrophilic substitution reaction in aromatic compounds-general mechanism, mechanism for nitration, sulphonation, halogenations and Friedel Craft's reactions. ucleophilic substitution reactions in benzene ring- Benzyne mechanism.

5.4 Aromatic poly nuclear hydrocarbons – Naphthalene, Anthracene and Phenanthrene – synthesis, properties and uses.

Extra reading/Keywords:*Aromaticity in annulenes*

Note: Texts given in the Extra reading /Key words must be tested only through Assignment and Seminars.

Course Outcomes

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Calculate the work function and free energy.	PSO 1	Ap
CO-2	Derive Maxwell's relations.	PSO 2	U
CO-3	Describe Nernst heat theorem.	PSO 2	U
CO-4	Compare the periodic properties of alkali and alkaline earth metals.	PSO 3	R,U
CO-5	Discuss the anomalous behavior of fluorine and oxygen	PSO 3	U
CO-6	Predict aromaticity using Huckel's rule.	PSO 3	Ap
CO-7	Discuss the mechanism of aromatic electrophilic substitution reaction.	PSO 4	U
CO-8	Predict the oxidation and reduction product of aromatic poly nuclear hydrocarbons.	PSO 5	U, Ap

Text Books:

1. Bahl B.S., Arun Bahl and Tuli, *Essentials of Physical Chemistry*, New Delhi, Sultan chand and sons, 2007.
2. Bahl B.S., Arun Bahl, *A Text Book of Organic Chemistry*, New Delhi, Sultan Chand &sons, 2010.
3. Puri B.R. and Sharma L.R., '*Principles of Inorganic Chemistry'*, New Delhi, Sultan Chand, 1989.

BOOKS FOR REFERENCE:

1. Puri B.R., Sharma. L.R. and Madan S. Pathania, '*Principles of Physical Chemistry*', 35th edition, New Delhi, Shoban Lal Nagin Chand and Co., 2011.

2. Jain M.K. '*Organic Chemistry*, 12th Edition, New Delhi, Shoban Lal Nagin (35th Edition), New Delhi, Shoban Lal Nagin Chand and Co., 2003.
3. Lee, J.D. *A New Concise Inorganic Chemistry* (4th Ed.). London:ELBS, 1995.
4. Samuel Glasstone, *Thermodynamics for Chemists* (3rd printing). East-West Edn., 1974.
5. Clayden, Warrenn, Wothers, '*Organic chemistry'*, 2nd Edition, Oxford University Press, 2012.
6. John Mc Murray, '*Organic chemistry'*, 8th Edition, Internation Edition, 2012.
7. Paula Yurkanis Bruice,. '*Organic chemistry'*, 8th Edition, Pearson Education Ltd., 2016.
8. Robert Thornton Morrison, Robert Neilson Boyd , Saibal Kanti Bhattacharjee, *Organic Chemistry*, 7th Edition, Pearson Education India, Chennai, 2011.
9. Soni P.L. and Chawla H.M., "*Text Book of organic Chemistry*", 27th Edition,Sultan Chand and Sons, 1997.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Second Year – Semester - III

Course Title	MAINCORE – 5: VOLUMETRIC ANALYSIS – Theory Cum Lab -I
Total Hours	60
Hours/Week	4 Hrs /Wk
Code	U15CH3MCP05
Course Type	Theory Cum Lab
Credits	4
Marks	100

General Objective:

To expose the students the various concepts in volumetric analysis and to gain skill in the preparation of standard solution and to find out the strength of unknown solutions in different types of volumetric analysis.

CO No.	Course Objectives
CO-1	Understands the terminologies and principle involved in volumetric analysis
CO-2	Define a primary standard ,standard solution and determine the equivalence point
CO-3	determine the concentration of solution in various units and prepare standard solution and dilute solution
CO-4	determine the strength of the given solution from different types of titrations like acid base, redox,and precipitation
CO-5	Solve volumetric problems using formula method

UNIT: I - VOLUMETRIC ANALYSIS12Hrs

1.1 Terminology, Basic requirement of a titration, standard solution – primary standard, preservation of standard solution, expressing concentration of standard solution, simple correlation for quick and convenient volumetric calculation, p-functions.

1.2 Volumetric Titrations: Acid base titration – acid base titration and use of indicators, titration of a strong acid against a strong base, titration of a weak acid with a strong base, titration of a weak base with strong acid, titration of Na_2CO_3 with HCl, the theory of acid base indicators, action of phenolphthalein and methyl orange.

1.3 Redox titration – theory – titration of Mohr salt against $KMnO_4$, oxalic acid against $KMnO_4$, $FeSO_4$ against $K_2Cr_2O_7$, internal indicator, external indicator, starch, iodimetry and iodometry. Precipitation titrations – conditions for precipitation titration and indicators.

1.4 Complexometric titration:-EDTA titrations, indicators of EDTA titrations, complexometric titration curves, EDTA – titration methods – masking of ions, precautions to avoid errors in titrimetric analysis, corrections for unavoidable errors.

Extra reading/Keywords :*Determine the total hardness present in the given water sample*

VOLUMETRIC ANALYSIS:

1. Acidimetry
   Estimation of Oxalic acid.

2. Permanganometry:
   i. Estimation of $FeSO_4$.
   ii. Estimation of Calcium. (Direct Method).

3. Iodimetry & Iodometry:
   i. Estimation of copper.
   ii. Estimation of Arsenious oxide.

4. Dichrometry:
   Estimation of Ferrous ion.

5. EDTA Titrations:
   i. Estimation of Magnesium.
   ii. Estimation of Zinc.

Note: Texts given in the Extra reading /Key wordsmust be tested only through Assignment and Seminars.

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Critical capacity to understand the procedures in order to define the common methods of analysis..	PSO 2	U
CO-2	Use correct titrimetric procedure when carrying out titrations	PSO 5	An
CO-3	Prepare the standard solution of different strength.	PSO 5	U
CO-4	Explain the acid base, redox and complexometric titrations with examples.	PSO 6	An
CO-5	Apply knowledge of concentrations of solutions to everyday examples and estimate the strength of the given unknown solution	PSO 6	App

TEXT BOOKS:

1. Puri B.R. and Sharma L.R. *Principles of Inorganic Chemistry.* New Delhi: Shoban Lal Nagin Chand and Co., 2002.
2. Venkateswaran V., Veeraswamy R. and Kulandaivelu A.R. *Basic Principles of Practical Chemistry.* New Delhi: 2nd edn, Sultan Chand & Sons, 1997.

BOOKS FOR REFERENCE:

1. Svehla G. *Vogel's Qualitative Inorganic Analysis.* US: 7th Edition, Prentice Hall, 1996.
2. Mendham J., Denney R. C., Barnes J. D. and Thomas M. J. K. *Vogel's Prescribed Book of Qualitative Chemical Analysis*, US: 6th Edition, Prentice Hall, 2000.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Second Year - Semester – III

Course Title	ALLIED – 4: Allied Chemistry Paper I (For Physics Main)
Total Hours	60
Hours/Week	4 Hrs /Wk
Code	U15CH3AOT01
Course Type	Theory
Credits	4
Marks	100

General Objective:

To make the students to understand the basic concepts in organic reactions, quantum numbers, chemical bonding, electrical and magnetic properties, solutions, colligative properties and phase equilibria.

Course Objectives:

CO No.	Course Objectives
CO-1	illustrate the types of organic reactions and the influence of field effects
CO-2	recognizes the concept of grouping elements based on their properties in periodic table
CO-3	understand the basic concepts of ionic and covalent bonding
CO-4	identify polar and non-polar molecules and to draw the molecular structure of some molecules and understand the concept of magnetic properties
CO-5	differentiate ideal and non-ideal solutions and to draw the phase diagram of water and lead-silversystem

UNIT1 - FUNDAMENTAL CONCEPTS **12 Hrs**

1.1 Types of organic reactions and reagents, common electrophiles, nucleophiles and free radicals.

1.2 Inductive, resonance, hyperconjugation and steric effects – an elementary idea.

1.3 Aromatic compounds - Benzene, phenol, benzaldehyde and acetophenone –preparation, properties and uses.

Extra reading/keywords :*Carbenes and Nitrenes*

UNIT 2 -QUANTUM NUMBERS AND PERIODIC TABLE 12 Hrs

2.1 Quantum numbers:- Principal, Azimuthal, Magnetic and spin quantum numbers. Electronic configuration of elements – Aufbau principle, Hund's rule and Pauli's exclusion principle.

2.2 Long form of periodic table, division of elements into s, p, d and f blocks, cause of periodicity.

2.3 Periodic properties – atomic radius, ionic radius – Ionization energy - Electron affinity – Electronegativity - definitions and variation along a group and period.

Extra reading/keywords : *Discovery of new elements - Nihonium and Moscovium*

UNIT3 -CHEMICAL BONDING 12 Hrs

3.1 Ionic bond – definition, Factors influencing formation of ionic bonding, variable electrovalency, properties of ionic compounds. Covalent bond - orbital overlap concept of molecules like H_2, F_2, O_2 and HF, Variable covalency, properties of covalent compounds.

3.2 Polarity in covalent bonds, Fajan's rules. Polarisation of molecules, Effects of polarization, percent ionic character.

Extra reading/keywords :*Problems in dipole moment and planar pentacoordinate carbons*

UNIT 4 -ELECTRICAL AND MAGNETIC PROPERTIES OF MOLECULES 12 Hrs

4.1 Dipole moment – Polar and nonpolar molecules, Induced dipolement – polarisability, polarization of molecule in an electric field. Mosotti – Clausius equation and Debye equation (derivation not required).

4.2 Dipole moment and molecular structure - CO_2, BCl_3, NH_3, CCl_4, and H_2O.

4.3 Magnetic properties – Magnetic permeability, magnetic susceptibility and magnetic moment. Diamagnetism, paramagnetism and ferro magnetism.

Extra reading/keywords :*Magnetic hypothermia and ferrimagnetism*

UNIT5 - SOLUTIONS AND PHASE EQUILIBRIA 12 Hrs

5.1 Solutions of liquids in liquids – ideal and non-ideal solutions – Raoult's law – criteria for ideal solutions, non-ideal solutions – Type I, Type II and Type III.

5.2 Colligative properties – Lowering of vapour pressure by a non-volatile solute, Measurement of vapour pressure lowering by Ostwald-Walker method, Osmosis and osmotic pressure – Measurement of osmotic pressure by Berkeley – Hartley method, Isotonic solutions, Reverse osmosis.

5.3 Phase Equilibria:- Phase, component, degree of freedom, Phase rule (derivation not required). One component system – water system. Two component system – simple eutectic system (Pb-Ag system).

Extra reading/keywords :*Alloy and three component phase diagram*

Note: Texts given in the Extra reading /Key words must be tested only through Assignment and Seminars.

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Identify the type of organic reaction and field effect in the given examples	PSO 1	U
CO-2	Predict the periodic trends along the group and the period	PSO 2	U
CO-3	Examine the polarity of the molecules using Fajan's rule	PSO 3	An
CO-4	Distinguish the types of magnetism	PSO 3	U
CO-5	Discuss the different colligative properties of solutions	PSO 4	U

TEXT BOOKS:

1. Puri B.R. Sharma L.R. and Kalia K.C., *Principles of Inorganic Chemistry.* New Delhi: Shoban lal Nagin Chand and Co., 1997.
2. Puri B.R. Sharma L.R and Madan S. Pathania, *Principles of Physical Chemistry*. New Delhi: 35th edition, Shoban Lal Nagin Chand and Co., 1994.
3. Vasudevan, A.N.S.*Ancillary Chemistry,* Part I and Part II.1981.

BOOKS FOR REFERENCE:

1. Huheey, J.E., Ellen. A. Keiter and Richard L. Keiter. *Inorganic Chemistry*. London: 4th edn., Addison & Wesley, 2003.
2. Lee, J.D. *A New Concise Inorganic Chemistry*. London:4th edn.,ELBS, 1995.
3. Veeraiyan , V. *Text Book of Allied Chemistry,* Volume I and Volume II.1997.
4. Parmer V.S. and Chawla B.M. *Principles of reaction mechanism in Organic Chemistry*. New Delhi: 2nd edn., Sultan Chand.,1973.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Second / Third Year – Semester- III / V

Course Title	SBE-3 & 4 : Experimental Chemistry for life science [Botany & Zoology]
Total Hours	30
Hours/Week	2 Hrs Wk
Code	U15CH3SBT03/ U15CH5SBT04
Course Type	Theory
Credits	2
Marks	100

General Objective:

The student learns about preliminary ideas of phytochemistry, water quality parameters, pH meter, determines the physical constants of given organic compounds and identifies the amino acids using paper chromatographic technique.

Course Objectives:

CO No.	Course Objectives
CO-1	deliver the concepts of primary and secondary metabolites and outline the phytochemical analysis and separation of aminoacids by paper chromatography.
CO-2	elaborate the principle and procedures for the determination of physical parameters.
CO-3	Explain the water quality parameters
CO-4	Determine the physical constants for the given compound, condunctance and pH.
CO-5	Determine the quality of the given water sample by testing its salinity, conductivity, turbidity and pH.

UNIT1- PHYTOCONSTITUENTS **5 Hrs**

1.1 Primary metabolites- Definition and examples. Secondary metabolites- sources and effects. Differences between primary and secondary metabolites.

1.2 Preliminary phytochemical Analysis. Extraction of phyto constituents from plants by soxhlation method.

1.3 Chromatography – Principle, separation of amino acids by paper chromatography.

Extra reading/keywords : *Soxhlet apparatus*

UNIT 2- DETERMINATION OF PHYSICAL PARAMETERS **5 Hrs**

2.1. Purity of organic compounds- melting and boiling point determination- principle and Procedures.

2.2. Water quality parameters- Turbidity, pH, Temperature, electrical conductivity, salinity, dissolved oxygen, nitrate and phosphate. Testing water quality parameters- water sampling, and testing procedures- Physical tests and chemical tests.

2.3. Buffer- definition, pH and buffer, Types of buffer, preparation of buffer solution, buffer action, determination of pH and Hendersen equation.

Extra reading/keywords : *Hardness of water*

PRACTICAL: **20 Hrs**

1. Determination of melting point of the given organic compound.
2. Determination of boiling point of the given organic compound.
3. Preparation of buffer solutions and the determination of pH of the given buffer solution.
4. Determination of Water parameters using water analyzer.
5. Extraction of phytoconstituents from a dried plant powder using Soxhlet apparatus
6. Separation of amino acids using Paper Chromatography

Note: Texts given in the Extra reading /Key words must be tested only through Assignment and Seminars.

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Identify the phytconstituents present in plant extracts.	PSO4	U
CO-2	Separate any given amino acids using paper chromatography.	PSO5	A
CO-3	Determine the melting and boiling points of the given organic compounds.	PSO5	A
CO-4	Predict the nature of the samples based on pH measurements.	PSO4	An
CO-5	Differentiate the different qualities of any given water sample	PSO6	An

BOOKS FOR REFERENCE:

1. Phytochemical methods by J.B. Harborne, Chapman and Hall, Newyork, 3rd edition,1998.
2. Environmetnal Chemistry, A.K.De, 8th edition, 2017.

(For candidates admitted from 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2 B.A./B.Sc./ B.Com./B.C.A./B.B.A DEGREE COURSE
SEMESTER – III / VI

Course Title	**GENDER STUDIES**
Total Hours	**15**
Hours/Week	**1**
Code	**U15WS3GST01 / U15WS6GST01**
Course Type	Theory
Credits	**1**
Marks	**100**

General Objective:
To help students to realize their strengths and weaknesses in leading an ethically enriched life and to enjoy a gender-balancedambience

Course Objectives:

The student will be able to

1. understand the concepts ofgender.
2. differentiate women studies from genderstudies
3. analyze the areas of genderdiscrimination
4. analyze and evaluate the initiative and policies for womenempowerment
5. remember the women's movements and safeguardingmechanisms

Unit I **3 hrs**

Concepts of Gender:

Sex-Gender-Biological Determination-Patriarchy-Feminism-Gender Discrimination-Gender Division of Labour -Gender stereotyping – Gender Sensitivity-Gender Equity – Equality – Gender Mainstreaming – Empowerment.
Extra reading /Key Words: *Acts on gender*

Unit II **3 hrs**

Women's Studies Vs Gender Studies:

UGC's Guidelines – VII to XI Plans – Gender Studies: Beijing Conference and CEDAW- Exclusiveness and Inclusiveness.
Extra reading /Key Words: *Origin of Women's studies in India*

Unit–III **3hrs**

Areas of Gender Discrimination:

Family – Sex Ratio – Literacy – Health – Governance – Religion Work Vs Employment – Market – Media – Politics – Law – Domestic Violence – Sexual Harassment – State Politics and Planning.
Extra reading / Key Words: *Survey of level of discrimination*

Unit–IV **3hrs**

Women Development and Gender Empowerment:

Initiatives – International Women's Decade – International Women's Year – National Policy for Empowerment of Women – Women Empowerment Year 2001 – Mainstreaming Global Policies.

Extra reading/Key Words: *Case study*

Unit–V **3hrs**

Women's Movements and Safeguarding Mechanism: In India National / State Commission for Women (NCW) – All Women Police Station – Family Court – Domestic Violence Act – Prevention of Sexual Harassment at Work Place Supreme Court Guidelines – Maternity Benefit Act – PNDT Act – Hindu Succession Act 2005 – Eve Teasing Prevention Act – Self Help Groups – 73_{rd}Amendment for PRIs.
Extra reading / Key Words: *Laws on gender equality*

Note: Extra Reading/ keywords are only for Internal Testing (Seminar/ Assignments)

Course Outcome:

2. evaluate the concepts of gender discrimination.
3. compare women's studies with gender studies.
4. describe the areas of gender discrimination.
5. evaluate the initiative and policies for women empowerment.
6. Explain the different women movement.

REFERENCES:

Manimekalai. N & Suba. S (2011), Gender Studies, Publication Division,

Bharathidasan University, Tiruchirappalli

Jane, P. & Imelda, W. (2004), 50 Key Concepts in Gender Studies.

(For the candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (Autonomous), Tiruchirappalli - 620 002.

TAMIL DEPARTMENT

For Candidate admitted from 2015 onwards

Second Year - Semester – IV

Course Title	**இரண்டாமாண்டு –நான்காம் பருவம்**
Total Hours	**75**
Hours/Week	**5 Hrs Wk**
Code	**U15TL4TAM04**
Course Type	**Theory**
Credits	**3**
Marks	**100**

General Objectives:

வாழ்வியல் நெறிகளாகிய அறம், பொருள், இன்பம், வீடுபேறு ஆகியவற்றின் மேன்மையை எடுத்துரைத்தல்

- Make the student to understand the cultural and tradition of Tamilians.
- Student will learn understand the religions knowledge to Sustain
- Understand the depth of Tamil Literature & Culture.
- Know about the structure of the family, manners is disciplines.
- Know about the right of equality.

Course Objectives:

CO No.	**Course Objectives**
CO-1	அறம், பொருள், இன்பம், வீடுபேறு ஆகியவற்றின் மேன்மையை உணர்த்துதல்.
CO-2	இலக்கியங்களின் வாயிலாக வாழ்க்கைத் தத்துவத்தினை அறியச் செய்தல்.
CO-3	தமிழ் இலக்கிய வரலாற்றின் வாயிலாகத் தமிழரின் பண்பாடு, கலாச்சாரத்தை அறியச் செய்தல்.
CO-4	மனிதநேய சிந்தனைகளை உருவாக்குதல்.
CO-5	மொழிப்பெயர்ப்புத்திறனை வளர்த்தல்.

அலகு:1 செய்யுள் **15 Hrs**

1. **குறுந்தொகை**

1. கொங்கு தேர் வாழ்க்கை அஞ்சிறைத் தும்பி - இறையனார்
2. யாரும் இல்லை தானே கள்வன் - கபிலர்
3. வேம்பின் பைங்காய்என் தோழி தரினே – மிளைக்கந்தன்

4. உள்ளது சிதைப்போர் உளரெனப் படாஅர் - பாலை பாடிய பெருங்கடுங்கோ
5. நோற்றோர் மன்ற தோழி –குறுங்குடி மருதன்

2. நற்றிணை

1. மனையுறை புறவின் செங்கால் பேடை
2. நீள்மலைக் கலித்த பெருங்கோற் குறிஞ்சி - பாண்டியன் மாறன் வழுதி
3. ஆய்மலர் மழைக்கண் தெண்பனி உறைப்பவும் - நல்விளக்கனார்
4. சிறுவீ முல்லைப் பெரிது கமழ் அலரி - மதுரை பேராலவாயர்

3. கலித்தொகை

1. எறித்தரு கதிர்தாங்கி ஏந்திய குடைநீழல் - கபிலர்
2. பாடுகம் வா வாழி தோழி - கபிலர்

அலகு:2 **15 Hrs**

அகநானூறு

1.வானம் வாய்ப்பக் கவினிக் கானம் - சீத்தலைச் சாத்தனார்

2. எம்வெங் காம மியைவதாயின் - மாமூலனார்

5.புறநானூறு

1. நின் நயந்து உறைநர்க்கும் - பெருஞ்சித்திரனார்
2. காய்நெல் அறுத்துக் கவளம் கொளினே - பிசிராந்தையார்
3. படைப்புப் பலபடைத்து - பாண்டியன் அறிவுடைநம்பி
4. கேட்டல் மாத்திரை – கோப்பெருஞ்சோழன்
5. ஈன்று புறந்தருதல் என்தலைக் கடனே - பொன்முடியார்

6. பதிற்றுப்பத்து - ஐந்தாம் பத்து

1. சுடர் வீ வேங்கை
2. தசும்பு துளங்கு இருக்கை
3. ஊன்துவை அடிசில்

7. திருக்குறள்

1. அறத்துப்பால் - இனியவை கூறல்
2. பொருட்பால் - வினை செயல்வகை
3. காமத்துப்பால் - புலவி நுணுக்கம்

myF:3 **15 Hrs**

jkpo; ,yf;fpa tuyhW

rq;ffhyk; - rq;fk; kUtpafhyk;

vl;Lj;njhif> gj;Jg;ghl;L> gjpndz;fPo;f;fzf;F E}y;fs;

அலகு:4 **15 Hrs**

வாழ்க்கை வரலாறு

அன்னை தெரசா - பா. தீனதயாளன்

மநல றுழசனள (நுஒவசய சுநயனனபெ)
அக்னி சிறகுகள் - அப்துல் கலாம்

அலகு:5 **15 Hrs**

பொது – மொழிப்பெயர்ப்பு

Note: Texts given in the Extra reading /Key words must be tested only through Assignment and Seminars.

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	உலக உயிரினங்களை உறவாகக் கொள்ளும் மனநிலையைப் பெறச்செய்தல்.	PSO 1	U
CO-2	புற இலக்கியங்களின் வாயிலாக பண்டைத் தமிழரின் வாழ்க்கைத் தத்துவத்தினை அறிவர்.	PSO 2	AN
CO-3	தமிழரின் பண்பாடு, அறஒழுக்கம் முதலானவற்றை உணர்ந்து தானும் அறவழியில் செயல்படுவர்.	PSO 2	R
CO-4	அன்னை தெரசாவின் உயரிய சேவையை உணர்ந்து தன் வாழ்க்கையில் பின்பற்றுவர்.	PSO 3	U
CO-5	மொழிப்பெயர்ப்புத்திறனை வளர்த்துக் கொள்வர்.	PSO 4	C

PO – Programme Outcomes; CO – Course Outcome; R- Remember; U- Understand; Ap – Apply; An – Analyse; E- Evaluate; C – Create

பாட நூல்கள்

1. செய்யுள் - தமிழாய்வுத்துறை வெளியீடு
2. தமிழ் இலக்கிய வரலாறு - தமிழாய்வுத்துறை வெளியீடு
3. வாழ்க்கை வரலாறு
   பா.தீனதயாளன் -அன்னை தெரசா
4. மொழிப்பெயர்ப்பு - தமிழாய்வுத்துறை வெளியீடு

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-620002
DEPARTMENT OF HINDI
SEMESTER – IV

Course Title	PART – I LANGUAGE HINDI -IV FUNCTIONAL HINDI & TRANSLATION
Total Hours	75
Hours/Week	5Hrs/Wk
Code	CODE: U18HN4HIN04
Course Type	Theory
Credits	3
Marks	100

General Objective : To enable the students to Learn the Language Skills.

Course Objectives (CO):

The learner will be able to

CO No.	Course Objectives
CO -1	apply technical translation in Functional Hindi
CO- 2	understand and evaluate global marketing
CO- 3	create general essays
CO- 4	apply the formats and create office orders
CO- 5	apply translation techniques in a text.

UNIT – I **(15 Hours)**

1. Personal Letters
2. Technical Terms
3. Translation Ex-1
4. General Essay - Pollution

Extra Reading (Key Words): *Jal Pradhooshan, Vayu Pradhooshan*

UNIT- II ***(15 Hours)***

1. Commercial Letters
2. Technical Terms
3. Translation Ex-4
4. General Essay - Globalisation

Extra Reading (Key Words): *Vyavasayikata*

UNIT- III ***(15 Hours)***

1. Office Memorandum
2. Technical Phrases
3. Translation Ex-6
4. General Essay – Self Employment

Extra Reading (Key Words): *Kisan*

UNIT- IV*:* **(15 Hours)**

1. Office Order
2. Technical Phrases
3. Translation Ex-13
4. General Essay – India – Unity in Diversity

Extra Reading (Key Words): *Hamara Bharat*

UNIT- V ***(15 Hours)***

1. Circular
2. Reminder
3. TranslationEx-15
4. General Essay – My Favourite Author

Extra Reading (Key Words): *Jayashankar Prasad, Premchand*

Note : Texts given in the Extra Reading (Key Words) must be tested only through Assignment and Seminars.

Course Outcomes:

The learner will be able to:

CO No.	Course Outcomes	Cognitive Level
CO -1	Utilize technical terms in translating a text.	Ap
CO- 2	Mark the global brands and their countries.	U, E
CO- 3	Develop an essay on any social issue.	E, C
CO- 4	Formulate an office order for the university	Ap, C
CO- 5	Make use of translation techniques in a text.	Ap

CO- Course Outcome; R- Remember; U- Understand; Ap- Apply; An- Analyze; E- Evaluate; C- Create

Prescribed Books

Vyavaharik Hindi,by Dr. Mahendra Mittal,Shabari Sansthan, Delhi.
Aalekhan Aur Tippan: Prof.Viraj, M.A; Raj Pal And Sons;Kashmiri Gate,Delhi.
Anuvad Abhyas : Bholanath Tiwari; Lokbharathi Prakashan; New Delhi.

Reference Books :

Raj Bhasha Hindi Aur Vuska Swaroop- Shanthi kumar Syal; Parampara Prakasha, Delhi
Vyaharopayogi evam kam kaji Hindi – Ananth Kedharea .;Sahityayan Prakashan; Kanpur.

(For candidates admitted 2016 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2
DEPARTMENT OF FRENCH
SEMESTER IV

Course Title	**PART I – LANGUAGE - FRENCH PAPER IV** **(**LANGUAGE & CULTURE (ÉCHO A2 2e édition)
Total Hours	75
Hours/Week	5 Hrs/Wk
Code	U16FR2FRE02
Course Type	Theory
Credits	3
Marks	100

General Objective: To enable the students to analyse and evaluate French cultural aspects and use the accumulated vocabulary and grammatical aspects in creative writing.

Course Objectives (CO):

The learner will be able to

CO1	Apply pronouns and create texts; appreciate and analyse French cuisine and festivals
CO2	critically evaluate the art forms of 20th century and apply conditional present tense in a text
CO3	remember savoir-faire in France and apply reported speech in story writing
CO4	analyse the consequences of immigration, sports and adventures; apply passive voice in a text
CO5	understand the usage of possessive pronouns and analyse the rhythm of life in France

Unit 1 C'est la fête ! (18 Hours)

Les pronoms objets directs et indirects – parler d'une fête – exprimer des goûts et des préférences – fêtes sans frontières – plats des fêtes – les jours fériés – les saisons

Extra Reading (Key Words): étude comparée des fêtes françaises et indiennes.

Unit 2 Vous plaisentez ! (18 Hours)

Le conditionnel présent, la distinction du futur et du conditionnel – le mouvement en général – raconter une anecdote – journée de détente – la naissance d'un chef d'œuvre - l'art au début du 20e siècle – le plaisir de jeux de mots.

Extra Reading (Key Words): Histoire du monde au début du 20e siècle.

Unit 3 On s'entend bien ! (18 Hours)

Les constructions « faire + verbe » et « laisser + verbe », le discours rapporté – décrire le caractère ou le comportement, exprimer l'accord et le désaccord – le langage des couleurs – sujets de conversation
– sujets d'étonnement.

Extra Reading (Key Words): les taboos

Unit 4 À vos risqué et périls ! (18 Hours)

Le subjonctif présent, la voix passive – l'aventure d'aujourd'hui – travailler pour la planète – réussites et échecs - marathon de Paris – plaisir des sports – les sports les plus regardés et pratiqués - les français et les sports.

Extra Reading (Key Words):les sportifs français

Unit 5 La vie est dure (18 Hours)

Les pronoms possessifs, les adjectifs, les pronoms indéfinis – parler de ses activités quotidiennes, exprimer la confiance ou la méfiance – les taches ménagères – la France insatisfaite - sans travail.

Extra Reading (Key Words): entretien d'une personne.

Course outcomes	**Cognitive level**
Design a text using pronouns	C
Discover a French recipe	An
Narrate an anecdote	C
Critically evaluate modern art forms	E
Infer reported speech and passive voice in a story	C
Explain the influence of immigration on sports	An
Examine the rhythm of life in France	An

TEXT BOOKS :

ECHO A2 – METHODE DE FRANÇAIS & CAHIER PERSONNEL D'APPRENTISSAGE
Authors: J. Girardet and J. Pécheur
Publication: CLÉ INTERNATIONAL,
2013.

Books for Reference:

La Conjugaison – Nathan
French made easy – Intermediate level - Goodwill Publishing
House Je parle français III – Abhay Publications
Le français avec des jeux et des activités -
ELI Langue et la civilisation – I – Mauger
Bleu

Note : Texts given in the Extra Reading (Key Words) must be tested only through Assignment and Seminars.

(for candidates admitted from June 2017 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), Tiruchirapalli – 620002
PG AND RESEARCH DEPARTMENT OF ENGLISH
I YEAR UG – SEMESTER IV
PART II – ENGLISH 4 - GENERAL ENGLISH IV

HOURS : 6 **CODE : U15EL4GEN04**
CREDIT : 3 **MARKS: 100**

EMPLOYABILITY SKILLS

OBJECTIVES:

1. To develop both receptive (reading, listening) and productive (speaking, writing) skills through communicative classes.
2. To acquire proficiency in oral and written language.
3. To train the students for employability skills such as team skills, communication skills and presentation skills.
4. To acquire values related to personal integrity and excellence in work propagated in the literary works.
5. To create interest among students for self-learning.

UNIT I – Personal integrity –Honesty, dependability, adaptability and loyalty.

Listening to identify a person's attitude, values, situation and the decision made.
Speaking about one's action, expressing opinions, character analysis.
Reading for comprehension(inferring a character's method of managing a situation, adaptability and the like).
Writing recommendations.
Grammar – use of appropriate adjectives and adverbs in contexts and reporting speeches
Vocabulary – differentiating shades of meaning, use of idioms and phrases in sentences
Composition – Your thoughts are the architects of your destiny – David O' Mckay
Honesty is the first chapter in the book of wisdom – Thomas Jefferson

TEXTS

1. *"How far is the river"* by Ruskin Bond
2. *The Pie and the Tart* by Hugh Chesterman.
3. An excerpt from Shakespeare's *"Julius Caesar"* Act III Scene II Lines 13 - 33– Antony's speech

UNIT II – Key to success – Self-esteem, perfection and excellence

Listening to differentiate dutyfrom obligation.
Speaking – Discussing one's knowledge about different subjects, learning skills, thirst for knowledge, learning form experiences.
Reading for comprehension exhibiting higher perception of life's experiences.
Writingparagraphs with cause and reason, analyzing motives behind people's actions and behavior.
Grammar – use of cohesive devices
Vocabulary – figures of speech– simile, metaphor.
Composition –
1. Excellence is not a destination, it is a continuous journey that never ends – Brian Tracy
2. To be perfect is to change often – Winston Churchill

TEXTS

1. Our urgent need for self-esteem by Nathaniel Brandon.
2. Five senses by Judith Wright
3. Three questions by Leo Tolstoy

UNIT III – Team skills

Listening to speaker's ideas, opinions, and suggestions and analyzing their character.
Speaking –Discussing, questioning, interacting, respecting, sharing and participating.
Reading for comprehension – absorbing the attitude of the people.
Writing – personal essays and report writing
Grammar – use of inverted structures
Vocabulary –New words in current usage.
Composition –1. "Talent wins games, but teamwork and intelligence wins championships."
2. "It takes two flints to make a fire."

TEXTS

1. "The Little Black Boy" by William Blake
2. How to get cooperation by Dale Carnegie.

UNIT IV – Communication skills for interpersonal relationship

Listening to specific information and guessing.
Speaking –Facing interview and situational speeches (Master of ceremony, felicitation and the like).
Reading for comprehension to identify the methods of persuasion.
Writingformal letters and invitations.
Grammar – Transformation of sentences.
Vocabulary – Words related to technical registers.
Composition –1. "Communication is an art form that is crafted throughout our lives."
2. Birds of same feather flock together.

TEXTS

1. The Refund by Fritz Karinthy

UNIT V –Presentation skills

Listening to commands,information, announcements, and discussions in a meeting.
Speaking –role play in panel discussion, mock parliament and public speaking.
Reading for comprehension.
Writingagenda, minutes, memo, notice, circular, project proposal.
Grammar – use of simple, compound, complex, imperative sentences and punctuations.
Vocabulary – Business terms.
Composition – writing a project.

TEXTS

1. An excerpt from Abraham Lincoln's speech in Gettysburg.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Second Year – Semester - IV

Course Title	**MAJOR CORE - 6 : GENERAL CHEMISTRY – IV**
Total Hours	**75**
Hours/Week	**6Hrs /Wk**
Code	**U15CH4MCT06**
Course Type	**Theory**
Credits	**5**
Marks	**100**

General objective:
To study the general characteristics of d- block elements and their compounds, Halogen compounds, carbonyl compounds, mechanisms of SN_i, SN_1 and SN_2 reactions and the kinetics of the reaction rate.

CO No.	**Course Objectives**
CO-1	Analyze the characteristics of d-block elements and outline the industrially important compounds of d-block elements.
CO-2	Deliver the main ideas regarding the general methods of formation,properties of aliphatic, aromatic halides, organ metallic compounds, formulate and explain the mechanisms of SN1, SN2 and SNi reactions.
CO-3	Measure the reaction rates and determine the rate laws
CO-4	Discuss the theories of reaction rates, catalysis and to understand the basic concepts involved in photochemistry.
CO-5	Discuss the mechanism of various reactions of carbonyl compounds.

Course Objectives:
UNIT 1 - d-BLOCK ELEMENTS **15Hrs**

1.1 General characteristics of d-block elements – electronic configuration, comparative study of elements of first transition series with reference to atomic and ionic radii, ionization potential, oxidation states, redox active metals, magnetic properties, complex formation, catalytic activities and colour.

1.2 Biological function and toxicity of elements – Cr, Mn, Co, Ni, Cu, Mo, Cd, Hg, Pb, Fe and Zn.

1.3 Prussian blue – preparation, uses and structure. Verdigris – preparation and uses. Oxidizing properties of $K_2Cr_2O_7$ and $KMnO_4$. TiO_2, V_2O_5, Sodium nitro prusside – preparation, properties and uses.

1.4 Ammonium molybdate, amalgams, philosopher's wool (ZnO), colloidal Au, Tungsten carbides, Silver chloride – Properties and uses.

Extra reading/Keywords:*Industrially important compounds of d-block elements.*

UNIT 2-HALOGEN COMPOUNDS **15Hrs**

2.1 Alkyl halides – Nomenclature, structure, General methods of formation and General chemical properties. DDT –structure and uses.

2.2 Aliphatic Nucleophilic substitution reactions – Mechanism of SN_1, SN_2 and SN_i reactions. Effect of solvents, leaving groups, Nucleophiles and structure of substrates. Ambient nucleophiles and regioselectivity, ambient substrates – examples.

2.3 Aromatic Halogen Compounds – General methods of preparation and properties. Low reactivity of aryl halides. Chemical properties of Aralkyl halides.

2.4 Organo metallic compounds: Grignard reagents – Synthetic applications. Haloalkenes (allyl chloride and vinyl chloride) – nucleophilic substation at allylic carbon and vinylic Carbon.

Extra reading/Keywords:*Aromatic nucleophilic substitution reaction*

UNIT 3 - CHEMICAL KINETICS I **15Hrs**

3.1 Rate of reaction, its determination, rate equation, rate constant, factors influencing rate of reaction, stoichiometry, order and molecularity of reactions.

3.2 Setting up and solving simple differential equations and derivation of half-life periods for first, second, third and zero order reactions, determination of order of reactions.

3.3 Experimental techniques involved in following the kinetics of reactions – volumetry, manometry, dilatometry, polarimetry and colorimetry – typical examples for each of the techniques.

3.4 Theoretical aspects: Effect of temperature on the rate constant – Arrhenius equation – Derivation, activation energy and its determination.

Extra reading/Keywords: *Problems in activation energy.*

UNIT 4-CHEMICAL KINETICS II AND PHOTOCHEMISTRY **15Hrs**

4.1 The collision theory of reaction rates and its limitations. The theory of absolute reaction rates, comparison of collision theory with absolute reaction rate theory, significance of free energy of activation and entropy of activation.

4.2 Lindemann's theory of unimolecular reactions, thermal chain reactions – hydrogen-bromine reaction.

4.3 Catalysis – Types of Catalysis- Homogeneous catalysis – the intermediate compound formation theory – Enzyme catalysis – the mechanism of enzyme catalysed reaction, Heterogeneous catalysis – the adsorption theory – active centers, poisoning of catalyst.

4.4 Photochemical reactions, Grothuss Draper's law, Stark Einstein's law of photochemical equivalence, quantum yield – definition, classification of photochemical reactions based on quantum yield and determination. Photochemical kinetics of hydrogen – bromine reaction.

Extra reading/Keywords:*Photochemical kinetics of hydrogen – chlorine, iodine reaction.*

UNIT 5 -CARBONYL COMPOUNDS **15Hrs**

5.1 Carbonyl compounds – general properties of aliphatic and aromatic aldehydes and ketones.
5.2 Individual members : Formaldehyde, acetone, acetophenone – preparation and properties.
5.3 Mechanisms of Aldol, Claisen, Perkin, Knoevenagel, Benzoin condensation, Reformatsky, Wittig, Claisen- Schmidt, Cannizzaro and haloform reactions. Mechanisms of reduction ($NaBH_4$, Wolff-Kishner and MPV reduction)
1.4 α, β – unsaturated carbonyl compounds – preparation and properties, Mechanism of Michael addition.

Extra reading/Keywords:*Salicylaldehyde, Benzophenone*

Note: Texts given in the Extra reading /Key wordsmust be tested only through Assignment and Seminars.

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Compare the periodic properties of d-block elements.	PSO 1	U
CO-2	Explain the Nucleophilic substitution mechanisms.	PSO 2	U
CO-3	Discuss the synthetic applications of Organomatallic compounds.	PSO 2	U
CO-4	Derive the rate equation of the first, second, third and zero order reactions.	PSO 3	R,U
CO-5	Calculate the activation using Arrhenius equation.	PSO 2	Ap
CO-6	Discuss the theories of reaction rates.	PSO 2	U
CO-7	Problems in quantum yield.	PSO 3	Ap
CO-8	Discuss the mechanism of given naming reactions.	PSO 3	U, Ap

Text Books:

1. Puri B.R., Sharma L.R. and Madan S. pathania, "*Principles of Physical Chemistry'*, Shoban Lal Nagin Chand and Co, 35th edn., 1994.
2. Puri B.R. and Sharma L.R., '*Principles of Inorganic Chemistry'*, Shoban Lal Nagin Chand and Co., 2002.
3. M.K. Jain, "*Modern Organic Chemistry*", 4th Edition, Vishal Publising Co, Jalendhar

BOOKS FOR REFERENCE:

1. Gurtu J.N. and Amit Gurtu, '*Chemical Kinetics'*, 5th edn., Mittal K.K., 1979.
2. Madan R.D., '*Modern Inorganic chemistry'*, S. Chand and Company (PVT) limited. Ist edn., 1987.
3. Samuel Glasstone, '*Text Book of Physical Chemistry'*, 2nd edn., 1974.

4. Parmar V.S. and Chawla H.M., "*Principles of reaction mechanism in Organic Chemistry*", 2nd edition, Sultan Chand, 1978.
5. Gurdeep Chatwal R, *Photochemistry*, Good Publishing House.
6. Tewari K.S., Vishnoi N.K., Mehrotra S.N., "*A Text Book of Organic Chemistry*", 2nd revised edition, Vikas Pulbishing House Pvt. Ltd.
7. Jagadamba singh and Yadav L.D.S., "*Advanced Organic Chemistry*", 22nd edition, Pragati Prakashan Educational Publishers, 2015.
8. Clayden, Warrenn, Wothers,. '*Organic chemistry'*, 2nd Edition, Oxford University Press, 2012.
9. John Mc Murray,'*Organic chemistry'*, 8th Edition, Internation Edition, 2012.
10. Paula Yurkanis Bruice, '*Organic chemistry'*, 8th Edition, Pearson Education Ltd.
11. Robert Thornton Morrison, Robert Neilson Boyd , Saibal Kanti Bhattacharjee, *Organic Chemistry*, 7th Edition, Pearson Education India, Chennai, 2011.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Second Year – Semester - IV

Course Title	**MAJOR ELECTIVE – 1: THEORY CUM LAB – II (LABORATORY TECHNIQUES AND VIRTUAL LAB EXPERIMENTS)**
Total Hours	**75**
Hours/Week	**5Hrs /Wk**
Code	**U17CH4MEP01**
Course Type	**LCT**
Credits	**5**
Marks	**100**

General Objective:

To enable the students to learn about adsorption, adulteration, colligative properties of dilute solutions, Nernst distribution law and to develop practical skills.

Course Objectives:

CO No.	**Course Objectives**
CO-1	compare physical and chemical adsorption and explain the application of adsorption.
CO-2	distinguish different types of adsorption isotherms.
CO-3	detect the food adulterants in different food items.
CO-4	apply distribution law to some chemical concepts.
CO-5	solve the problems under different colligative properties.

1. analyze the applications of adsorption and detection of adulterants in food items.
2. discuss the different Colligative properties and solves the problems.

UNIT 1 - ADSORPTION AND FOOD ADULTERATION 15 Hrs

1.1 Adsorption by solids: Adsorption – Types of adsorption – physical adsorption, chemical adsorption. Some important applications of adsorption.

1.2 Adsorption isotherms: Langmuir adsorption isotherm, Freundlich adsorptionisotherm and Gibbs adsorption isotherm. (Derivations not needed)

1.3 Adulteration – definition. Common food adulterants – it's effects. Incidental adulterants.Metallic contamination. Contamination by pest and pesticide residues.

1.4 Simple physical tests and chemical tests for detection of food adulterants. Detection of food additives: Detection of saccharin, Dulcin, flavours, lead chromate,water in milk, streptomycin, pesticides.

Extra reading/Keywords: *Techniques to estimate adulterants.*

UNIT 2 – SOLUTIONS II AND DISTRIBUTION LAW 15 Hrs

2.1 Lowering of vapour pressure by non-volatile solute, relationship between relative lowering of vapour pressure and mole fraction, experimental determination of molecular weight of non-volatile solute.

2.2 Osmosis and osmotic pressure, relationship between osmotic pressure and lowering of vapour pressure of an ideal solution, isotonic solutions, measurement of osmotic pressure, reverse osmosis.

2.3 Elevation in boiling point and depression in freezing point by a non volatile solute – thermodynamic derivation and experimental determination.

2.4 Abnormal molecular weights – Van't Hoff factor, association and dissociation.

2.5 Nernst distribution law & its applications.

Extra reading/Keywords*:* *Application of Colligative Properties and Distribution Law.*

Note: Texts given in the Extra reading /Key words must be tested only through Assignment and Seminars.

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	compare physical and chemical adsorption and explain the application of adsorption.	PSO 1	U
CO-2	distinguish different types of adsorption isotherms.	PSO 2	U
CO-3	detect the food adulterants in different food items.	PSO 2	An
CO-4	apply distribution law to some chemical concepts.	PSO 3	Ap
CO-5	solve the problems under different colligative properties.	PSO 2	An

Text Books:

1. Puri B.R., Sharma L.R. and Madan S. Pathania, *Principles of Physical Chemistry*, New Delhi: 35th edn. Shobanlal Nagin Chand and Co., 2003.
2. Negi A.S. and Anand S.C., *A Text book of Physical Chemistry*, 3rd Edition, Wiley Eastern Ltd., 1994.
3. Arun Bahl, B.S. Bahl and G.D. Tuli, *Essentials of Physical Chemistry*, New Delhi: S. Chand & company Pvt. Ltd., 2014.

BOOKS FOR REFERENCE:

1. Atkins, P. W. and Paula, J. *Physical Chemistry*, Oxford Publications, 8th edn., 2009.
2. Silbey, R. J. Albert , R. A. and Bawendi, M. G. *Physical Chemistry*, Wiley, 4th edn., 2004.
3. Levine, I. N. *Physical Chemistry*, McGraw-Hill Science/Engineering/Math, 6th edn., 2008.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Second Year – Semester - IV

Course Title	**MAJOR ELECTIVE – 1 : THEORY CUM LAB – II (VERIFICATION OF COLLIGATIVE PROPERTIES)**
Total Hours	**75**
Hours/Week	**5Hrs /Wk**
Code	**U17CH4MEP02**
Course Type	**LCT**
Credits	**5**
Marks	**100**

OBJECTIVES:

To expose the students to the knowledge of solutions and phase equilibria and also to develop practical skills in the same topics by giving them certain experiments.

CO No.	**Course Objectives**
CO-1	apply distribution law to some chemical concepts.
CO-2	solve the problems under different colligative properties.

UNIT: I

Solutions II and Distribution law

1.1 Lowering of vapour pressure by non-volatile solute, relationship between relative lowering of vapour pressure and mole fraction, experimental determination of molecular weight of non-volatile solute.
1.2 Osmosis and osmotic pressure, relationship between osmotic pressure and lowering of vapour pressure of an ideal solution, isotonic solutions, measurement of osmotic pressure, reverse osmosis.
1.3 Elevation in boiling point and depression in freezing point by a non volatile solute - thermodynamic derivation and experimental determination.
1.4 Abnormal molecular weights – Van't Hoff factor, association and dissociation.
1.5 Nernst distribution law & its applications.

PHYSICAL CHEMISTRY PRACTICAL – HEATING EXPERIMENTS

1. Determination of Molal depression constant of a solvent by Rast Macro method.
2. Determination of Molecular weight of a solute by Rast Macro method.
3. Determination of Transition Temperature of a given salt-hydrate.
4. Critical solution temperature of phenol-water system.
5. Effect of impurity on the critical solution temperature.

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	apply distribution law to some chemical concepts.	PSO 3	Ap
CO-2	solve the problems under different colligative properties.	PSO 2	An

BOOKS RECOMMENDED:

Test Books:

1. Puri B.R., Sharma L.R. and Madan S. Pathania, "Principles of Physical Chemistry', (2003), Shobanlal Nagin Chand and Co., Delhi, 35th edn.

Reference Books:

1. Samuel Glasstone M.Sc. Ph.D., 'Text Book of Physical Chemistry', (1974), 2nd Edn.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Second Year - Semester – IV

Course Title	ALLIED – 5 : Allied Chemistry Paper II (For Physics Main)
Total Hours	60
Hours/Week	4 Hrs /Wk
Code	U15CH3AOT02
Course Type	Theory
Credits	4
Marks	100

General Objective:
To learn about the basic concepts in solid state, photochemistry, electrochemistry and chemical kinetics.

Course Objectives:

CO No.	Course Objectives
CO-1	understand the fundamental concepts in solid state and to predict the structure of sodium chloride
CO-2	explain the photochemical and photophysical processes and their mechanisms.
CO-3	identify the different terms in electrochemistry and different conductometric titrations.
CO-4	understand the working of galvanic cell and explains the emf series, corrosion and overvoltage.
CO-5	describe the general forms of rate equations and state the Arrhenius equation.

UNIT 1- THE SOLID STATE **12 Hrs**

1.1 Structure of solids – classification, isotropy and anisotropy, interfacial angle. Symmetry in crystals – cubic system, space lattice and unit cell, law of rational indices, Miller indices.
1.2 Packing arrangements in crystals – hexagonal and cubic close packing. Simple, body centered and face centered cubes.
1.3 Structure of NaCl - rotating crystal technique.
1.4 Defects in solid state, conductors, semi conductors and super conductors.

Extra reading/Keywords : *Structure of zinc oxide and cesium chloride*

UNIT 2- PHOTOCHEMISTRY **12 Hrs**

2.1 Photochemical reactions – Differences between thermal and photochemical reactions. Stark-Einstein law of photochemical equivalence, Lambert – Beer's law.

2.2 Quantum yield – definition, classification of photochemical reactions based on quantum yield, reasons for high and low quantum yield with one example for each.

2.3 Photosensitized reactions, photo processes – fluorescence, phosphorescence and chemiluminescence.

Extra reading/Keywords :*Problems in quantum yield and applications of photochemistry*

UNIT 3-ELECTROCHEMISTRY – I **12 Hrs**

3.1 Electrical conductance, Ohm's law, specific conductance, equivalent conductance, molar conductance. Determination of conductance, variation of equivalent conductance with dilution.

3.2 Kohlrausch's law and its application – Calculation of molar conductance at infinite dilution for weak electrolyte. Conductometric titrations - HCl with NaOH, CH_3COOH with NaOH, CH_3COOH with NH_4OH and KCl with $AgNO_3$.

Extra reading/Keywords :*Conductance determination by experiments*

UNIT 4-ELECTROCHEMISTRY – II **12 Hrs**

4.1 Galvanic cell – Daniel cell, single electrode potential, standard electrode potential, determination of electrode potential.

4.2 Reference electrodes – hydrogen and calomel electrodes. Electrochemical series and its applications.

4.3 Corrosion – definition, electrochemical theory of corrosion, prevention. Over-voltage – definition and application of over-voltage.

Extra reading/Keywords :*Fuel cells and batteries*

UNIT 5- CHEMICAL KINETICS **12 Hrs**

5.1 Order and molecularity of reactions, setting up and solving simple differential equation and half-life period for first order reaction.

5.2 Setting up and solving simple differential equations and half-life periods for second order and zero order reactions.

5.3 Determination of order of reactions, effect of temperature on reaction rate – Arrhenius equation, the activation energy.

Extra reading/Keywords :*Dilatometry and polarimetry*

Note: Texts given in the Extra reading /Key wordsmust be tested only through Assignment and Seminars.

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Explain the structure of solids on the basis of packing and discuss crystal defects and their influence on materials properties	PSO 1	R, U
CO-2	explain theory and practice of common photochemical and photophysical methods	PSO 2	U
CO-3	Explain the different types of conductometric titrations	PSO 2	U
CO-4	Calculate the reduction potential for various metals	PSO 3	Ap
CO-5	Derive the rate equation for first order and second order equations	PSO 4	An

TEXT BOOKS:

1. Puri B.R. and Sharma L.R., '*Principles of Inorganic Chemistry'*, Shoban Lal Nagin Chand and Co., 2002.
2. Vasudevan A.N.S., *Ancillary Chemistry*, Part I and Part II, 1981.
3. Dr. V. Veeraiyan, *Text Book of Allied Chemistry*, Volume I and Volume II, 1997.

BOOKS FOR REFERENCE:

1. Cotton F.A. and Wilkinson. G. *Advanced Inorganic Chemistry*, 4thEdn., London: John Wiley and Sons Inc., 1999.
2. Huheey, J.H..*Inorganic Chemistry*, 4th Edn.. London: Pearson Education Pvt., Ltd., 2002.
3. Puri B.R. Sharma L.R and Madan S. Pathania, *Principles of Physical Chemistry*, 35th edition, shoban Lal Nagin Chand and Co., 1994.
4. Soni P.L. and Chawla H.M., '*Text Book of Organic Chemistry*", 27th Edition, Sultan Chand and sons, 1997.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Second Year - Semester – IV

Course Title	ALLIED 6: ALLIED CHEMISTRY PRACTICAL PAPER III
Total Hours	60
Hours/Week	4 Hrs /Wk
Code	U15CH4AOP03
Course Type	Practical
Credits	3
Marks	100

General Objective:

To expose the students to various concepts in volumetric analysis and to gain skill in volumetric analysis.

Course Objective:

CO No.	Course Objectives
CO-1	Understands the terminologies and principle involved in volumetric analysis
CO-2	Define a primary standard ,standard solution and determine the equivalence point
CO-3	determine the concentration of solution in various units and Prepare standard solution and dilute solution
CO-4	determine the strength of the given solution from different types of titrations like acid base, redox,precipitation and complexometric titration
CO-5	Solve volumetric problems using formula method

UNIT1 - VOLUMETRIC ANALYSIS **12Hrs**

1.5 Terminology, Basic requirement of a titration, standard solution – primary standard, preservation of standard solution, expressing concentration of standard solution, simple correlation for quick and convenient volumetric calculation, p-functions.

1.6 Volumetric Titrations: Acid base titration – acid base titration and use of indicators, titration of a strong acid against a strong base, titration of a weak acid with a strong base, titration of a weak base with strong acid, titration of Na_2CO_3 with HCl, the theory of acid base indicators, action of phenolphthalein and methyl orange.

1.7 Redox titration – theory – titration of Mohr salt against $KMnO_4$, oxalic acid against $KMnO_4$, $FeSO_4$ against $K_2Cr_2O_7$, internal indicator, external indicator, starch, iodimetry and iodometry. Precipitation titrations – conditions for precipitation titration and indicators.

1.8 Complexometric titration:-EDTA titrations, indicators of EDTA titrations, complexometric titration curves, EDTA – titration methods – masking of ions, precautions to avoid errors in titrimetric analysis, corrections for unavoidable errors.

Extra reading/Keywords :*Determine the total hardness present in the given water sample*

VOLUMETRIC ANALYSIS:

1. Acidimetry
   Estimation of Oxalic acid.

2. Permanganometry:
   i. Estimation of $FeSO_4$.
   ii. Estimation of Calcium. (Direct Method).

3. Iodimetry&Iodometry:
   i. Estimation of copper.
   ii. Estimation of Arsenious oxide.

4. Dichrometry:
   Estimation of Ferrous ion.

5. EDTA Titrations:
i. Estimation of Magnesium.
   ii. Estimation of Zinc.

Note: Texts given in the Extra reading /Key wordsmust be tested only through Assignment and Seminars.

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Critical capacity to understand the procedures in order to define the common methods of analysis..	PSO 2	U
CO-2	Use correct titrimetric procedure when carrying out titrations	PSO 5	An
CO-3	Prepare the standard solution of different strength.	PSO 5	U
CO-4	Explain the acid base, redox and complexometric titrations with examples.	PSO 6	An
CO-5	Apply knowledge of concentrations of solutions to everyday examples and estimate the strength of the given unknown solution	PSO 6	App

TEXT BOOKS:

1. Venkateswaran V., Veeraswamy R. and Kulandaivelu A.R. *Basic Principles of Practical Chemistry.*New Delhi:2nd edn, Sultan Chand & Sons, 1997.

BOOKS FOR REFERENCE:

1. SvehlaG. *Vogel's Qualitative Inorganic Analysis.*US: 7th Edition, Prentice Hall, 1996.
2. Mendham J., DenneyR. C., Barnes J. D. and Thomas M. J. K.*Vogel's Prescribed Book of Qualitative Chemical Analysis*, US: 6th Edition, Prentice Hall,2000.
3. Puri B.R. and Sharma L.R. *Principles of Inorganic Chemistry*. New Delhi: Shoban Lal Nagin Chand and Co., 2002.

(For Candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
B.A. /B.Sc. / B.Com. / BBA/ B.C.A. DEGREE COURSE
LIFE ORIENTED EDUCATION
ETHICS – II: EMPOWERMENT OF WOMEN

HRS / WK : 1 **CODE: U15VE4LVE02**
CREDIT : 1 **MARKS : 100**

OBJECTIVES:

- To make the learners aware of various gender and social issues and Cyber Crimes.
- To make the learners understand and appreciate the role of media, in facing the challenges on various life issues.
- To enable the learners to understand the ways of empowering women and cyber crime against women

UNIT – I: GENDER ISSUES

Feminism, Responsibilities of men and women towards Egalitarian society, Gender Identity-Factors contributing to gender identity (Family values, culture, tradition, religion, societal values, mass media)

UNIT – II: SOCIAL ISSUES RELATED TO WOMEN

Eve teasing, Rape, Dowry, Harassment in marriage, Divorce and Widows Remarriage, HIV & AIDS, Transgender, Female Genocide, sex workers, trafficking, fugitive, Female foeticide, handicapped children and women and evils of drug abuse.

UNIT – III: WOMEN AND MEDIA

Portrayal of women in media world - News paper, Magazine, Cinema, TV, Video and Advertisements - Morality in Media and Right use of Media

UNIT – IV: WAYS OF EMPOWERING WOMEN

Need for empowerment –Skills required for empowerment and Career Oriented Skills, Women's bill- Property rights, Models of Empowered Women- St. Teresa of Kolkata, Indira Gandhi, Helen Keller, Chanu Sharmila and Malala

UNIT – V: CYBER CRIME AGAINST WOMEN

Harassment and Spoofing via e-mail, Cyber Stalking, Cyber Pornography, Morphing. Cyber Laws, Social network: Face book, Twitter and Whats app

REFERENCES:

1. Dr.M.Arumairaj et al., 1999, "Marching towards the Millenium ahead".
2. Thomas Anjugandam, 1999, "Grow Free Live Free" Salesian Publicaiton.
3. H.C Pretti Nandhini Upretti, jaipur 2000 "Women and problems of Gender Discrimination".
4. Thomas B.Jayaseelan, 2002, "Women: Rights and law" Indian Social Institute, New Delhi.
5. Reni Jacob vol I & II, April- June 2004, "Vikasimi – The journal of Women's Empowerment, Ed,"

(For Candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI –
2 B.A./ B.Sc/ B.Com/ BBA/ B.C.A - DEGREE COURSES
LIFE ORIENTED EDUCATION
CATECHISM – II: CHURCH AND SACRAMENTS

HRS / WK : 1 **CODE : U15VE4LVC02**

CREDIT : 1 **MARKS : 100**

OBJECTIVES:

- To enable the students to understand the ways of Christian living with the Church
- To understand God's gift of the Holy Spirit.
- To understand the methods of building relationship with Jesus.
- To learn the life of Sacraments and Prayer
- To enrich our devotion to Mother Mary and Saints.

UNIT – I: MISSION OF THE CHURCH

What is church (attributes) – Interpretation: body of Christ- Bride of Christ, goal of all things- Historical as well as spiritual- Mystery and Sacrament-Pilgrim Church.

UNIT – II: PARTICIPATORY CHURCH

Work of the Holy Spirit- Salt and leaven in the world "Church of modern World" Church as community – Its important aspect, early Christian Church – People of God as Church- Its characteristics and structure

UNIT – III: THE FUNCTIONARY CHURCH AND I

Ministerial Church – Relating Church –Parish Church- Role of lay faithful in the Church – Its challenges – Church and I.

UNIT – IV: SACRAMENTS

Sacraments – Initiation– Healing – Service (all the seven) – Emphasis on Confession, Confirmation and Holy Communion. Sacramental: holy "things" used –Their sanctity.

UNIT – V: MARY AND SAINTS

Mary as a young virgin- Disciple- Her role in the Catholic Church-Annual feasts- Pilgrimages- Devotion to Mary, Dogmas. Saints in the Church- Prominent Women in the old testament

REFERENCES:

1. "Vatican II Revised" Archbishop Angelo Fernandes Published by X.Diax de Rio S.J. Gujarat Sahitya Prakash, P.O.Box. 70, Gujarat, 388001, India.
2. "The Sacraments The Word of God at the Mercy of the Body" Claretian Publications, Malleswaram, Bangalore 560055.
3. Documents of Vatican II – St. Paul's Publications, Bombay 1966.

(For Candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE(AUTONOMOUS) TRICHIRAPALLI-2.
B.A/B.Sc/B.Com /B.C.A – DEGREE COURSES
LIFE ORIENTED EDUCATION
BIBLE STUDIES – II: OLD TESTAMENT

HRS / WK :1 **CODE: U15VE4LVBO2**
CREDIT : 1 **MARKS : 100**

OBJECTIVE:

- To enable the students to understand the desires of God through Prophetic revelation and to become sensitive to the heart beat of God.

UNIT – I: PURPOSE OF LIFE

Creation of man – fall of man (Gen 1-4) Plan of redemption through the life of :

- Noah (Gen 6-9); Abraham (Gen 12-18);
- Joseph (Gen 37-40); Moses (Exo 4-5);
- Joshua (Joshua 1-8)

UNIT – II: JUDGES AND KINGS

- Judges: Deborah (Judges 4); Samson (Judges 6-8); Gideon (Judges 13-16)
- Kings**:** David (I Sam 17-31, II Sam 1-12); Solomon (I Kings 1-11)

UNIT – III: MINOR PROPHETS

Brief Life History and teachings of

- Amos
- Jonah
- Micah
- Nahum
- Habakkuk

UNIT – IV: MAJOR PROPHETS

Brief Life History and teachings of

- Isaiah (Is 1,6,11,36-38,40-42,44,50,53,61)
- Jeremiah (Jer 1-3,7-12,18-19,23)
- Ezechial (chapters 1,2,3,5,8,12 visions)
- Daniel (Daniel 1-6)

UNIT – V: WOMEN IN THE BIBLE

Women in the Old Testament

- Eve (Gen 3)
- Ruth (Ruth 1-4)
- Hannah (I Sam 1:1-28)
- Esther (Esther 1-6)

REFERENCES:

1. Russell Fueller (1999) The Text book of the Twelve Minor Prophets. Wipf & Stock Publishers, UK.
2. Willis Judson Beecher (2002) The Prophets and The Promise. Wipf & Stock Publishers, UK

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Third Year – Semester- V

Course Title	Main Core – 7: Inorganic Chemistry
Total Hours	60
Hours/Week	4 Hrs Wk
Code	U15CH5MCT07
Course Type	Theory
Credits	4
Marks	100

General objective:

To make the students to learn about the nomenclature, isomerism, theories, distortion and stability of coordination complexes, the structure of solids and defects in crystals, the concepts of nuclear chemistry, important bio-inorganic molecules, lanthanides and actinides.

Course Objectives:

CO No.	Course Objectives
CO-1	differentiate different types of isomerism
CO-2	discuss the characteristic properties of complexes.
CO-3	explain the structure of crystalline solids, crystal axis, planes, lattices and defects and apply XRD analysis for characterization of crystalline materials.
CO-4	apply the principles of nuclear chemistry in various nuclear reactions and understand the applications of radioactive isotopes.
CO-5	analyse the chemistry of metal ions in different biological co-ordination compounds and describe the differences and similarities between the chemistry of lanthanides and actinides.

UNIT 1 - CO-ORDINATION CHEMISTRY I 12Hrs

1.1 Double salts, co-ordination compounds, co-ordination complexes and complex ions, co-ordination number, classification of ligands, chelates, physical methods in the study of complexes.
1.2 Nomenclature of co-ordination compounds, Werner's theory, Effective atomic number (EAN) and 18 electron rule.
1.3 Structural isomerism – hydrate isomerism, co-ordination isomerism, linkage isomerism, coordination position isomerism, ionization isomerism and polymerization isomerism.
1.4 Stereoisomerism – Geometrical isomerism and optical isomerism in 4 and 6 co-ordinated complexes.

Extra reading/Keywords:*The spectral data to elucidate the structure of complexes.*

UNIT 2 -CO-ORDINATION CHEMISTRY II 12Hrs

2.1 Valence bond theory – Postulates, formation of inner and outer sphere complexes, application of VBT (Magnetic property and geometry of complexes), defects of VBT.

2.2 Crystal field theory – crystal field splitting of energy levels of d-orbitals in octahedral, tetrahedral and square planar complexes, Crystal field stabilization energy, Factors affecting the magnitude of Δ_o. Application of CFT – colour, magnetic properties and spin states of the complexes. Distortion of octahedral complexes and John-Teller theorem, cause and types of distortion, Defects of CFT.

2.3 Stability of complexes – stepwise formation and overall formation constant. Labile and inert Complexes. Factors affecting the stability of complexes. Experimental determination of stability constant (Job's method, Bjerrum method). Irving Williams theory.

Extra reading/Keywords:*Jahn Teller theorem and MOT*

UNIT 3 -SOLID STATE 12Hrs

3.1 Structure of solids – Classification, isotropy and anisotropy, interfacial angle, symmetry in crystals – cubic and hexagonal systems. Space lattice and unit cell, Bravais lattices, designation of planes in crystals – Miller indices. Diffraction of X-rays by crystals – Bragg's equation – derivation, rotating crystal technique.

3.2 Types of crystals, close packing of identical solid spheres - interstitial sites, limiting Radius ratios (derivation not needed), radius ratio rule and shapes of ionic crystals. Structures of NaCl, CsCl, ZnS ,CaF_2 and Rutile.

3.3 Defects in stoichiometric crystals – Schottky and Frenkel defects. Defects in Non-stoichiometric crystals – metal excess and metal deficiency defects. Impurity defects – semi conductors – n-type and p-type semi conductors.

Extra reading/Keywords:*Applications of semiconductors.*

UNIT 4 -NUCLEAR CHEMISTRY 12Hrs

4.1 Subatomic particles, nuclear size, nuclear forces – Meson theory of nuclear forces. Magic number, nuclear shell structure - Liquid drop model.

4.2 Mass defects in atomic nucleus, nuclear binding energies. Nuclear stability – n/p ratio, the whole number rule and packing fraction. Isotopes, Isobars, Isotones and isomers – definition and examples.

4.3 Definition of nuclear transformation, Bohr's theory of nuclear reactions. Classification of nuclear reactions, Q value of nuclear reactions, Nuclear fission - controlled nuclear fission. Nuclear fusion - stellar energy.

4.4 Artificial transmutation of elements, induced radioactivity, applications of radioisotopes in medicine, agriculture and industry, carbon dating.

Extra reading/Keywords:*Types of Radioactive decay and their effect on the nucleus.*

UNIT 5 - BIO-INORGANIC CHEMISTRY AND f- BLOCK ELEMENTS 12Hrs

5.1 The porphyrin ring system –Oxygen transport- Hemoglobin and Myoglobin- biological functions only. Cytochrome-C - structure and biological functions. Blue copper proteins, Fe-S protein – Ferridoxin and vitamin B_{12}- biological functions only.

5.2 Lanthanide series - Properties of lanthanides – electronic configuration, oxidation states, ionic radii, lanthanide contraction, colour, magnetic properties, basic character, solubility of ompounds and chemical reactivity, separation of lanthanides.

5.3 Actinide series – electronic configuration, oxidation states, ionic radii, colour and formation of complexes, Transuranic elements. Comparison between actinides and lanthanides.

Extra reading/Keywords:*Spectral properties of lanthanides.*
Note: Texts given in the Extra reading /Key wordsmust be tested only through Assignment and Seminars.

Course outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Classify the various types of isomerism of coordination compounds.	PSO1	R
CO-2	Analyze the stability of complex based on EAN and 18 electron rule.	PSO4	An
CO-3	Compare the various theories of coordination complexes.	PSO2	U
CO-4	Categorize the different types of crystals and its defects,	PSO1	U
CO-5	Sketch and explain the packing arrangements of atoms and the structures of few ionic crystals	PSO6	U
CO-6	Classify the subatomic particles and explain the nuclear shell and liquid drop model.	PSO1	U
CO-7	Evaluate the nuclear stability based of n/p ratio, whole number rule, mass defect and packing fraction	PSO4	E
CO-8	Categorize the various nuclear reactions and summarize the applications of radio isotopes.	PSO6	U
CO-9	Sketch and explain the biological functions of few bio inorganic compounds.	PSO5	U
CO-10	Summarize the chemistry of inner transition elements.	PSO4	An

TEXT BOOKS:

1. Puri B.R. and Sharma L.R., *Principles of Inorganic Chemistry*, New Delhi: Sultan Chand.1989.
2. Madan R.D., *Modern Inorganic Chemistry* S.Chand and company (PVT) limited, Ist edn.1987.

BOOKS FOR REFERENCE:

1. Soni P.L. and Chawla H.M *Text Book of Inorganic Chemistry* (26th edn), New Delhi, Sultan Chand and sons, 2004.
2. Lee J D, *Concise inorganic chemistry*, 5thedn, Wiley India Edition, 2009.
3. Cotton F A, Wilkinson G, MurilloC. A and Bochmann, M*Advanced Inorganic Chemistry*, 6thedn, John Wiley & Sons,2008.
4. Huheey J. E., KeiterE. A., KeiterR. L. and MedhiO. K., *Inorganic Chemistry – Principles of Structure and Reactivity*, 4thedn, Pearson Education, 2006.
5. Atkins P, Overton T,Rourke J M. Weller and Armstrong F, Inorganic Chemistry, 5 th edn, Oxford University Press, 2010.
6. Puri B.R., Sharma, L.R and Madan S. Pathania . *Principles of Physical Chemistry* (35th edn), New Delhi,:Shoban Lal Nagin Chand and Co.2008.
7. Gopalan R., Ramalingam, V.*Concise Co-ordination Chemistry*, Vikas Publishing House Pvt. Ltd.2001.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Third Year - Semester – V

Course Title	Major Core 8 – ORGANIC CHEMISTRY-I
Total Hours	60Hrs
Hours/Week	4 Hrs Wk
Code	U15CH5MCT08
Course Type	Theory
Credits	4
Marks	100

General Objectives:

The student learns the preparations and properties involved in the organic compounds containing oxygen and nitrogen.

Course Objectives:

CO No.	Course Objectives
CO-1	understand the preparation, properties and strength of aliphatic,aromatic carboxylic, sulphonic acids and their derivatives.
CO-2	appraise and justify the preparation, properties and basicity of nitrogen containing organic compounds.
CO-3	classify, formulate and discuss the concepts of amino acids, prorteins and nucleic acids.
CO-4	reproduce and describe the preparation, properties of oxygen and sulphur containing compounds.
CO-5	classify, distinguish and elucidate the structures of few carbohydrates

UNIT 1 -ORGANIC ACIDS AND DERIVATIVES 12Hrs

1.1 General methods of preparation and properties of aliphatic and aromatic mono carboxylic acids. Ionization of carboxylic acids. Acidity constant. Comparison of acid strengths of substituted halo acids and substituted benzoic acids.

1.2 Aromatic sulphonic acid – preparation and properties. Aliphatic hydroxy acids – Action of heat on α, β, γ hydroxy acids. Acyl substitution.

1.3 Aliphatic dicarboxylic acid – Blanc's rule. Problems related to mono and dicarboxylic acids.

1.4 Malonic and aceto acetic ester – characteristics and synthetic uses.

Extra reading/Keywords:*Benefits of Hydroxy citric acids*

UNIT 2- NITRO COMPOUNDS AND AMINES 12Hrs

2.1 Aliphatic nitro compounds – comparison between primary, secondary and tertiary Nitrocompounds. Conversion of nitrobenzene to o, m and p-dinitro benzene. TNT. Reduction of nitrobenzene in neutral, acidic and alkaline media.

2.2 Relative basic characters of aliphatic, aromatic amines and guanidine. Separation of aliphatic amines. Phenylene diamines – preparation, properties and uses.
2.3 Diazotisation - Illustration and mechanism. Synthetic applications of diazonium salts.
2.4 Diazomethane and diazo acetic ester – preparations, structure and their synthetic uses.

Extra reading/Keywords:*Role of Nitrogen containing compounds in daily life*

UNIT 3- AMINO ACIDS, PROTEINS AND NUCLEIC ACIDS 12Hrs

3.1 Amino acids – introduction, classification, zwitter ions, iso electric point, Preparation and Properties.
3.2 Polypeptides – peptide synthesis. Structural determination of polypeptides – end group analyses.
3.3 Proteins – classification based on physical and chemical properties. Physiological functions, Primary, secondary and tertiary structures of proteins.
3.4 Nucleic acids: RNA and DNA - Biological functions.

Extra reading/Keywords:*Nuclear bases*

UNIT 4-OXYGEN AND SULPHUR CONTAINING COMPOUNDS 12Hrs

4.1 Alcohols - distinction of primary, secondary and tertiary alcohols. Thioalcohol (Ethyl Mercaptan), Poly-hydric alcohols (Glycol and Glycerol), Unsaturated alcohol (Allyl alcohol) – preparation and properties.
4.2 Ethers - (Diethyl ether and anisole), Epoxide (Ethylene oxide), Thioether (Ethyl Sulphide) - Preparation and properties. Mustard gas – structure and preparation.
4.3 Phenols : Preparation and acidic character of phenols - explanation on the basis of resonance stabilization, Effect of substituent on acidity. Ring substitution in phenols – Orientation of phenolic group towards electrophiles. Esterification, nitration, sulphonation, halogenation, coupling, Kolbes reaction (mechanism), Reimer-Tiemann reaction (mechanism). Lederer-Manasse, Liebermann's, Hoesh reactions, Elb's persulphate oxidation, phthalein reaction and Peckmann condensation.
4.4 Cresols, Di and Trihydric phenols and naphthols – reactions.

Extra reading/Keywords:*Harmful effects of Resorcinol*

UNIT 5-CARBOHYDRATES 12Hrs

5.1 Introduction. Classification. Preparation and reactions of glucose and fructose.
5.2 Ascending and descending of sugar series. Interconversions. Mutarotation and its mechanism. Epimerization. Constitution of glucose and fructose.
5.3 Disaccharides – preparations, reactions and structure of maltose, lactose and sucrose Structural elucidation not expected).
5.4 Polysaccharides : Starch and cellulose – properties and uses.

Extra reading/Keywords:*Deficiency of Carbohydrates*

Note: Texts given in the Extra reading /Key wordsmust be tested only through Assignment and Seminars.

Course Outcomes

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Formulate and discriminate the preparation, properties and strength of aliphatic, Aromatic carboxylic, sulphonic acids and their derivatives.	PSO 1	R, U
CO-2	Explain the preparation, properties and basicity of nitrogen containing organic compounds.	PSO 2	U
CO-3	Describe the physiological functions and structures of proteins, amino acids and nucleic acids.	PSO 2	Ap
CO-4	List out the preparation, properties of oxygen and sulphur containing compounds.	PSO 3	R
CO-5	Elucidate the structure of glucose and fructose	PSO 4	Ap

PO – Programme Outcomes; CO – Course Outcome; R- Remember; U- Understand; Ap – Apply; An – Analyse; E- Evaluate; C – Create

TEXT BOOKS:

1. Jain M.K., Sharma S.C., *Modern organic chemistry*, Fourth edition, Vishal Publishing Co., Jalandhar, 2012.
2. Tewari K.S., Vishnoi N.K., Mehrotra S.N., "*A Text Book of Organic Chemistry*", 2nd Revised edition, Vikas Pulbishing House Pvt. Ltd.

BOOKS FOR REFERENCE:

1. Soni P.L. and Chawla H.M., "*Text Book of organic Chemistry*", 27th Edition, Sultan Chand and Sons, 1997.
2. Subash Chandra Rastogi, Satiskumar, Agarwala, Ashok Kumar Sharma. " Natural Products" – Vol. I.
3. I.L.Finar, Organic chemistry, Vol. I- 6th edition, vol.2 – fifth edition, Pearson Education, 2002.
4. Jonathan Clayden, Nick Geeves, Stuart Warren, *Organic chemistry*, 2nd Edition, Oxford University Press, 2012.
5. John McMurray, *Organic chemistry*, 8th Edn., International Edition ,Mary Firch, 2011.
6. Robert Thornton Morrison, Robert Neilson Boyd , Saibal Kanti Bhattacharjee, *Organic Chemistry*, 7th Edition, Pearson Education India, Chennai, 2011.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Third Year – Semester- V

Course Title	**Main Core – 9: Physical Chemistry – I [Electro chemistry and Phase rule]**
Total Hours	**60**
Hours/Week	**4 Hrs Wk**
Code	**U15CH5MCT09**
Course Type	**Theory**
Credits	**4**
Marks	**100**

General Objective:

To make the students learn the basic concepts of electrolytic conductance, understand the different types of electro chemical cells, EMF of cell and its measurement and concepts of phase rule.

Course Objectives:

CO No.	**Course Objectives**
CO-1	understand the basic concepts of electrolytic conductance and transport number measurements.
CO-2	classify the electrolytes and interprets the various theories of electrolytes
CO-3	implement electrode potential and apply Nernst equation for calculating the emf of the galvanic cell.
CO-4	apply emf measurements and outlines corrosion and overvoltage as electrochemical processes
CO-5	interpret Gibbs phase rule and its application in separation of metals from ores and alloys

UNIT 1 - ELECTROLYTIC CONDUCTION – I **12 Hrs**

1.1 Specific conductance, equivalent conductance, relation between specific conductance and equivalent conductance, molar conductance, variation of molar conductance with dilution.

1.2 Determination of conductance and cell constant. Ionic mobility and its determination, discharge of ions on electrolysis – Hittorf's theoretical device.

1.3 Transport number, determination of transport number – Hittorf's method and moving boundary method, effect of concentration on transport number.

Extra reading/Keywords*: Conductance determination by experiments*

UNIT 2- ELECTROLYTIC CONDUCTION – II **12Hrs**

2.1 Kohlrausch's law – statement, applications of Kohlrausch's law – calculation of molar conductance at infinite dilution for weak electrolyte and determination of transport number.

2.2 Applications of conductance measurements – determination of degree of dissociation of weak electrolyte, ionic product of water, solubility of sparingly soluble salt and conductometric titrations.

2.3 An elementary treatment of Debye Huckel theory of strong electrolytes, significance of Debye - Huckel - Onsagar equation. Conductance at high field and high frequencies - Wein & Debye – Falkenhagen effects.

Extra reading/Keywords:*Degree of dissociation of strong and weak electrolytes and solubility product determinationby experiments*

UNIT 3- ELECTROCHEMICAL CELLS – I **12 Hrs**

3.1 Galvanic cells, reversible electrodes and their types – metal/metal ion, gas/ion, metal/insoluble salt/anion, oxidation – reduction electrodes.

3.2 Single electrode potential, sign of electrode potential, reference electrodes – hydrogen, calomel and silver/silver chloride electrodes.

3.3 Thermodynamics of reversible cells and reversible electrodes – electrical energy in a galvanic cell, electrical energy and free energy change of the cell reaction, relation between electrical energy and enthalpy of a cell reaction. Effect of concentration of electrolyte on cell potential and electrode potential – Nernst equation.

3.4 E.M.F. of a cell and its measurement, Weston standard cell, the electrochemical series and its applications.

Extra reading/Keywords:*Fuel cells, primary and secondary batteries*

UNIT 4 - ELECTROCHEMICAL CELLS – II **12 Hrs**

4.1 Electrolyte concentration cells with and without transference, liquid junction potential.

4.2 Applications of E.M.F. measurements – determination of valency of ions, solubility product and pH – hydrogen electrode, quinhydrone electrode and glass electrode, potentiometric titrations.

4.3 Over Voltage – definition, determination and applications. Corrosion of metals – definition, types, electrochemical theory of corrosion and prevention.

Extra reading/Keywords:*Electrical double layer and corrosion inhibitors*

UNIT 5- PHASE EQUILIBRIA AND PHASE RULE **12Hrs**

5.1 Meaning of the terms – phase, component and degree of freedom. Criteria of phase equilibrium, Derivation of Gibb's phase rule.

5.2 Phase equilibria in one component systems – phase diagrams of water, carbon di-oxide and sulphur system.

5.3 Simple eutectic system – Lead-Silver system and Potassium iodide-Water system. Applications of thermal analysis in the construction of simple eutectic diagram.

5.4 Systems giving rise to compounds with congruent melting point – Zinc-Magnesium system. Systems giving rise to compounds with incongruent melting point – Sodium-Potassium system. Partially miscible liquids – Phenol-Water system, triethylamine-water and Nicotine-Water systems.

Extra reading/Keywords*:* *Three component systems*

Note: Texts given in the Extra reading /Key wordsmust be tested only through Assignment and Seminars.

Course Outcomes

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Analyze the variation of specific and equivalent conductance with dilution	PSO2	An
CO-2	Discuss the applications of conductance measurement	PSO4	A
CO-3	Classify the types of electrodes	PSO1	U
CO-4	Explain the electrochemical theory of corrosion	PSO5	U
CO-5	Sketch and discuss the phase diagram of simple eutectic systems	PSO2	U

Text Books:

1. Puri B.R., Sharma L.R. and Madan Pathania S. , *Principles of Physical Chemistry*, 35th edn., Shobanlal nagin Chand and Co, 1994..
2. Arun Bahl, B.S. Bahl & G.D. Tuli, *Essentials of Physical Chemistry*, S.Chand & company Pvt. Ltd, 2014.

BOOKS FOR REFERENCE:

1. Negi, A.S. & Anand, S.C., *A Text book of Physical Chemistry*, 3rd edn., Wiley EasternLtd, 1994.
2. Walter J Moore *Physical Chemistry*, 5th edn.,., Prentice-Hall, 1999.
3. Bockris, J.O.M and Reddy, A.K.N. *Modern Electro Chemistry* 2nd edn.,, New York: Plenum Press, 1998.
4. Crow, D.R. *Principles And Applications To Electrochemistry*, Chapman And Hall, 1991.
5. Samuel Glasstone, *An Introduction to Electrochemistry* McMillan India Ltd.,2015.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Third Year - Semester – V

Course Title	MAJOR ELECTIVE – 2 : DAIRY CHEMISTRY
Total Hours	75
Hours/Week	5Hrs /Wk
Code	U15CH5MET01
Course Type	Theory
Credits	4
Marks	100

General Objectives
The student learns various concepts of all the dairy products

CO No.	Course Objectives
CO-1	appraise properties of milk and detection of adulteration and presevatives
CO-2	classifies the milk lipids, proteins, carbohydrates vitamins and its properties
CO-3	categorize and summarize the milk products and its measurements
CO-4	describes the milk products and its composition
CO-5	explains the methods of manufacture of milk powder

UNIT I:

Milk: Definition – General composition of milk – Physical properties of milk – colour, odour, acidity – natural and developed, specific gravity – Recknagel effect, viscosity and conductivity, factors affecting the gross composition of milk, Physico – chemical change taking place in milk due to processing parameters – boiling pasteurization, sterilization and homogenization. Adulterants, preservatives and neutralizers – examples and their detection. Estimation of fat, specific gravity, acidity and total solids in milk.

UNIT II: 10 hrs.

Milk lipids – terminology and definitions classification – saponifiable (triglycerides) and unsaponifiable matters (sterols and cholesterol) phospholipids – structure and properties (Lecithin and Cephalin) Milk fat constants – refractive index – saponification number, Iodine number, R.M. number and Polenske number.

Milk proteins – chemistry of proteins in general structure –N-terminal and C-terminal, hydrogen bond, disulphide bond and salt linkages, outlines of primary, secondary and tertiary structure of proteins. Physical properties of milk proteins – electrical properties and hydration, solubility, reaction of milk proteins with formaldehyde and ninhydrin. Non-protein nitrogen constituents of milk, effect of heat on milk protein, milk enzyme and functions.

Milk carbohydrate – Lactose – its structure, solubility, hydrolysis, oxidation and reduction, estimation of lactose in milk.
Milk vitamins – water and fat soluble vitamins, effect of heat and light on vitamins.
Ash and mineral matters in milk.

UNIT III:
Creams: Definition – composition – chemistry of creaming process – gravitational and centrifugal methods of separation of cream – factors influencing cream separation (Mention the factors only) – cream neutralization. Estimation of fat in cream.

Butter: Definition - % composition – manufacture – Estimation of fat, acidity, salt and moisture content – Desi butter.

Ghee: Major constituents – common adulterants added to ghee and their detection – rancidity – definition – types (hydrolytic, oxidative and ketonic) prevention and anti oxidants and synergist (natural and synthetic) – Measurements.

UNIT IV:
Fermented Milk products: Fermentation of milk – definition, conditions, cultured milk – definition of culture – examples, conditions, types – cultured cream – cultured butter milk – Bulgaricus milk - acidophilus milk – yogurt. Recteriophage – definition and its function.

Indigenous Products: Definition – percentage composition – preparation – physico- chemical changes take place during khoa making – khoa sweet – Gulabjamun, Chana sweet – Rossogolla – ingredients and preparation.

Ice Cream: Definition – Percentage composition – types – ingredients needed – manufacture of ice-cream stabilizers – emulsifiers and their role.

UNIT V:

Milk Powder: Definition – need for making powder – drying process – spray drying, drum drying, jet drying and foam drying – principles involved in each. Manufacture of whole milk powder by spray drying process – keeping quality of milk powder.

Dairy Detergents: Definition – characteristics – classification – washing procedure (modern method) sterilization – Chloramines – T and hypochlorite solution.

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	appraise properties of milk and detection of adulteration and presevatives	PSO1	U
CO-2	classifies the milk lipids, proteins, carbohydrates vitamins and its properties	PSO2	An
CO-3	categorize and summarize the milk products and its measurements	PSO1	ap
CO-4	describes the milk products and its composition	PSO4	U
CO-5	explains the methods of manufacture of milk powder	PSO5	Ap

REFERENCE:

1. Outlines of Diary Technology – Sukumar De.
2. Principles of Dairy Chemistry – Robert Jenness & S. Patorn.
3. Indian Diary products – K.S. Rangappa and K.T. Achaya.
4. Modern Diary products – L.M. Lampert.
5. Principles of Dairy processing – Warner.

PRACTICAL:

1. Estimation of fat, acidity and T.S. in various samples of milk.
2. Estimation of protein in milk.
3. Detection of adulterants, preservatives and neutralizers in milk.
4. Detection of rancidity I ghee.
5. Estimation of rancidity, salt content, fat in butter.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Third Year - Semester – V

Course Title	MAJOR ELECTIVE 2- POLYMER CHEMISTRY
Total Hours	**75**
Hours/Week	**5 Hrs/Wk**
Code	**U15CH5MET02**
Course Type	**Theory**
Credits	**4**
Marks	**100**

GENERAL OBJECTIVES:

To learn about classification of polymers, polymerization techniques and properties of polymers

Course Objectives (CO):

CO No.	**Course Objectives**
CO-1	understand the different mechanism of polymerisation
CO-2	explain the polymerization techniques and commercial applications of different polymers
CO-3	determine the molecular weight of polymers by various methods
CO-4	categorize various degradation types of polymers
CO-5	explain the fabrication techniques and applications of polymers

UNIT I: 10 hrs.

1.1 Introduction, classification of polymers.
1.2 Polymerization - step polymerization, chain polymerization and co-ordination polymerization.
1.3 Catalysts in polymerization, degree of polymerization, kinetic chain length.

UNIT II: 10 hrs.

2.1 General methods of polymerization bulk, solution, suspension and emulsion polymerization.
2.2 Study of commercial polymers – polyacrylonitrile, polymethyl methacrylate, polyurethanes, polyvinyl chloride, polytetra fluoroethylene, polyamides.
2.3 Silicones, rubber, elastomers, vulcanization.

UNIT III: 10 hrs.

3.1 Characterisation of polymers – chemical structure and polymer properties – Degree of crystallinity, Tm, Tg, mechanical, electrical, thermal, optical and chemical properties.
3.2 Molecular weights and averages – number average, weight average, molecular weight distribution.
3.3 Determination of molecular weight – Viscosity method, osmometry and end group analysis, spectral analysis and thermogravimetric analysis.

UNIT IV: 10 hrs.

4.1 Polymer degradation – definition, types.
4.2 Thermal degradation, mechanical degradation.
4.3 Photo degradation, oxidative degradation – rubber oxidation, ozone oxidation.

UNIT V: 10 hrs.

5.1 Compounding – compounding materials and their significances.
5.2 Fabrication – Techniques – Compression, injection, lamination mouldings.
5.3 Applications of polymers and plastics.

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	understand the different mechanism of polymerisation	PSO 1	U
CO-2	explain the polymerization techniques and commercial applications of different polymers	PSO 1	U
CO-3	determine the molecular weight of polymers by various methods	PSO 3	App
CO-4	categorize various degradation types of polymers	PSO 4	An
CO-5	explain the fabrication techniques and applications of polymers	PSO 3	App

BOOKS RECOMMENDED:

TEXT BOOK:

1. Gowarikor V.R., Viswanathan N.V., Jayadev Sreedhar, Polymer Science , Revised edition 2005, New Age International PVT. LTD.

REFERENCE BOOK:

1. Fred W. Billmeyer JR, 3rd edition John Wiley & Sons (P) Ltd.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Third Year - Semester – V

Course Title	MAJOR ELECTIVE – 2 : FOOD CHEMISTRY
Total Hours	75
Hours/Week	5Hrs /Wk
Code	U17CH5MET03
Course Type	Theory
Credits	4
Marks	100

General Objectives
The student learns various concepts of all the nutrients, food preparation, preservation and adulteration.

CO No.	Course Objectives
CO-1	Appraise the functions, sources, deficiency diseases, daily allowances of major nutrients.
CO-2	Enumerate the functions, sources, deficiency diseases, daily allowances of minor nutrients.
CO-3	Categorize and summarize the various techniques of food preparation and recommend steps to retain the nutritive value.
CO-4	Describe the concepts involved in food preservation techniques
CO-5	Identify the different types of food adulteration and suggest few tests for their detection and relates chemical structure of ingredients with taste.

UNIT I:
Nutrients –I:

1.1 Protein – functions, sources, deficiency diseases, daily allowances.
1.2 Carbohydrates – functions, sources, deficiency diseases, daily allowances.
1.3 Fats and oils – functions, sources, deficiency diseases, daily allowances, disorders due to excess of fat.
1.4 Minerals – Ca, P, Fe, I, Na – functions, sources, deficiency diseases and disorders of taking excess. Importance of micronutrients.

Organic sources of nutrients.

UNIT II:
Nutrients –II:

2.1 Vitamins – H_2O soluble and fat soluble vitamins – sources, functions, deficiency and disorders of taking excess of vitamins.
2.2 H_2O – functions, sources, deficiency diseases.
2.3 Fibre – functions, requirements and sources. Effects of deficiency of fibre.

2.4 Algae and fungi as foods, Toxicants naturally present in foods. Fermented foods and pickles.

Preparation of Spirulina and dosage

UNIT III:

Food Preparation:

3.1 Food preparation - Effect of cooking and heat processing on the nutritive value of foods. Food faddism and faulty food habits.
3.2 Cooking methods: Moist heat methods and dry heat methods – merits and demerits. Biofortification and Nutraceuticals – definition and examples.
3.3 Retention of nutritive value during preparation. Microwave cooking, solar cooking – escription, advantages and disadvantages.

Obesity

UNIT IV:

Food Preservation:

4.1 Food preservation: Importance of food preservation, causes of food spoilage.Principles of food preservation. Home scale methods of food preservation.
4.2 Methods of food preservation: Low temperature, high temperature, preservatives, osmotic pressure, dehydration, irradiation – merits and demerits.
4.3 Practical rules for good sanitation, food selection, purchase and storage – Non perishable foods, semi-perishable and perishable foods.
4.4 Browning reactions in foods – enzymic browning and non-enzymic browning.

Organic insecticides

UNIT V
Food Adulteration and Taste Sensation:

5.1 Food Adulteration – Types, international, Metallic, incidental adulteration and their ill effects.
5.2 Simple physical and chemical tests for detection of food adulterants, consumer protection.
5.3 Packaging hazards, Food borne diseases. Control of insects and rodents.
5.4 Physiological and chemical aspects of taste sensation – mechanism of sensation of taste, factors affecting taste response. Relation between chemical structure and taste.

Adulteration in Maida

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	List the important nutrients of healthy diet	PSO1	U
CO-2	Analyses the nutrients presents of balanced diet	PSO2	An
CO-3	Summarize the various cooking methods and its effects.	PSO1	U
CO-4	Explain the different food preservation techniques	PSO4	U
CO-5	Evaluate the adulterants present in food	PSO5	Ap

BOOKS RECOMMENDED

BOOKS FOR STUDY:

1. Dr. M. Swaminathan, Hand book of food and Nutrition' Reprint, published by The Bangalore printing and publishing co. ltd. 2008.
2. B. Srilakshmi, Food Sceince, Third Edition, New Age international publishers, 2003.

BOOKS FOR REFERENCE:

1. Dr. M. Swaminathan, Food Science Chemistry and Experimental foods, second enlarged edition, published by Bangalore press. (1987)
2. Dr. M. Swaminathan, 'Advanced test Book on Food and Nutrition' Volume I and II second edition, The Bangalore printing and publishing co. ltd.
3. Sumathi.R. Mudambi, 'Fundamentals of food and Nutrition', Second edition, Wiley Eastern Limited, "1983.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Third Year – Semester- V

Course Title	Main Elective – 2 : Chemistry of Biomolecules
Total Hours	75
Hours/Week	5 Hrs Wk
Code	U15CH5MET03
Course Type	Theory
Credits	4
Marks	100

General objective:

To make the students to learn about carbohydrates, lipids, proteins, enzymes, blood and bile pigments.

Course objectives:

CO No.	Course Objectives
CO-1	understand the importance and different classes of lipids and describe the metabolism and functions of lipids.
CO-2	describe what happens during carbohydrate digestion, glycolysis, glycogenesis, glycogenolysis and gluconeogenesis.
CO-3	analyse the metabolism, anabolism and catabolism of proteins and detect the effects of starvation on different metabolism.
CO-4	analyse the properties, mechanism of action metabolic effects of Thyroxine and find out the diseases associated with abnormal metabolism of thyroxine.
CO-5	describe the functions and properties of blood, Haemoglobin, bile pigments, bile acids and distinguish blood groups.

The Learner will be able to

describe the functions and properties of blood, Haemoglobin, bile pigments, bile acids and distinguish blood groups.

UNIT 1 - CARBOHYDRATES **15 Hrs**

1.1 Definition, Biological Significance, Digestion and absorption of carbohydrates, Chemical and Physical changes of glucose after absorption (Preliminary idea).
1.2 Intermediary metabolism of carbohydrates – glycogenesis, glycogenolysis, glycolysis, gluconeogenesis.
1.3 Regulation of blood sugar – Regulation by liver and regulation by kidney,glucose Tolerance Tests. Diabetics – types, pathological condition and treatment, glycosuria.

Extra reading/Keywords*:* *Carbohydrates as valuable tool for product development.*

UNIT 2 – LIPIDS **15 Hrs**

2.1 Introduction, Biological significance of fats, classification, Blood lipids.
2.2 Oxidation of fatty acids –β-oxidation cycle of saturated fatty acids.
2.3 Ketogenesis, Ketosis, Ketolysis, role of liver in fat metabolism.
2.4 Cholesterol – absorption, factors influencing absorption, Cholesterol content of serum, fatty liver. Hyper and Hypochlolesterolemia – pathological condition and treatment.

Extra reading/Keywords:*Characterization and analysis of lipids.*

UNIT 3 – PROTEINS **15 hrs**

3.1 Absorption, metabolic pool, general pathway of protein metabolism, nitrogen metabolism. Diseases due to abnormal composition of urine.
3.2 Anabolism of protein – protein turnover and Biosynthesis of protein.
3.3 Catabolism of proteins – Removal of amino group, Fate of amino group and fate of Carbon skelton, diseases due to deficiency of protein.
3.4 Inborn errors of phenylalanine metabolism, effects of starvation on different metabolism.

Extra reading/Keywords:*Importance and deficiency of proteins.*

UNIT 4 - ENZYMES AND THYROXINE **15 Hrs**

4.1 Enzymes – properties, classification, mechanism of enzyme action, Factors influencing enzyme action, enzyme inhibitors, introduction to co-factors.
4.2 Digestive enzymes and their action – salivary digestion, gastric digestion, pancreatic and intestinal digestion.
4.3 Intestinal fermentation and putrefaction – Action of Bacteria on CH_2O, Fat, Protein and Bilirubin.
4.4 Thyroxine – Circulating thyroid hormone, metabolic effects of thyroxine, Agents interfering with the synthesis of thyroid hormone, Diseases associated with abnormal metabolism of thyroxin – treatment.

Extra reading/Keywords:*Consequences of enzyme deficiency in human body.*

UNIT 5 - BLOOD, BILE ACIDS AND PIGMENTS **15 Hrs**

5.1 Blood – functions of blood and plasma proteins, blood groups and Rh factor, coagulation of blood mechanism.
5.2 Haemoglobin – structure, properties of Hb, metabolism.
5.3 Bile pigments – examples, properties, Types of Jaundice (preliminary idea).
5.4 Bile acids – examples, function and diseases associated.

Extra reading/Keywords:*Types and Derivatives of Haemoglobin.*

Note: Texts given in the Extra reading /Key wordsmust be tested only through Assignment and Seminars.

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Explain the digestion and absorption of carbohydrates, processes involved in their metabolism and regulation of blood sugar.	PSO2	An
CO-2	Recognize the different types of blood lipid, discuss the metabolism of fatty acids and analyze the factors influencing the absorption of cholesterol.	PSO4	An
CO-3	Describe the metabolic pathway of proteins and recognize the effect of starvation on metabolism.	PSO2	U
CO-4	Categorize the different classes of enzymes, list their properties and describe the action of enzymes and bacteria on digestion of various nutrients.	PSO2	U
CO-5	Analyze the metabolic effects of thyroxine.	PSO3	An
CO-6	Discuss the function and properties of blood, bile pigments and bile acids.	PSO3	An

TEXT BOOKS:

1. Ambika Shanmugam.*Fundamentals of Biochemistry for medical students*. 4th edn., Navabharat offset works, 1983.
2. Satyanarayana U. and Chakrapani U.*Biochemistry*, 4th Revised edn., Elsevier, 2013.

BOOKS FOR REFERENCE:

1. Dulsy Fatima, Narayanan L.M. and Co-workers. *BioChemistry*, Saras Publication.1993.
2. Richard A. Harvey and Denise R. Ferrier, *Biochemistry* 4th edn., Lippincott Williams and Wilkins, 2008.
3. David L. Nelson, Albert L. Lehninger and Michael M. Cox , *Princples of Biochemistry*. New York: 5th edn., Worth *Publishers*,2008.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
III Year- Semester V/VI

Course Title	**NON MAJOR ELECTIVE – 1: HOME CARE**
Total Hours	**30**
Hours/Week	**2 Hrs /Wk**
Code	**U15CH5NMT01/U15CH6NMT01**
Course Type	**Theory**
Credits	**2**
Marks	**100**

General Objective:
To enable the students to learn about balanced diet, food nutrition, marriage and family, fire prevention and protection, care of household metals and safe use of pesticides.

CO No.	Course Objectives
CO-1	Understand and identify the different types of food nutrition.
CO-2	Categorize the types of Marriage and Family
CO-3	Describe the concepts involved in fire prevention techniques.
CO-4	List the preventive measures of house hold metals.
CO-5	Outline the general methods of handling Pesticides.

UNIT 1- DIETETICS AND FOOD NUTRITION **6 Hrs**
Balanced diet, Specific functions of nutrients, Effects of cooking on various nutrients.

Extra reading/Keywords:*Nutraceuticals*

UNIT 2- MARRIAGE AND FAMILY **6 Hrs**
Family life cycle, Different types of marriage, Parenting styles, Single parenthood, Types of family.

Extra reading/Keywords:*Balancing Family and Social responsibility in life.*

UNIT 3-FIRE PREVENTION **6 Hrs**
Major causes of fire in homes, Fire prevention and fire fighting in homes, Methods of extinguishing fire – starvation, cooling and smothering. Simple extinguishing agents. Chemical fire extinguisher – CO_2 extinguisher.

Extra reading/Keywords: *First Aid techniques and Rescue Victims.*

UNIT 4- CARE OF HOUSE HOLD METALS **6 Hrs**

Metal polishes – functions, composition, mode of action. General rules for cleaning and polishing, cleaning and polishing of aluminium utensils, silverwares, copper and brassware, gold and teflon.

Extra reading/Keywords *:* *Applications of metals in day today life.*

UNIT 5- SAFE USE OF PESTICIDES **6 Hrs**

Need of pesticides at home, Types of insect and their control at home - mosquitoes, flies, ants, cock roaches, termites and head lice. Precautions in application of pesticides.

Extra reading/Keywords *:* *Pest Management and Control.*

Note: Texts given in the Extra reading /Key wordsmust be tested only through Assignment and Seminars.

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Categorize the Composition of a balanced diet.	**PSO 1**	**R, U**
CO-2	Explain the different types of marriages	**PSO 1**	**U**
CO-3	Describe the methods of fire prevention and fire fighting in homes	**PSO 1**	**Ap**
CO-4	List out the rules involved in cleaning and polishing of various metal ware.	**PSO 4**	**Ap**
CO-5	Enumerate the Precautions in application of pesticides.	**PSO 4**	**Ap**

TEXT BOOKS:

1. Swaminathan M., 'Essentials of food and *nutrition'* the Bangalore printing & publishing Co., Ltd. 1985.
2. Sumati Mudambi R. and Rajagopal M.V., *Fundamentals of food and nutrition,* third edition.
3. Thankamma Jacob *'A Text Book of Applied Chemistry'* Macmillan India Ltd. 1987.
4. Matin Khan, '*Consumer Behaviour'* New age international (p) Ltd., publishing 2008.
5. Raheena Begum, *"A Text Book of applied Chemistry'* Sterling publishers private Ltd, 1991.

BOOKS FOR REFERENCE:

1. Bharathi V.V. and M. Jacinth '*Family resource management' Discovery publishing house*, 1994.
2. Shankar Rao C.N., '*Sociology'* S.Chand & Company Ltd., 1997.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Third Year - Semester – V/VI

Course Title	NON MAJOR ELECTIVE – 2: COSMETOLOGY
Total Hours	30
Hours/Week	2Hrs /Wk
Code	U15CH6NMT02
Course Type	Theory
Credits	2
Marks	100

General Objective:
To expose the students to the study of skin, hair, facial, cosmetics and hazards of cosmetics.

Course Objectives:

CO No.	Course Objectives
CO-1	categorizes and identifies the types, functions and threats to the skin
CO-2	understand and identify the types and problems of hair and suggests treatments
CO-3	list out the advantages and disadvantages of manual massage and mask treatment
CO-4	outline the preparations of facecreams, toilet powders and suggest facial packs for different types of skin
CO-5	enumerate the hazards due to cosmetics and appraise various techniques for the beautification of facial skin.

UNIT 1 -SKIN **6 Hrs**

Study of Skin: Types, functions, diet and skin, threats to skin, effects of summer, winter, wind and rain on skin. Common skin disease – acne and warts.

Extra reading/Keywords:*Skin diseases :Leucoderma and Psoriasis*

UNIT 2-HAIR **6 Hrs**

Types of hair, problems of hair – Hair falling, baldness, graying of hair, problems with lice, dandruff, hair care conditioning.

Extra reading/Keywords:*Ill effects of using chemical hair conditioner and hair colourants*

UNIT 3 - FACIAL **6Hrs**

Manual massage – advantages, disadvantages. Mask treatment – setting and non-setting masks and uses.

Extra reading/Keywords: *Ayurvedic Massage Techniques*

UNIT 4 – COSMETICS **6 Hrs**

Face creams, toilet powders – ingredients, preparations. Preparation of facial packs for different types of skin, Dentifrices.

Extra reading/Keywords: *Herbal Facial Packs*

UNIT 5- STEPS IN FACIAL **6 Hrs**

Hazards due to cosmetics, skin – cleansing, toning, moisturizing, exfoliation – types, preparation, applications and uses.

Extra reading/Keywords: *Advantages of Herbal Cleansers, Toners and Moisturizers*

Note: Texts given in the Extra reading /Key wordsmust be tested only through Assignment and Seminars.

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Discuss the different types of skins and their functions	PSO1	U
CO-2	Identify the various hair problems	PSO2	U
CO-3	Outline the advantages and disadvantages of mask treatment.	PSO2	U
CO-4	Prepare the natural facial packs on their own.	PSO3	An
CO-5	Summarizes the hazards due to usage of cosmetics.	PSO4	Ap

TEXT BOOKS:

1. Thankamma Jacob ‘A Text Book of Applied Chemistry’ Macmillan India Ltd. 1987.

BOOKS FOR REFERENCE:

1. ParveshHanda, “ A complete book on Beauty, Body, Make-up and Hairstyles, Goodwill publishing House, New Delhi.
2. ParveshHanda, “ Herbal Beauty Care”, Orient paperbacks, New Delhi 2004

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Third Year - Semester – VI

Course Title	MAJOR CORE PAPER – 11: ORGANIC CHEMISTRY - II
Total Hours	75
Hours/Week	5Hrs /Wk
Code	U15CH6MCT12
Course Type	Theory
Credits	5
Marks	100

General objective:

The student learns the concepts of stereochemistry, mechanisms of rearrangement reactions, chemistry of heterocyclic compounds and structural elucidation of few natural products.

Course Objectives:

CO No.	Course Objectives
CO-1	elaborate the concepts of optical isomerism and illustrate, assign the notations for the same..
CO-2	discuss and justify the conformational analysis of alkanes, cycloalkanes, geometrical isomers and their stability.
CO-3	illustrate and apply the mechanism of various molecular rearrangements to the given substrates.
CO-4	classify, formulate and defend the preparation, properties of Heterocyclic compounds.
CO-5	outline the general methods of structural elucidation and apply to the prescribed natural products.

UNIT 1-STEREOCHEMISTRY I **15 Hrs**

1.1 Isomerism-Types and examples. Tautomerism-Types and examples.
1.2 Optical isomerism - Asymmetric centre, chirality, achiral and prochiral molecules. Elements of symmetry.
1.3 Enantiomers and diastereomers – properties. Racemisation. Resolution. Asymmetric synthesis. Walden Inversion. Vant Hoff's rule of superposition. Freudenberg's rule of shift.
1.4 Notations of optical isomers – Cahn, Ingold, Prelog rules. R – S notations for optical isomers with one asymmetric carbon.
1.5 Optical activity in compounds containing no asymmetric carbon – Biphenyls, allenes and spiranes – Elementary treatment only. Optical isomers of lactic, tartaric and malic acid - Structures and preparations.

Extra reading/Keywords:*Conversion of Enantiomers into Diastereomers*

UNIT 2-STEREOCHEMISTRY II **15 Hrs**

2.1 Geometrical Isomerism- Nomenclature of geometrical isomers (E and Z, syn and anti system for aldoximes and ketoximes)
2.2 Cycloalkanes: Introduction – preparation and reactions, Baeyer's strain theory and theory of strainless rings, Coulson and Moffit's concept, orbital picture of angle strain.
2.3 Conformational analysis: Introduction of terms – conformers, configuration, dihedral angle, torsional strain. Conformational analyses of ethane and n - butane. Conformation of 1,3-butadiene.
2.4 Conformers of cyclohexane – axial and equatorial bonds, ring flipping showing axial and equatorial bonds and their inter-conversions. Conformations of mono substituted cyclohexanes – 1,3-diaxial interaction.

Extra reading/Keywords:*Conformation in cis-1,4-di-t-butylcyclohexane*

UNIT 3- MOLECULAR REARRANGEMENTS **15 Hrs**

3.1 Molecular Rearrangements: Classification.
3.2 Mechanism of Pinacol – Pinacolone, Beckmann, Benzidine rearrangements.
3.3 Hofmann, Curtius, Schmidt, Cope rearrangement.
3.4 Claisen, Fries, Benzil – Benzilic acid rearrangements.

Extra reading/Keywords:*Rearrangements extended to unknown substrate*

UNIT 4- HETEROCYCLIC COMPOUNDS **15 Hrs**

4.1 Aromatic characteristics of heterocyclic compounds. Importance of Heterocyclic compounds.
4.2 Five membered Hetero cyclics- Furan, pyrrole, thiophene- Preparation and properties .
4.3 Six membered hetero cyclics – pyridine- Preparation and Properties. Comparison of basicity of pyrrole and Aniline with pyridine.
4.4 Condensed Hetero cyclics - Indole, Quinoline, isoquinoline – properties only. Examples of condensed heterocyclics containing more than one hetero atom.

Extra reading/Keywords: *Nonaromatic Heterocyclics*

UNIT 5- NATURAL PRODUCTS **15 Hrs**

5.1 Alkaloids: Introduction, General methods of structural elucidation. Structural elucidation of Coniine, Piperine and Nicotine.
5.2 Terpenes: Introduction, classification, Isoprene rule. Structural elucidation of Menthol and α – terpineol.
5.3 Vitamins: Introduction, classification and structural elucidation of Ascorbic acid and Pyridoxine.

Extra reading/Keywords:*Terpenes are the volatile constituents of palanresins and essential oils*
Note: Texts given in the Extra reading /Key wordsmust be tested only through Assignment and Seminars.

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Identify the chirality and configuration in various organic compounds.	PSO-1	U
CO-2	Predict the nomenclature of geometrical isomers.	PSO-3	An
CO-3	Analysis the conformers of alkanes, cycloalkanes and their stability.	PSO-3	An
CO-4	Discuss the mechanisms of various molecular rearrangements.	PSO-1	U
CO-5	List out the preparation and properties of Heterocyclic compounds.	PSO-1	U
CO-6	Elucidate the structure of terpenes and alkaloids.	PSO-2	U

TEXT BOOKS:

1. Parmar V.S. and Chawla H.M., "*Principles of reaction mechanism in Organic Chemistry*", 2nd edition, Sultan Chand, 1978.
2. Soni P.L. and Chawla H.M, "*Text Book of Organic Chemistry*", 27th edition, Sultan Chand, 1997.

BOOKS FOR REFERENCE:

1. Jain M.K. "*Organic Chemistry*", 12th edition, Shoban Lai Nagin Chand and Co.
2. Jerry March, "*Advanced Organic Chemistry*" Reactions, Mechanisms and Structure", 4th Edition,John Wiley and Sons(Asia)Pte. Ltd, New delhi, 1997.
3. Robert Thornton Morrison, Robert Neilson Boyd , Saibal Kanti Bhattacharjee, *Organic Chemistry*, 7th Edition, Pearson Education India, Chennai, 2011.
4. I.L. Finar, "*Organic Chemistry*" 5th Edition,Dorling Kindersly (India) Pvt.Ltd., 1975.
5. Subhash Chandra Rastogi, Satis Kumar Agarwala, Ashok Kumar Sharma, "*Chemistry of Natural Products*", Vol I & Vol. II, I Edition 1974-75. Jai Prakash Nath & Co.Leading Educational Publishers.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Third Year - Semester – VI

Course Title	MAJOR CORE – 12 : PHYSICAL CHEMISTRY – II [SPECTROSCOPY]
Total Hours	75
Hours/Week	5Hrs/Wk
Code	U15CH6MCT13
Course Type	Theory
Credits	5
Marks	100

General objective:
To study the basic principles and applications involved in Rotational spectra, IR spectra, Raman spectra, Electronic spectra, Mass spectra, NMR spectra and ESR spectra.

Course Objectives:

CO No.	Course Objectives
CO-1	identify different molecular energies, interprets rotational spectrum of diatomics, apply the interpretation to calculate bond length, rotational constant, moment of inertia and analyze the rotational spectra of simple molecules.
CO-2	distinguish between harmonic and anharmonic vibrations, interprets the spectrum of vibrating rotator and attribute to group frequencies, hydrogen bonding and finger print region.
CO-3	recognize the existence of Raman lines, differentiate Raman from IR and elucidate structures of simple inorganic molecules based on the mutual exclusion principle.
CO-4	explain electronic spectroscopy, fragmentation pattern in mass spectrometry and apply it to simple organic molecules.
CO-5	understand the processes responsible for NMR chemical shifts, identify, interpret the signals in simple molecules, recalls the theory of ESR and explain the ESR spectrum for simple organic radicals.

UNIT 1- ROTATIONAL SPECTROSCOPY 15Hrs

1.1 Properties of electromagnetic radiation, electromagnetic spectrum, Molecular energies, interaction of electromagnetic radiation with matter.
1.2 Microwave spectroscopy – rotation of molecules, rotational spectra – diatomic molecules.

1.3 Rotational spectra of polyatomic molecules – linear molecules, symmetric top molecules. Applications to simple molecules.

Extra reading/Key words: *Microwave assisted synthesis*

UNIT 2 - VIBRATIONAL SPECTROSCOPY 15Hrs

2.1 Infra – red spectroscopy – energy of a diatomic molecule, the simple harmonic oscillator, the anharmonic oscillator – fundamental absorption, overtones and hot bands.

2.2 The diatomic vibrating rotator, the vibrations of polyatomic molecules – CO_2 and H_2O, combination and difference bands.

2.3 Analysis by infrared techniques – finger print region, group frequencies, hydrogen bonding, structure of thio acetic acid.

Extra reading/Key words: *Interpret and elucidate structures from IR data*

UNIT 3- RAMAN SPECTROSCOPY 15Hrs

3.1 Raman spectroscopy – Occurrence of Raman lines, stokes and antistokes lines, classical theory of Raman effect, Quantum theory of Raman effect.

3.2 Pure rotational Raman spectrum of linear molecules, symmetric top molecules, Raman activity of vibrations of CO_2 and water, Rule of mutual exclusion.

3.3 Structure determination from Raman and infrared spectroscopy – CO_2, N_2O, H_2O, SO_2, NH_3, NO_3^-, ClO_3^- and ClF_3.

Extra reading/Key words: *Application of Group theory in IR and Raman*

UNIT 4 - ELECTRONIC AND MASS SPECTROSCOPY 15Hrs

4.1 Electronic spectroscopy of molecules – Electronic spectra of diatomic molecules, Born-Oppenheimer Approximation, Vibrational course structure, Intensity of vibrational electronic spectra - Franck–Condon principle.

4.2 Dissociation energy – determination from electronic spectrum, V_{max} and Birge–Sponer method, Pre–dissociation.

4.3 Mass spectrometry – Basic Principles of Mass spectrometry – Molecular ion peak – Base peak – isotopic peak – Meta stable peak – nitrogen rule – Modes of fragmentation of simple organic compounds - n-butane, 2& 3 pentanone.

Extra reading/Key words: *Elucidate structure from UV and Mass spectrum, Photoelectron spectroscopy*

UNIT 5 - NMR AND ESR SPECTROSCOPY 15Hrs

5.1 Nuclear Magnetic Resonance spectroscopy – spin of nucleus – Theory of NMR spectroscopy

5.2 Chemical shift – spin-spin splitting – NMR spectrum of ethanol – Applications to simple organic molecules like simple alkanes, alkenes, alkyl halides, aldehydes, ketones and benzene.

5.3 Electron Paramagnetic Resonance spectroscopy – Theory of EPR spectroscopy – presentation of the spectrum – Hyperfine splitting in some simple systems – proton, methyl free radical. General rules governing hyperfine splitting – applications to simple organic radicals like methyl, ethyl, benzene, naphthalene, anthracene and para semibenzoquinone.

Extra reading/Key words: *Interpretation of NMR spectrum, 2DNMR, ESR of complexes*

Note: Texts given in the Extra reading /Key wordsmust be tested only through Assignment and Seminars.

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Explain the principles of Rotational spectroscopy calculate moment of inertia from rotational spectra of diatomic molecules.	PSO 1	U
CO-2	Distinguish harmonic and anharmonic vibrations	PSO 2	U
CO-3	Discuss the Classical and Quantum theories of Raman effect	PSO 2	Ana
CO-4	Outline Salient features of fragmentation pattern of organic compounds	PSO 4	App
CO-5	Demonstrate NMR chemical shifts and splitting patterns with illustrations	PSO 5	App
CO-6	Determine the dissociation energy using Birge-Sponer method.	PSO 2	App

Text Books:

1. Colin Bannwell N and Elaine McCash M, *Fundamentals of molecular spectroscopy*, 4th edition, McGraw hill Publishing company limited, 1994.
2. Sharma Y.R. *Elementary Organic spectroscopy*, Chand S. and Co., 1989.

BOOKS FOR REFERENCE:

1. Russell S. Drago, *Physical methods for chemists*, Saunders, 1992.
2. Manas Chanda , *Atomic structure and Chemical Bond Including Molecular Spectroscopy*, Tata McGraw-Hill Publishing Company Ltd, 1972.
3. McHale, J.L "*Molecular spectroscopy*", Prentice Hall Publishers**,** 1999.
4. Sindhu, P.S "*Fundamentals of Molecular spectroscopy*" 1st edition, New Age International publishers, 2006.
5. William Kemp "*Organic Spectroscopy*", 3rd edition, ELBS publishers, 1991.
6. Russell S. Drago, *Physical methods in Inorganic Chemistry*, East West student edition, 1978.
7. Manas Chanda , *Atomic structure and Chemical Bond Including Molecular Spectroscopy*, Tata McGraw-Hill Publishing Company Ltd, 1972.
8. Levine, I.N "*Molecular spectroscopy*", John Wiley and Sons, 2000.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Third Year - Semester – VI

Course Title	MAJOR ELECTIVE 3- ENVIRONMENTAL POLLUTION
Total Hours	**75**
Hours/Week	**5 Hrs/Wk**
Code	U!5CH6MET01
Course Type	**Theory**
Credits	**4**
Marks	**100**

GENERAL OBJECTIVES:

To learn the various forms of pollution and contaminants of the environment, solid waste management and environment acts.

Course Objectives (CO):

CO No.	**Course Objectives**
CO-1	explain the sources and effects of air pollutants
CO-2	understand the effects of various agricultural and industrial discharge on water bodies
CO-3	understand the physico-chemical characteristics of soil
CO-4	explain the different techniques involved in solid waste management
CO-5	explain the environment acts against environmental degradation

UNIT I

Air pollution:

1.1 Atmosphere – structure of atmosphere, hydrosphere, hydrological cycle, Lithosphere, Biosphere.

1.2 Air pollution – composition of air – major sources of air pollution – classification and effects of air pollutants. Particulates – effect and control of particulates.

1.3 Effect of ozone on man and plants, effect of photochemical smog – chlorofluorocarbons –green house effect – major source and consequences of green house effect. Acid rain formation – adverse effects of acid rain, control of acid rain.

1.4 Prevention and control of air pollution – control by fuel selection and utilization, control by process modification, control by site selection and zoning, general method of air pollution control, control at source, control by devices, stacks, planting trees and growing vegetation.

UNIT II:

2.1 Definition – types of water pollution, sources of water pollution, sewage and domestic wastes, harmful effects of sewage and domestic waste, industrial effluents.

2.2 Agricultural discharges – fertilizers, effect of fertilizer and detergents. Pesticides – biodegradation of pesticides – farm waste – biofertilizers.

2.3 Industrial wastes – characteristics, types, principles, treatment and disposal of industrial waste with organic and inorganic impurities. Sewage – municipal waste water – composition, properties, method of treatment – removal of P, N from waste water, Aerobic and Anaerobic biological oxidation of plants.

2.4 Prevention, control of water pollution and recycling and reuse of waste water.

UNIT III

3.1 Chemistry of soil, soil irrigation by effluents, Agricultural pollution, role of micro nutrients in soil, Analysis of micronutrients in soil.

3.2 Pesticides and pollution – DDT problem, classification of pesticides, degradation of pesticides, disease caused by soil pollution, impact of soil pollution on air quality.

3.3 Control of sewage, domestic and industrial waste, ecoforming and ecotecnology, integrated nutrient management, genetic resource management, hand use systems, water management.

3.4 Ecotechnology – ecological farming system, organic farming, advantages of organic, farming, biotechnology – integrated plant nutrient management integrated pest management, soil solarisation, water shed management.

UNIT IV

Solid wastes – pollution, treatment and disposal:

4.1 Introduction, classification and origin, characteristics of solid wastes, objectives and consideration in solid waste management .

4.2 Biomedical wastes, chemical wastes – environmental effects, Love canel episode, toxic chemicals identification of hazardous wastes, management of hazardous wastes – treatment and disposal – physical, chemical and biological process, co disposal, security land fill.

4.3 Microbiology involved in solid waste disposal, methods of solid waste disposal – composting, sanitary land filling – economic, aesthetic and environmental problems.

4.4 Thermal process of solid waste disposal – incineration, pyrolysis, recycling and reuse of solid wastes, bioconversion.

UNIT V

Environmental Management:

5.1 Introduction, objectives, component, Environmental impact assessment (EIA), elements of the EIA process, participants of EIA process, contents of EIS, Design of EIA.

5.2 The wild life protection act, the forest conservation act, the water prevention and control act, Air prevention and control of pollution act.

5.3 Environment protection act – preliminary, general powers of the central Government, prevention, control and abatement of environmental protection.

5.4 Hazardous wastes management and Handling rules, the hazardous micro-organisms rules.

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level

CO-1	Explain the sources, classification and effects of air pollution	PSO 1	U
CO-2	Discuss the sources, classification and effects of water pollution	PSO 1	U
CO-3	Describe the soil characteristics and mechanism of organic farming	PSO 2	U
CO-4	Summarize the different methods of solid waste disposal	PSO 4	U
CO-5	Outline the objectives of various environment acts	PSO 5	App
CO-6	Examine the micronutrients in soil	PSO 3	Ana

Text Books:

1. Dara S.S.,(2002) A Text Book of Environmental Chemistry and Pollution Control, S. Chand and Company, 5th Revised edition.
2. Sharma B.K. (2005) Environmental Chemistry, Goel publishing house, Meerut 9th Edn.

Reference Books:

1. Kudesia V.P. and Ritu (2003), Environmental Chemistry, Pragathi Prakashan, Meerut 2nd Edn.
2. Mukherjee S & Ghosh A(2002), Environmental studies, Books and Allied (P) Ltd, 3rd Edn.
3. Kaur H, (2005), Environmental studies, Pragati Prakashan, Ist Edn.

PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Third Year - Semester – VI

Course Title	**Major Elective – Dye Chemistry**
Total Hours	**75**
Hours/Week	**5 Hrs /Wk**
Code	U15CH6MET02
Course Type	**Theory**
Credits	**4**
Marks	**100**

General Objectives:

To make the students understand and learn about the different types of dyes, properties, applications and hands on training on dyeing.

Course Objectives:

CO No.	Course Objectives
CO-1	Classify the different types of dyes
CO-2	describes properties of natural and synthetic fibres.
CO-3	understand the applications of dyes
CO-4	analyse the different methods of dyeing
CO-5	execute hands on training on dyeing and printing

UNIT I: 12 Hrs.

Dyes and Dye Intermediates

1.1 Dye – definition – colour and constitution.
1.2 Classification of dyes (based on their use and on their structures) – Classes of Dyes for dyeing on different fabrics (Natural & Man Made).
1.3 Important dye stuff intermediates – their names.
1.4 General properties of dye stuff-linearity, co planarity, fastness, fluorescence and optical brighteners.

UNIT II 12 Hrs.

Fibre Science

2.1 Fibre classification, properties – Count, Denier, Tex, stable length, spinning properties, strength, elasticity and creep.
2.2 Natural fibres – cotton, wool and silk – General characteristics.
Synthetic fibres – poly amide (Nylon 6,6), polyester fibre, polyacrylonitrile and viscose (properties

only)

UNIT III: 12 Hrs.

Dye Application I Pretreatments

3.1 Sizing and designing – purpose, designing methods (Hydrocytic & Enzymatic).
3.2 Scouring – purpose – Kier boiling – Alkali scouring – Acid scouring – Principles involved in these methods.
3.3 Bleaching – Methods (peroxide and bleaching powder bleaching)

UNIT IV 12 Hrs.

4.1 Dye bath preparation – M.L Ratio – Fixation of dye and additive concentration on the basis of weight of the material – Methods of expressing the concentrations in dye bath (gpl).
4.2 Dyeing assistants – Wetting agent (Turkey red oil) – (preparation and purpose), Anionic and non-ionic detergents, leveling agents, fastness improvers, dispersing agents, exhausting agents (examples and functions). Mordants Ingrain.
4.3 Dye bath receipe model – (Dyeing of cotton with reactive dyes, sulfur dyes, azoic dyes. Dyeing of polyester with disperse dyes with and without carriers. Dyeing silk with metal complex dyes.

UNIT V 12 Hrs.

Dye Application-II Dyeing process

5.1 Vat dyeing – classification of vat dyes, Vatting, Dyeing procedure.
5.2 Reactive dyeing – Hot and cold brand – Principles involved in the dyeing process.
5.3 Dyeing of polyester and blends – function of dispersing agents, fibre swelling, carrier dyeing, High temperature dyeing and selection of dye stuff.

PRACTICALS 15 Hrs.

Dyeing using direct dyes and Batik printing

CO No.	**Course Outcomes**	**PSOs Addressed**	**Cognitive Level**
CO-1	Classify the different types of dyes	PSO1	U
CO-2	describes properties of natural and synthetic fibres.	PSO5	App
CO-3	understand the applications of dyes	PSO2	U
CO-4	analyse the different methods of dyeing	PSO4	An
CO-5	execute hands on training on dyeing and printing	PSO2	An

REFERENCES:

1. Shenai V.A. – ‘An introduction to dye stuff and intermediates’, Sevak publications, Wadelka Bombay-3.
2. Abrahard E.N. – ‘Out lines of chemistry of dye stuff and intermediates’, chemical publishing, New York.
3. Shenai V.A – ‘Technology of textiles processing’.
    a. Textiles fibres – Vol-I.
    b. Techniques of bleaching Vol-III.
    c. Principles of dyeing Vol-IV
4. Charwal and Anand, ‘Synthetic Organic dyes’, Himalaya publishing House.
5. Sharma B.K., ‘Industrial Chemistry’, COEL Publishing house, Meert.
6. Venkataraman K., ‘The Chemistry of synthetic dyes’. Academic press Vol-I – VIII.
7. Gites C.H., ‘A laboratory course in Dyeing’, the society of Dyes and colorists.

PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Third Year - Semester – VI

Course Title	**Major Elective –** HEALTH AND HYGIENE
Total Hours	**75**
Hours/Week	**5 Hrs /Wk**
Code	U15CH6MET03
Course Type	**Theory**
Credits	**4**
Marks	**100**

General Objectives:

To make the students understand and learn about the different types of health aspects and pollution and mental health

Course Objectives:

CO No.	Course Objectives
CO-1	classify the different factors influencing health
CO-2	describes the types of pollution
CO-3	explains the types of diseases caused by flies
CO-4	analyse the relationship between the different types of emotions with health
CO-5	discuss the personal health and hygiene

UNIT I: ASPECTS OF HEALTH

Definition of health, factors influencing health – human biology, ways of living, economic status, health services, cultural factors and health, physical factors and health – heat and cold, ecological factors and health – definition, factors influencing the ecology of man – Physical environment and biotic environment.

Health education – aims, areas of health education, education of the general public, uses of health statistics. Public health and sanitation, sewage disposal, advantages and disadvantages of incineration.

UNIT II: ENVIRONMENT AND HEALTH .

Environment – definition, water pollution – sources, impurities in water – natural impurities and result of human activities, purification of H_2O – slow sand or biological filter, rapid sand or mechanical filter and house hold purification of water.

Air pollution – factors affecting air composition, air pollutants, health effects of air pollution, pollution control, reasons for discomfort in occupied rooms.

Noise pollution – definition, sources, effects, noise control, community noise levels, refuse disposal – health hazard, methods of refuse disposal, excreta disposal – health hazards, septic tank, working of septic tank, field toilets.

UNIT III: DISEASES

Transmission of diseases, concept of diseases, disease cycle, spectrum of disease, levels of prevention.

Mosquito – types, habits, mosquito home diseases, control of mosquitoes, anti-larval measures, anti-adult measures.

House fly – general characters, transmission of diseases, fly borne diseases, fly control measures.

AIDS: AIDS in India, HIV targets in India, symptoms of HIV infection, Tests for antibodies, accuracy of blood tests, treatment possibilities, means of transmission and prevention.

UNIT IV: MENTAL HEALTH

Definition, characteristics of a mentally healthy person, foundations of mental health (brief account), needs of M.H. warning signs of poor M.H. Types of mental illness.

Emotion – mind, emotion – definition, types of emotion, role of emotions in health, causes of mental illness – hereditary and environment. Prevention of mental illness, emotional quotient.

Tensions – definition, types, effects discharging of tension, behaviour – physical response.

UNIT V:

Personal hygiene – good posture, causes of incorrect posture, habits, sunlight and fresh air, rest and sleep, fatigue, exercises, cleanliness of the body – bath, care of hair, teeth, eyes, ears, nails, feet, hands, skin, recreation, nutrition, elimination (brief account) menstrual hygiene, sex hygiene, human biological clock, Biorhythms, Circadian rhythms, Role of biological clock in health.

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level

CO-1	classify the different factors influencing health	PSO1	Ap
CO-2	describes the types of pollution	PSO5	U
CO-3	explains the types of diseases caused by flies	PSO2	Ap
CO-4	analyse the relationship between the different types of emotions with health	PSO4	An
CO-5	discuss the personal health and hygiene	PSO2	U

TEXT BOOK:

1. J.E. Park and K. Park, Text Book of Community health for nurses, Fourth edn. Asrani Publishers, Jabalpur, (1982)

REFERENCE BOOK:

1. Lily Pritam Telu Ram, Environmental health and Hygiene, Second revised edition, Pashupathi Printers, New Delhi, (1993)
2. Gracious Thomas AIDS in India-Myth and Reality, Rewat Publications, New Delhi.

PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Third Year – Semester- VI

Course Title	Major Elective – 3 : Analytical Chemistry
Total Hours	75
Hours/Week	5 Hrs Wk
Code	U15CH6MET04
Course Type	Theory
Credits	5
Marks	100

General objective:

To make the students to learn about the laboratory hygiene and safety, data analysis, dipole moment and magnetic properties, principle of precipitation, applications of thermogravimetric analysis, photochemical reactions and colorimetric estimation.

Course Objectives:

CO No.	Course Objectives
CO-1	identify various chemicals used in the laboratory and explain first aid techniques and treatment for specific poisons.
CO-2	understand, apply and analyse the various tests in data analysis and different chromatographic techniques.
CO-3	analyse the applications of dipole moment and magnetic properties for inorganic and organic molecules.
CO-4	analyse the thermogram of various compounds using thermoanalytical methods.
CO-5	apply and evaluate the principle of photometric techniques in the estimation of metal ions.

The Learner will be able to

UNIT 1 - LABORATORY, HYGIENE AND SAFETY 15Hrs

1.1 Storage and Handling of chemicals – carcinogenic chemicals – Handling of Ethers – Toxic and Poisonous chemicals – safe limits of vapour concentrations.
1.2 Waste disposal – Fume disposal - precautions for avoiding accidents, Material safety data sheet (MSDS).
1.3 First Aid techniques , precautions to avoid poisoning,t reatment for specific poisons , laboratory safety measures.

Extra reading/Key words:*Hazardous waste management.*

UNIT 2 - DATA ANALYSIS 15Hrs

2.1 The mean, The median, significant numbers, confidence limits, data ethics, precision and accuracy, standard deviation.

2.2 Errors – Types of errors, correction of determinate errors.
Methods for improving accuracy – Rejection of data – Q test. Presentation of tabulated data – Scatter diagram – Method of least squares, S.I. units.

Separation Techniques:

2.3 Precipitation,solvent extraction , chromatography – Types, Column chromatography,Thin layer chromatography.

2.4 Paper chromatography – Paper electrophoresis , Ion exchange chromatography, Gas liquid chromatography. HPLC, GC-MS, LC-MS- preliminary idea.

Extra reading/Key words:*GC-MS Techniques.*

UNIT 3 - DIPOLE MOMENT AND MAGNETIC PROPERTIES 15Hrs

3.1 Dipole moment and magnetic properties – Dipole moment – polar and non polar molecules – polarization of molecules – atomic, induced and orientation polarizations – Mosotti-Clausius equation and Debye equation.

3.2 Measurement of dipole moment and its applications to structural studies of simple inorganic and organic molecules including substituted benzenes - estimation of percent ionic character.

3.3 Magnetic properties of matter – diamagnetism – paramagnetism – ferro magnetism – antiferromagnetism – magnetic flux – magnetic permeability. Magnetic susceptibility – its determination using Guoy balance,Application to structural problems.

Extra reading/Key words:*Dipole moment and magnetic properties in spectroscopy.*

UNIT 4 - GRAVIMETRIC ANALYSIS AND THERMO ANALYTICAL METHOD 15Hrs

4.1 Principles of Gravimetric analysis- Methods of gravimetric analysis – requirements of gravimetric analysis. Precipitation – Theory of precipitation.

4.2 Types of precipitates – co-precipitation, post precipitation and precipitation from Homogeneous solution – Digestion, filtration and washing, drying and ignition. Inorganic and organic precipitating agents and sequestering agents. Types, care and use of crucibles.

4.3 Thermogravimetric analysis – Principles, thermal analysis of silver nitrate, methods of obtaining thermograms – Derivative thermogravimetry. Factors influencing the thermogram – TGA. Instrumentation – precautions in the use of thermobalance – Application of TGA.

4.4 Differential thermal analysis - DTA of calcium oxalate monohydrate – thermal analysis of calcium acetate monohydrate.

Extra reading/Key words:*Electrogravimetry.*

UNIT 5 - VISIBLE SPECTROPHOTOMETRY AND COLORIMETRY15Hrs

5.1 Beer-Lamberts law, Molar absorptivity and absorbance, Types of photochemical reactions – Fluorescence, Phosphorescence, Chemiluminescence, photosensitisation.

5.2 Instrumentation – Radiation sources, filters and monochromators, photo tubes, photomultiplier tubes, power supply.

5.3 Visual comparators – multiple standard methods, duplication and dilution method, balance method, photoelectric colorimeter, spectrophotometer.

5.4 Criteria for satisfactory colorimetric estimation , advantages of colorimetric estimation, determination of composition of complexes, colorimetric estimation of iron, chromium and nickel.

Extra reading/Key words:*AAS and flame photometry***.**

Note: Texts given in the Extra reading /Key wordsmust be tested only through Assignment and Seminars.

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Categorize the various chemicals and recognizes the precautions to handle poisonous chemicals and to avoid the accidents.	PSO1	An
CO-2	Summarize the principles and applications of various chromatographic techniques.	PSO5	A
CO-3	Explain the different types of polarization and differentiate the magnetism.	PSO2	U
CO-4	Evaluate the determination, application of dipole moment and magnetic susceptibility of molecules.	PSO4	E
CO-5	Categorize the various types of precipitation and analyze the theories of precipitation.	PSO2	An
CO-6	Summarize the principle, instrumentation and application of thermogravimetric analysis.	PSO4	An
CO-7	Sketch the schematic instrumentation of various photometric methods.	PSO4	An

TEXT BOOKS:

1. Gopalan R, Subramanian PS and Rengarajan K '*Elements of Analytical Chemistry'* Second revised edition, Sultan chand.1993
2. Puri B.R. and Sharma L.R. *Principles of Inorganic Chemistry* :New Delhi.Sultan Chand.1989

BOOKS FOR REFERENCE:

1. Puri B.R., Sharma, L.R and Madan S. Pathania , *Principles of Physical Chemistry*New Delhi: 35th edn, Shoban Lal Nagin Chand and Co.2008
2. Willard H H, MerrittL. L., and Dean J. A., *Instrumental Methods of analysis*, Delhi, 6th edn, CBS Publishers & Distributors, Shahdara 1986.
3. Skoog D and.West D, *Principles of Instrumental Analysis*; 6th edn,Cengage Learning 2006.
4. Gurdeep R. Chatwal, Sham K. Anand *Instrumental methods of chemical analysis*, Himalaya publishing house.2005
5. Gary D. Christian, *Analytical Chemistry*, John Wiley & Sons, 6th edition, 2007.
6. BobbittJ. M, Roy Gritter, *Introduction to chromatography*, Holden Day; 2nd edition.1985
7. Soni P.L., Chawla H.M., *Text Book of Organic Chemistry*, 6th Reprint, New Delhi: Sultan Chand & sons, 2006.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Third Year – Semester- V&VI

Course Title	**MAJOR CORE – 10: PRACTICAL PAPER II/III**
Total Hours	**-**
Hours/Week	**8 Hrs Wk**
Code	U15CH5MCP10/ U15CH6MCP11
Course Type	**PRACTICAL PAPER**
Credits	**5**
Marks	**100**

Course Objectives:

CO No.	**Course Objectives**
CO-1	Analyse the organic compounds qualitatively and quantitavely.
CO-2	Prepare the different organic compounds and check their purity .
CO-3	Identify various types of organic compounds and confirm them by different tests.
CO-4	Understand, apply and analyze the principles of gravimetric analysis

Gravimetric analysis:

1. Nickel as nickel dimethyl glyoxime.
2. Lead as lead chromate.
3. Barium as barium sulphate.
4. Calcium as calcium oxalate.
5. Calcium as calcium carbonate.

Organic Preparation:

1. Preparation involving oxidation, hydrolysis, nitration and halogenation (Internal valuation only).

2. Characterization of organic compounds by their functional groups and confirmation by preparation of derivative.

Substances for organic analysis:

Urea, Nitrobenzene, Glucose, Phthalic acid, m-dinitro benzene, aniline, benzoic acid, cinnamaldehyde, resorcinol, acetanilide, benzamide, succinic acid, sucrose, ethyl benzoate, acetophenone, benzaldhyde, phenol, cinnamic acid.

Course Outcomes

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Carry out self directed experiments	PSO5	Ap
CO-2	Develop the skill to prepare different organic compounds	PSO1	U
CO-3	Apply the techniques of gravimetric analysis to find out the quantity of an ion in a given solution.	PSO4	Ap
CO-4	Purify the crude sample.	PSO4	An
CO-5	Accurately record and analyse the results of the experiments	PSO5	Ap

TEXT BOOKS:

1. Venkateswaran V., Veeraswamy R. and Kulandaivelu A.R. *Basic Principles of Practical Chemistry*.New Delhi:2nd edn, Sultan Chand & Sons, 1997.

BOOKS FOR REFERENCE:

1. SvehlaG. *Vogel's Qualitative Inorganic Analysis.*US: 7th Edition, Prentice Hall, 1996.
2. Mendham J., DenneyR. C., Barnes J. D. and Thomas M. J. K.*Vogel's Prescribed Book of Qualitative Chemical Analysis*, US: 6th Edition, Prentice Hall,2000.
3. Puri B.R. and Sharma L.R. *Principles of Inorganic Chemistry.* New Delhi: Shoban Lal Nagin Chand and Co., 2002.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Third Year – Semester- V & VI

Course Title	MAJOR CORE – 13: MAIN PRACTICAL III/II
Total Hours	
Hours/Week	8hrs./wk
Code	U15CH5MCP11/ U15CH6MCP10
Course Type	Pratical
Credits	5
Marks	100

Course Objectives:

CO No.	Course Objectives
CO-1	Determine the equivalence point of titration using the conductometric and electric potential method
CO-2	Determine the colored compounds in solutions by colorimetrically
CO-3	Measure the pH of various solution using pH meter
CO-4	Determine the rate constant of chemical reaction changes as function of time
CO-5	Understand the interaction of plane polarized light with a solution of chiral substances

Conductivity:

1. Determination of cell constant.
2. Determination of equivalent conductance of a strong electrolyte.
3. Determination of dissociation constant of a weak electrolyte.

Conductometric titrations:

4. Strong acid versus strong base. (HCl Vs NaOH)
5. Weak acid versus strong base. (CH_3COOH Vs NaOH)

Potentiometric Titrations:

6. To find the strength of HCl potentiometrically using quinhydrone electrode.
7. To determine the strength of Ferrous ammonium Sulphate potentiometrically.

Colorimetry:

8. To verify Beer's law for $K_2Cr_2O_7$ solution using photoelectric colorimeter and determine the unknown concentration.
9. Estimation of Fe (III) as ferric thiocyanate complex.

PH Meter:

10. To determine the strength of the given CH_3COOH by titrating with given NaOH.

Polarimetry:

11. To determine the concentration of the given sugar solution using a polarimeter.

Chemical Kinetics:

12. I order - Acid catalysed hydrolysis of ester.
13. II order - Saponification of ester.

Nernst Distribution law:

14. Determination of partition coefficient of iodine between CCl_4 and H_2O.

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Carry out self directed experiments	PSO5	Ap
CO-2	Calibrate the conductometry and potentiometry	PSO1	U
CO-3	Apply the techniques of condutometry, potentiometry, pH, colorimetry to solve chemical problems	PSO4	Ap
CO-4	Determine the strength of the given unknown solution	PSO4	An
CO-5	Accurately record and analyse the results of the experiments	PSO5	Ap

TEXT BOOKS:

1. Venkateswaran V., Veeraswamy R. and Kulandaivelu A.R. *Basic Principles of Practical Chemistry.*New Delhi:2nd edn, Sultan Chand & Sons, 1997.

BOOKS FOR REFERENCE:

1. SvehlaG. *Vogel's Qualitative Inorganic Analysis.*US: 7th Edition, Prentice Hall, 1996.
2. Mendham J., DenneyR. C., Barnes J. D. and Thomas M. J. K.*Vogel's Prescribed Book of Qualitative Chemical Analysis*, US: 6th Edition, Prentice Hall,2000.
3. Puri B.R. and Sharma L.R. *Principles of Inorganic Chemistry.* New Delhi: Shoban Lal Nagin Chand and Co., 2002.

HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
Third Year – Semester- VI

Course Title	SBE-5: Industrial chemistry
Total Hours	30
Hours/Week	2 Hrs Wk
Code	U17CH6SBT05
Course Type	Theory
Credits	2
Marks	5

General objective:

To gain knowledge in the manufacture of various industrial products like aspirin, soap and detergents, glass, cement, pigment and paper.

Course Objectives:

CO No.	Course Objectives
CO-1	deliver concepts of drugs and its functions
CO-2	Understand the theories of colour and constitutionand uses of various dyes
CO-3	Summarizes the raw materials and manufacturing of glass fertilizers, paper and cement industry

UNIT I:

1.1 Pharmaceutical industries - Process development for industrial applications. Preparation of p-acetamol, aspirin and ibubrufen.

1.2 Soaps and soapless detergents. Special varieties of soaps. Cleansing action of soaps. Synthetic detergents – composition.

Preparation of soaps, candles.

UNIT II:

Dyes:

2.1 Dyes – colour sensation, colour and constitution (Otto-Witt theory), valence bond theory.

2.2 Classification of dyes according to application. Classification of dyes according to structure.

2.3 Malachite green, Methyl orange, Bismarck brown. Phenolphthalein, Fluorescein, alizarin, Indigo, Anillin yellow, crystal violet – preparation and uses.

Preparation and dyeing of fabric.

UNIT III

Polymers:

3.1 Addition polymerization, condensation polymerization – examples. Mechanisms – ionic and free radical polymerization. Ziegler – Natta polymerization.

3.2 A brief introduction to Silicones. Stereo chemistry of polymers, plasticity. Types of plastics. Natural and synthetic rubbers.

Polymer testing

UNIT IV

4.1 Glass Industry – Raw materials. Manufacture Annealing, varieties of glass.

4.2 Portaland cement – raw materials, Manufacture, setting of cement, concrete.

4.3 Lead pigments – white lead, red lead - manufacture.

Raw materials used in Textile Industries

UNIT V:

5.1 Fertilizers – Functions of essential nutrients. Types of Manures, N.P.K fertilizers.

5.2 Paper industry – raw materials used, Manufacture, Filling and sizing, calendaring.

Process of Leather Industry

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Illustrate the preparation of p-acetamol, aspirin and ibubrufen	PSO1	U
CO-2	Understand the theories of colour and constitution and identifies the preparation and uses of various dyes	PSO2	An
CO-3	Describe the mechanism of ionic and free radical polymerization and discuss the stereochemistry of polymers	PSO2	U
CO-4	Summarizes the raw materials and manufacturing of glass cement industry	PSO4	An
CO-5	discuss the processes involved in fertilizer and paper industry	PSO4	An

BOOKS RECOMMENDED

BOOKS FOR STUDY:

1. Jain M.K., Sharma S.C., (2012), Modern organic chemistry, Fourth edition, Vishal Publishing Co., Jalandhar.
2. Soni P.L., Mohan Katyal., (1996), Text book of 'Inorganic Chemistry', Sultan Chand and Sons, New Delhi.

BOOKS FOR REFERENCE:

1. Gopalan R., 2009, Inorganic Chemistry', First Edition, Universities Press India Ltd, Chennai.
2. Soni P.L., Chawla H.M., (2006), 'Text Book of Organic Chemistry', 6^{th} Reprint, Sultan Chand & sons, New Delhi.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2 SEMESTER VI

Course Title	SKILLBASEDELECTIVE 6: RESEARCH METHODOLOGY
Total Hours	30
Hours/Week	2
Code	U15DS6SBT06
Course Type	(Theory cum Project)
Credits	2
Marks	100

General Objective:

Students get introduced to concept of research and to carry out research projects.

Course Objective:

The student will be able to

1. understand the different types of research.
2. analyze the research objectives and frames the hypothesis 3.understand the structure of dissertation.
4. evaluate their research work.

Unit I **6Hrs**

Introduction to research: Concept of research – types of research – introduction to research literature base – collection of research information from different sources; maintenance of information.

Extra reading / Key Words: *Primary data, Secondary data collection*

Unit II **6Hrs**

Research focusing: identifying research area – drawing objectives\ hypothesis – designing the work – data collection – analysis.

Extra reading / Key Words: *Test of Hypothesis and Levels of significance.*

Unit III **6Hrs**

Preparation of dissertation: Structure of dissertation – editing – bibliography.

Extra reading / Key Words: *Summarizing any Two research article.*

Unit IV Project work **12Hrs**

Note: 1.Extra reading/Key words are only for internal testing(Seminar/Assignment)

3. The students will be evaluated internally by a test for 50 marks. The Project will be evaluated by an external evaluator and a viva- voce will be conducted for 50 marks. The students can carry out their projects individually or in groups.

REFERENCES:

Blaxter, L., Hughes, C. aned Tight (1999) How to research? Viva Book private Limited

Kothari, C.R. (2004) research Methodology- Methods and Technioques, New Age International Publishers, India

Lal, B.(2002) Research Methodology, ABD Publishers

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
B.A. /B.Sc. / B.Com. / BBA/ B.C.A. DEGREE COURSE
LIFE ORIENTED EDUCATION
ETHICS – III: FAMILY AND CAREER DEVELOPMENT

HRS / WK : 1 **CODE: U15VE6LVE03**
CREDIT : 1 **MARKS : 100**

OBJECTIVES:

- To help the students acquire skills, knowledge and talents to lead a meaningful life.
- To make the students learn skills of nurturing family and children.
- To make the students aware of emotional intelligence and choose their career.

UNIT – I: PERSONAL COMPETENCE

Emotional Intelligence for Professional growth, Management Vs Leadership-Management and Leadership Skills - Conflict Management - Tips for Professional growth

UNIT – II: MARRIAGE AND FAMILY

Family Vision - Family Values, Family relationship, Family Management, Sex in Marriage, Emotional Balance and Imbalance, Compatibility between Husband and Wife

UNIT – III: PARENTHOOD

Bringing up Children - Development stages (Eric Ericson model), Spirituality: Spirituality in Family - Prayer, God's Will , Role of Mother

UNIT – IV: PERSONALITY DEVELOPMENT

Self Analysis; interpersonal relation, introspection – Character formation towards positive personality- Values, self and college motto, punctuality, good moral, poverty, honesty, politeness, humanity, gentleness, friendship, fellowship and patriotism

UNIT – V: CAREER CHOICE

Career Choice according to Personality, Preparation for Competitive Exams, Sources of Knowledge, Memory Techniques, Mind Mapping

REFERENCES:

1. Tony B and Barry Buzan(2003), The mind map book, BBC world wide limited, London.
2. Susan Nash(2005), Turning team performance inside out, Jai CO. publishing House, New Delhi.
3. Fr. Ignacimuthu (1999) "Values for Life", Vaigarai Pathipagam.
4. Grose. D.N. (2000), "A text book on Value Education", Dominant Publishers.

(For Candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2
B.A./B.Sc/B.Com/BBA/B.C.A - DEGREE COURSES
LIFE ORIENTED EDUCATION
CATECHISM – III: LITURGY AND CHRISTIAN LIFE

HRS / WK : 1 **CODE:U15VE6LVC03**
CREDIT : 1 **MARKS : 100**

OBJECTIVES:

- To prepare the students to participate meaningfully in the liturgical celebration and experience GOD in their day today life.
- To enable the students to become living witnesses to Jesus Christ in their personal, family and social life.

UNIT – I: LITURGY

Personal prayer (Know oneself) – Vocal prayer – Community prayer – Meditation – Contemplation – Knowing the prayers : Our Father – Hail Mary – Holy Rosary – Mysteries of the Rosary- Litany of Mary – Family prayer-Popular devotion

UNIT – II: HOLY SACRIFICE OF THE MASS

Significance – Meaning and need for spiritual growth – Mass prayers – Part of the mass – Liturgical year, its division and its significance. – The Creed – Act of contrition – Discernment of spirits – Counseling – Spiritual direction.

UNIT – III: CHRISTIAN VOCATION AS DISCIPLE FOR THE KINGDOM OF GOD

Who am I as a Christian? – Christian dignity and others – The values of the Kingdom opposing to the values of the World – Christian social conscience – Christian in the reformation of the world – A call to be salt and light in today's context.

UNIT – IV: CHRISTIAN FAMILY

Holy Family- Characteristic of good family – Bible centered, Prayer centered, Christian centered–Responsibilities of parents and children in the family –Laws of the Church towards marriage-Pro life (Abortion, Euthanasia) – Lay Vocation – Lay Participation – Lay associates.

UNIT – V: CONSECRATED LIFE

"Come and follow me" – special disciples - Religious vocation – "I have called you to be mine"- Role of Nuns and Priest - called to be prophets and agents for God's Kingdom – nucleus of the church – Eschatological signs of the God's Kingdom.

REFERENCES:

1. Compendium – Catechism of the Catholic Church Published by Vaigarai Publishing House for the Catholic Church of India.
2. You are the light of the World, A course on Christian living for II year Religion published by Department of Foundation Courses, St.Joseph's College (Autonomous), Tiruchirappalli–620 002.
3. Documents of Vatican II – St. Paul's Publications, Bombay 1966.

HOLY CROSS COLLEGE(AUTONOMOUS) TRICHIRAPALLI-2.

B.A/B.SC/B.COM/ B.C.A – DEGREE COURSES
LIFE ORIENTED EDUCATION
BIBLE STUDIES – III: ESSENCE OF CHRISTIAN LIVING

HRS / WK : 1 **CODE: U15VE6LVBO3**

CREDIT : 1 **MARKS : 100**

OBJECTIVE:

- To prepare the students to practice Christian principles in family, church and society as young women

UNIT – I: ESSENTIALS OF CHRISTIAN FAITH

- Salvation – Deliverance from sin (Is 53),Assurance of salvation and New life (II Cor 5:17)
- Sacraments – Baptism (Luke 3: 6-14), Lord's Supper (I Cor 10: 16,17; 11: 23-29)
- Trinity – One in three and three in one. Illustrations from the Bible. (John 14: 16,17)

- Heaven and Eternal life (John 14: 13, 3: 13-21)

UNIT – II: MARRIAGE AND FAMILY LIFE

- Finding the God's Will - Issac (Gen 24)
- Man and woman as Partners – Abraham and Sarah (Gen 16-18,22), Aquila and Priscilla (Acts 18: 1-3,26)
- Evils to be avoided – Premarital Sex, Extramarital Sex, Homosexuality, Abortion(Heb 13: 4, Psalm 127 : 4)
- Ideal Wife – Sarah (I Peter 3: 1-6), Ruth,(Eph 5)

UNIT – III: CHRISTIAN HOME

- Parental Responsibilities and bringing up children – Abraham (Gen 22), Eli (I Sam 2: 24-36,3: 11- 18), Mary, Mother of Jesus (Luke 2: 51,52)
- Caring for the Aged (I Sam 2: 31,32)

UNIT – IV: CHRISTIAN ETHICS

- Holiness – Joseph (Gen 39:9) Levi 11: 45, Ecc 12
- Obedience to God - Abraham (Gen 12) ; St.Paul (Acts 9)
- Freedom and Accountability
- Justice and Love
- Choices in Life – Making Decisions (Studies, job, life Partner)
- Model to follow – Who is your model? (John 15: 1-17)
- Social Evils – Dowry, Caste discrimination, Accumulation of wealth

UNIT – V: MISSIONARIES DOWN THE LANE

- William Carrie (Calcutta)
- Pandithar Rama Bai (Karnataka)
- Amy Carcheal (Dohnavur)
- Dr. Ida Scuddar (Vellore)
- Devasagayam (Nagercoil)
- St. John De Britto (Oriyur)
- Graham Staines & Family (Odisha)
- St. Mother Teresa (Calcutta)

REFERENCES:

1. Alban Douglass (1982) One Hundred Bible Lessons. Gospel Literature Service, Mumbai.
2. Derek Prince (1993) Foundations for Righteous Living. Derek Prince Ministries-South Pacific, New Zealand.
3. Derek Prince and Ruth Prince (1986) God is a Match maker. Derek Ministries, India.
4. Ron Rhodes(2005) Hand book on Cults. Amazon.com
5. Stanley.R. (1997) With God Again. Blessing Youth Mission, India.
6. Taylor.H. (1993) Tend My Sheep. SPCK, London.