(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
B.Sc. CHEMISTRY- COURSE PATTERN
2015-2016

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/ U15HN1HIN01/ U15FR1FRE01	6	3	100
	II	English	English Paper I	U10EL1GEN01	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	-	-
TOTAL					30	21	600
II	I	Language	Tami Paper II/ Hindi Paper II /French Paper II	U15TL2TAM02/ U15HN2HIN02/ U15FR2FRE02	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: Semimicro 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	2	2	100
		Value Education	Ethics I/ Bible Studies I/ Catechism I	U15VE2LVEP1/ U15VE2LVB01/ U15VE2LVC01	1	1	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/ U15HN3HIN03/ U15FR3FRE03	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	Industrial Chemistry	U15CH3SBT03	2	2	100
			Experimental Chemistry For Life Science [For Botany]	U15CH3SBP04			
		Value Education	Ethics-II/ Bible Studies-II/ Catechism -II	U15VE4LVE02 U15VE4LVB02 U15VE4LVC02	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/ U15HN4HIN04/ U15FR4FRE04	5	3	100
	II	English	English Paper – IV	U13EL4GEN04	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)	U15CH4MEP01/ U15CH4MEP02	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
	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 Photochemistry]	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	U15CH5MET01/ U15CH5MET02/ U15CH5MET03	5	4	100
	IV	NME – 1	Home Care/ Cosmetology	U15CH5NMT01/ U15CH5NMT02	2	2	100
		SBE – 4	Experimental Chemistry for Life Science [For Zoology]	U15CH5SBP04	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 - Gravimetric, Organic analysis and Organic Preparation	U15CH6MCP11/10	8	5	100
		Major Elective – 3	Environmental Pollution Dye Chemistry Food Chemistry Analytical Chemistry	U15CH6MET01 U15CH6MET02 U15CH6MET03 U15CH6MET04	5	5	100
	IV	NME – 2	Home Care/ Cosmetology	U15CH6NMT01/ U15CH6NMT02	2	2	100
		SBE – 5	Laboratory Techniques	U15CH6SBT05	2	2	100

		SBE – 6	Research Methodology	U15DS6SBT06	2	2	100
		Value Education	Ethics -III / Bible Studies-III / Catechism-III	U11VE6LVE03 U11VE6LVB03 U11VE6LVC03	1	-	-
			Total		30	26	700
	V	Extension Activity	RESCAPES-Impact Study of Project	U08RE6ETF01	-	1	100
Grand Total					180	141	4300

புனித சிலுவை தன்னாட்சிக் கல்லூரி, திருச்சிராப்பள்ளி – 620 002.
தமிழாய்வுத்துறை
இளங்கலை / இளமறிவியல் / இளம்வணிகவியல் / பட்டவகுப்பு
முதலாமாண்டு – முதற்பருவம் - நவம்பர் - 2015-16
தாள் - I

Total Hours : 90 **Code : U15TL1TAM01**
Hrs : 6Hrs /Wk **Marks : 100**
Credit : 3

நோக்கங்கள்:

1. தாய்மொழியை வலுவோடும், பொலிவோடும் கையாளும் வழி முறைகளைக் கண்டறியச் செய்தல்.
2. தமிழ் இலக்கியப் பரப்பையும், பாரம்பரியத்தையும் அறிமுகப்படுத்துதல்.
3. படைப்பாற்றலை வளர்த்துக் கொள்ள ஊக்கம் அளித்தல்.
4. உயர்ந்த பண்பாடுகளின் அடிப்படையில் வாழ்க்கையை அமைத்துக் கொள்ளும் உள்ளார்ந்த விருப்பத்தைத் தோற்றுவித்தல்.
5. மனித உரிமைகளை வலியுறுத்தி மனித நேயத்தை வளர்த்தல்.
6. நாம் வாழும் நாட்டையும், உலகையும் பற்றிய விழிப்புணர்வை ஊட்டி சமய நல்லிணக்கத்தையும், சமூக நல்லுறவையும் பேணிக்காக்கத் துணைப்புரிதல்.
7. ஆரோக்கியமான சிந்தனைகள் வளர ஆக்கம் அளித்தல்.

பயன்கள்:

1. தற்காலத் தமிழ் இலக்கிய வரலாற்றை வளர்க்க வழிகாட்டல்.
2. மாணவர்களின் தன்னம்பிக்கையை வளர்த்தல்
3. வாழ்வியல் நெறிகளை உணர்த்தல்.
4. பிழையின்றி எழுத பேச பயிற்சி அளித்தல்.

பாடத்திட்டம்

அலகு:1 செய்யுள்

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

அலகு:2 செய்யுள்

8. கல்யாண்ஜி – பேசும்பார் என் கிளி
9. நிர்மலா சுரேஷ் - தைலச்சிமிழும் தச்சன் மகளும்
10. இரா. மீனாட்சி – ஒரு கோதை
11. விஜி – குரங்கு மனிதன்
12. பா. சத்திய மோகன் - எங்கெங்கு காணினும்
13. ஹைகூ கவிதைகள்

அலகு:3

தமிழ் இலக்கிய வரலாறு

20-ஆம் நூற்றாண்டு (தற்காலம்)

தமிழாய்வுத்துறை வெளியீடு

அலகு:4

படைப்பிலக்கியம் - சிறுகதைத் தொகுப்பு

அலகு:5

பொதுப்பகுதி - கலைச்சொற்கள்

தமிழாய்வுத்துறை வெளியீடு

பாட நூல்கள்

செய்யுள் - தமிழாய்வுத்துறை வெளியீடு

தமிழ் இலக்கிய வரலாறு - தமிழாய்வுத்துறை வெளியீடு

சிறுகதைத் தொகுப்பு - தமிழாய்வுத்துறை வெளியீடு

கலைச்சொற்கள் - தமிழாய்வுத்துறை வெளியீடு

(for the candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-620002

DEPARTMENT OF HINDI

PART – I LANGUAGE HINDI FOR B.A, B.Sc & B.Com HINDI

PAPER-I SHORT STORY, PROSE, GRAMMAR SEMESTER – I

HRS/WEEK : 6 **CODE: U15HN1HIN01**

CREDITS : 3 **MARKS : 100**

UNIT – I : Purasakar, Sukamaya Jeevan, Ganga Singh, Machuye Ki Beti, Maharaj Ka Ilaj

UNIT- II : Maatru vandana, Chandini, Thitalii, Divali, Seekho.

UNIT- III : Sadak Ke Niyam, Bhagavan mahaveer, Prithvi Ka swarga, Mahan ganithagya Ramanujam, Birbal Ki Chathuraye.

UNIT- IV : General Grammar
(Sanghya, Visheshan, ling, Vachan, Kriyavisheshan)

UNIT- V : Anuvad Abhyas – II

Books Prescribed :

1. Galpa Sanchayan - D.B.H.P. Sabha Publishers, Chennai-17
2. Naveen Hindi Patamala – I - D.B.H.P. Sabha Publishers, Chennai-17
3. Naveen Hindi Patamala – II - D.B.H.P. Sabha Publishers, Chennai-17
4. Sugam Hindi Vyakaran - D.B.H.P. Sabha Publishers, Chennai-17

Anuvad Abhyas – II - D.B.H.P. Sabha Publishers, Chennai-17

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 2

DEPARTMENT OF FRENCH

SYLLABUS

SEMESTER I

PART I – LANGUAGE - FRENCH PAPER I [GRAMMAR & CIVILISATION (ÉCHO A1 2e édition)]

(For candidates admitted 2013 onwards)

HRS/WEEK : 6 CODE : U15FR1FRE01

CREDIT : 3 **MARKS : 100**

Unit 1 Parcours d'initiation ; Vous comprenez

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.

Unit 2 Au travail!
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.

Unit 3 On se détend!

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

Unit 4 Racontez-moi ! ; Bon voyage !

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

Unit 5 Bon appétit!

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.

TEXT BOOKS :

ECHO A1 – METHODE DE FRANÇAIS & CAHIER PERSONNEL D'APPRENTISSAGE
Authors: J. Girardet and J. Pécheur Publication: CLÉ INTERNATIONAL, 2012.

(for candidates admitted from 2015 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2.
2015 - 2016
I B.A., B.Sc., B.Com., B.R.Sc., B.C.A., B.B.A., SEMESTER I
PART II - ENGLISH 1 - GENERAL ENGLISH PAPER I

HOURS – 6 PER WEEK **CREDIT : 3**
CODE : U15EL1GEN01

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

Listening	-	*This is the Photograph of me* by Margaret Atwood
Speaking	-	*The Mayonnaise Jar*
Reading	-	*In Prison* by Jawaharlal Nehru (edited)
Writing	-	Othello's soliloquy (extract from Shakespeare's *Othello*)

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

Listening	-	*Night of the Scorpion* by Nissim Ezekiel
Speaking	-	*The Old Folks at Home* by Alphonse Daudet (edited)
Reading	-	*Will you? Daddy* (Extract from Reader's digest)
Writing	-	conversation among King Lear and his daughters professing their love for their father (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

Listening	-	*Snake* by D.H. Lawrence (poem)
Speaking	-	*Floating Fantasy* by Vinu Abraham (Prose)
Reading	-	*Discovery* (ed.) (play)
Writing	-	*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

Listening	-	*I have a Dream* by Martin Luther King Jr(edited)
Speaking	-	*What I have lived for?* by Bernard Russell
Reading	-	*Three days to see* by Helen Keller(edited)
Writing	-	Quality of Mercy (Portia court scene) (extract from Shakespeare's *The Merchant of Venice*)

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

Listening	-	Profile of a successful personality
Speaking	-	Success story of Indra Krishnamoorthy Nooyi
Reading	-	*The Verger* by Somerset Maugham

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
SEMESTER I
MAIN CORE PAPER – I : GENERAL CHEMISTRY – I

Theory: 7 hrs./wk
Credits: 6 **Code: U15CH1MCT01**

Course objectives:

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

UNIT I :

Atomic structure

1.1 Rutherford's nuclear model of atom. Planck's Quantum theory of radiation. photo electric 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. Quantum Numbers – wave picture of electron. Concept of atomic orbitals – shapes of s, p & d orbitals, nodal planes and nodal points in atomic orbitals, g & u character of atomic orbitals.

UNIT II :

Periodic table and Periodic properties:

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.

UNIT III:

The Gaseous State:

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 of gas. vanderwaal's equation of state – derivation.

UNIT IV:

Qualitative Analysis

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.**

UNIT V:

Fundamental concepts in Organic Chemistry

5.1 IUPAC system of Nomenclature – Longest chain rule, lowest number rule, arrangement prefixes, lowest number for functional group, writing names for compounds containing more than one functional group. Writing the structural formula from given IUPAC name.
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, stability. Carbocations, carbanion, carbenes – Formation, stability and reactions.

BOOKS FOR STUDY:

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

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

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

BOOKS FOR REFERENCE:

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

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
SEMESTER I
ALLIED – 1: ALLIED CHEMISTRY PAPER I
[For Botany and Zoology]

HOURS: 4Hrs./Wk. **CODE: U15CH1AOT01**
Credit: 4

Course objectives:

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.

UNIT I:

Fundamental Concepts of Organic Chemistry:

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.

UNIT II:

Carbohydrates and Heterocyclic compounds:

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.

UNIT III:

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.

UNIT IV:

Chemical Kinetics and Catalysis:

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.

UNIT V:

Chromatography and Osmosis:

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

BOOK FOR STUDY:

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

REFERENCE BOOKS:

1. Jain M.K, Sharma S.C. 'Modern Organic Chemistry', (2007), Vishal Publishing Co
2. Soni P.L. and Mohankatyal (1992) 'Text book of Inorganic Chemistry' 20^{th} revised edition, sultan chand.
3. . Bahl B.S, Arun Bahl and Tuli G.D. (2012), *Essentials of Physical Chemistry*, New Delhi: Sultan Chand and sons.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
SEMESTER I
ALLIED : 2 - ALLIED CHEMISTRY PRACTICAL PAPER II
[FOR BOTANY ANDZOOLOGY]

Hours : 4Hrs./wk.
Credits : 3 **Code: U15CH1AOP02**

OBJECTIVES:

To expose the students to the theory of volumetric analysis and also to develop practical skills by giving them certain experiments in volumetric analysis.

VOLUMETRIC ANALYSIS: (10 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

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)

(For candidates admitted from 2015 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
ENVIRONMENTAL STUDIES

Hrs – 2/Week **CODE: U15RE1EST01**
CREDITS :2

Unit I–Awareness and Natural Resources

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.

Unit II–Ecosystems and Biodiversity

Ecosystem–concepts, structure and types–concept of food chain sand food web–causes and effects of weakening food chains

Biodiversity–concept of genetic, species and ecological biodiversity–ecological and economic values–India, a mega diversity country, hotspots–threats to biodiversity and conservation measures.

Unit III–Environmental Pollution

Causes, effects and control of water, and air pollution–global warming–ozone depletion–

Nuclear hazards.

Unit IV–Human population and Environment

Population growth at national and global level.

World food production-Effects of modern agriculture on land and Eco systems-GMOs and related issues

Environmental pollutions and diseases-malaria- chikungunya

Unit V–Environment and Social Issues

Rich–poor wide–at national and global levels

Urbanization –slums

Changing value systems -AIDS

Family welfare programs

REFERENCES:

Agarwal,K.C.(2001). Environmental Biology, Nidi Publication Ltd. Bikaner.
Chairas,D.D.(1985).Environmental Science. The Benjamin Cummings Publishing company.,Inc.
Clarke George,L. (1954). Elements of Ecology. Hohn Wiley and SONS, Inc.
Hodges,L. (1977). Environmental Pollution, II Edition. Holt, Rinehart and Winston, New York.
Krebs,C.J.(2001). Ecology.VI Edition. Benjamin Cummings.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
B.A. /B.Sc. / B.Com. / B.R.Sc. / B.C.A. DEGREE COURSE
LIFE ORIENTED EDUCATION
ETHICS – I: RELIGION AND VALUE SYSTEMS

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

OBJECTIVES:

- To Understand My and Other Religions and Culture
- To Appreciate My and Other Religions and Culture
- To Learn from other Religions and Culture
- To Interact with My and Other Religions and Culture to enhance My faith in My religion.
- To Help the students to become aware of the negative forces of religions.

UNIT – I: RELIGION

God – concept of faith, Faith, Meaning, Definition, Nature, Characteristics and Basic values of different religions. Impact of Globalization on religion – Importance of worship in holy places – celebration, come-union, socialization.

UNIT – II: DIFFERENT RELIGIONS

Basic characteristics and basic thoughts- Buddhism, Christianity, Hinduism, Islam, Jainism and Sikhism

UNIT – III: UNITY OF RELIGION

Unity of Vision and Purpose- Respect for Other's Faith, 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 concept 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.R.Sc/B.C.A-DEGEE 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 – specialty 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. VaalvinValizha – St. John's Gospel – Fr. Eronimus

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE(AUTONOMOUS) TRICHIRAPALLI-2.
B.A/ B.Sc/ B.Com/ B.R.Sc/ B.C.A DEGREE COURSES
LIFE ORIENTED EDUCATION
BIBLE STUDIES – I: NEW TESTAMENT

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

OBJECTIVE:

- Developing the passion for the Word of God – Jesus and inculcating 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-
- Messiah 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 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)
- Betrayal and the change in the life of 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)

UNIT – V: MISSIONARIES AND EVANGELISTS

- St.Thomas (John 20:24-31) & Missionary to India\Pandithar Rama Bai
- William Carrie
- Dr.Ida Scuddar& St. Britto (Oriyur)
- Amy Carcheal
- Mother Teresa (Calcutta)
- Devasagayam (Nagercoil)
- Staines & Family

REFERENCES:

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

புனித சிலுவை தன்னாட்சிக் கல்லூரி, திருச்சிராப்பள்ளி – 620 002.

தமிழாய்வுத்துறை
இளங்கலை / இளம் அறிவியல் / இளம் வணிகவியல் பட்ட வகுப்பு
முதலாமாண்டு – இரண்டாம் பருவம் - ஏப்ரல் - 2015 - 2016
தாள் - II

Total Hours : 75 **Code : U15TL2TAM02**
Hrs : 5Hrs /Wk **Marks : 100**
Credit : 3

நோக்கங்கள்:

1. இறைச் சிந்தனை வழி மாணவர்களை ஒருமுகப்படுத்துதல்.
2. தமிழ்ச் சான்றோர்களின் சிறப்புகளை அறிமுகப்படுத்துதல்.
3. மாணவர்களின் நல்லெண்ணங்களை மேம்படுத்துதல்.
4. நட்புணர்வை மாணவர்கள் மனதில் பதியவைத்தல்.

பயன்கள்:

1. இப்பாடம் மாணவர்களிடையே ஆன்மீக அறிவு அறிமுகமாகவும், வளரவும், ஆழப்படவும் துணைபுரிகின்றது. இது ஓர் இயற்கைப் பூங்கா.
2. தமிழை நேசித்து, தமிழ்ச் சான்றோர்களின் மீது மதிப்புக் கொள்ளவும், தானும் சான்றோர் ஆகவும் இது ஒரு பாலமாக பயன்படுகிறது.
3. ஊற்றுக்களாய் மாணவிகளிடையே மறைந்து கிடக்கும் நல்லெண்ணங்களை வெளிக்கொணரவும் நேர்மறைச் சிந்தனைகள் தோன்றவும் பயன்படுவதால் இது ஒரு நூலகமாகும்.
4. வாழ்க்கையில் நட்பின் தேவையை உணர வைக்கும் வழிகாட்டியாகத் திகழ்கிறது. இது வாழ்க்கைப் பெட்டகம்.

பாடத்திட்டம்

அலகு:1 செய்யுள்

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

அலகு:2 செய்யுள்

6. மீனாட்சியம்மை பிள்ளைத்தமிழ் - குமரகுருபரர்
7. இரட்சணிய யாத்திரிகம் - எச்.ஏ.கிருட்டிணப்பிள்ளை

8. வேதநாயகம் சாஸ்திரியார் பாடல்கள் - வேதநாயகம் பிள்ளை
9. நபிகள் நாயக மான்மிய மஞ்சரி - செய்கு தம்பிப் பாவலர்

அலகு:3

தமிழ் இலக்கிய வரலாறு - தமிழாய்வுத்துறை வெளியீடு

பல்லவர்காலம்

நாயக்கர்காலம்

அலகு:4

படைப்பிலக்கியம் - புதினம்

கல்கி - பார்த்திபன் கனவு

அலகு:5

கடிதம் எழுதுதல்

பாட நூல்கள்

செய்யுள் - தமிழாய்வுத்துறை வெளியீடு

தமிழ் இலக்கிய வரலாறு - தமிழாய்வுத்துறை வெளியீடு

கல்கி - பார்த்திபன் கனவு

கடித இலக்கியம் - பயிற்சி ஏடு.

(for the candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-620002

DEPARTMENT OF HINDI

PART – I LANGUAGE HINDI FOR B.A, B.Sc & B.Com

HINDI PAPER-II PROSE, DRAMA, GRAMMAR-II, COMPREHENSION SEMESTER –II

HRS/WEEK : 5 **CODE: U15HN2HIN02**

CREDITS : 3 **MARKS : 100**

UNIT – I : Bharat matha, Premchand, Taj mahal ki Aathma Kahani, Mahakavi Prasadh, Meri theertha yatra

UNIT- II : Sathyameva jayathe - Drama (chapter 1& 2)

UNIT- III : Sathyameva jayathe – Drama (chapter 3)

UNIT- IV : General Grammar (Sarvanaam, Kriya, Kaal, Karak, Ne Ka niyam)

UNIT- V : Comprehension – Prose passages

Books Prescribed :

5. Naveen Gadhya Chayanika – D.B.H.P. Sabha Publishers, Chennai-17
6. Sathyameva Jayathe – D.B.H.P. Sabha Publishers, Chennai-17
7. General Grammar – D.B.H.P. Sabha Publishers, Chennai-17

(For candidates admitted 2013 onwards)

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

SEMESTER II

PART I - LANGUAGE - FRENCH PAPER II [GRAMMAR, CIVILISATION & TRANSLATION (ÉCHO A1 2e édition)]

HRS/WEEK : 5 CODE : U15FR2FRE02

CREDIT : 3 **MARKS : 100**

Unit 1 Quelle journée !

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.

Unit 2 Qu'on est bien ici !
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)

Unit 3 Souvenez-vous ?

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.

Unit 4 On s'appelle ?

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.

Unit 5 Un bon conseil ! ; Parlez-moi de vous !
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.

TEXT BOOKS :
ECHO A1 – METHODE DE FRANÇAIS & CAHIER PERSONNEL D'APPRENTISSAGE
Authors: J. Girardet and J. Pécheur Publication: CLÉ INTERNATIONAL, 2012.

(for candidates admitted from 2015 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2.
2015 - 2016
I B.A., B.Sc., B.Com., B.R.Sc., B.C.A., B.B.A., SEMESTER II
PART II – ENGLISH II - GENERAL ENGLISH PAPER II

HOURS – 6 PER WEEK **CREDIT : 3**
CODE : U15EL2GEN02

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. *When I have fears* by John Keats (poem)
2. *Key to courage* by I.A.R. Wylie (prose)
3. *The Far and the Near* by Thomas Wolfe (Short Story)

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. *My early days* (An extract from *Wings of fire* by A.P.J. Abdul Kalam (prose)
2. *The robe of peace* by O. Henry (Short Story)
3. An extract from *Androcles and the lion* by G.B. Shaw (play)
4. *Give me the strength* by Tagore's *Gitanjali* (poem)

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. *The Ballad of father Gilligan* by Alexander Pope (poem)
2. *Six thinking hats* by Edward de Bono (prose)
3. *A cup of tea* by Katherin Mansfield (Short Story)
4. 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. *The flower* by Tennyson (poem)
2. *How to avoid argument* by Sam Horn (prose)
3. *The child is father of man* by Wordsworth (poem)
4. An extract from *Pygmalion* by G.B. Shaw

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. *The Garden* by Dom Moraes (poem)
2. *On saying please* by A.G. Gardiner (prose)
3. *One good turn* by A.E.M. Bayliss (play)

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-2
B.SC. CHEMISTRY - SEMESTER II
CHOICE BASED CREDIT SYSTEM
MAIN CORE PAPER – 2: GENERAL CHEMISTRY – II

Theory:7 hrs./wk
Credits: 6 **Code: U15CH2MCT02**

Course objectives:

To make the students learn about the fundamental concepts of ionic, covalent and hydrogen bonding. To predict the shapes of molecules from the valence shell electron pair repulsion model. To write the molecular orbital diagrams for homo nuclear and heteronuclear diatomic molecules. To learn the basic important concepts in alkanes, alkenes and alkynes. To relate heat, work, energy and first law of thermodynamics and to calculate work from pressure – volume relationships.

UNIT I:

Aliphatic hydrocarbons

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.
1.4 Octane number, Cetane number, Flash point – definitions. Anti- knocking properties. Petroleum as a source of aromatics.

UNIT II:

Aliphatic unsaturated hydrocarbons

2.1 Alkenes: Nomenclature. Addition reaction – Markownikoff's and Anti Markownikoff's rule. Reactions. showing stereo specificity and non stereo specificity.
2.2 Elimination reactions: Hofmann, Saytzeff's elimination. Mechanism of E1 and E2, Hydroboration and Ozonolysis.
2.3 Alkynes – Acidity of acetylene. Properties - oxidation, ozonolysis.
2.4 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.

UNIT III:

Thermodynamics – I

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.

UNIT IV:

Thermochemistry:

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, Heat changes at constant pressure and 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.

UNIT V:

Chemical Bonding:

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.

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

BOOKS FOR STUDY:

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

BOOKS FOR REFERENCE:

1. Samuel Glasstone,(1974). *Thermodynamics for Chemists (* 3rd printing). East-West Edn.
2. Bahl B.S, Arun Bahl and Tuli G.D. (2012), *Essentials of Physical Chemistry,* New Delhi: Sultan Chand and sons.
3. Jain M.K. (2003), Organic Chemsitry, (12th edition), New Delhi: Shoban Lal Nagin Chand and Co.
4. Bahl B.S, Arun Bahl and Tuli G.D. (2007), *Essentials of Physical Chemistry,* New Delhi: Sultan Chand and sons.

5. Robert Thornton Morrison, Robert Neilson Boyd , Saibal Kanti Bhattacharjee,(2011), Organic Chemistry(7th Edition), Pearson Education India, Chennai.
6. Soni P.L. and Mohankatyal (2013) 'Text book of Inorganic Chemistry' 20th revised edition, sultan chand.
7. Raj K. Bansal, (2007) "A Text Book of Organic Chemistry", 5th edition, New Age International Limited.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
SEMESTER II
MAIN CORE – 3: PRACTICAL –I : SEMIMICRO ANALYSIS

Hours:3hrs./wk.
Credits: 2 **Code: U15CH2MCP03**

Objectives: To impart in students the skill in the analysis of Inorganic salts.

1. Reactions of the following Radicals:

   Lead, Copper, Bismuth, Cadmium, Iron, Aluminium, Zinc, Manganese, Cobalt, Nickel, Calcium, Strontium, Barium, Magnesium and Ammonium.

   Sulphate, Carbonate, nitrate, Fluoride, Chloride, Bromide, Oxalate, Phosphate, Borate and Arsenite.

2. Analysis of Mixtures containing two cations and two anions of which one will be an interfering ion.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
SEMESTER – II
ALLIED - 3: ALLIED CHEMISTRY PAPER III
[For Botany and Zoology]

Hours: 4Hrs./Wk. **Total Hours: 50**
Credits: 3 **Code:U15CH2AOT03**

Course objectives:

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

UNIT: I

Co-ordination Chemistry:

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.

UNIT: II

Amino acids and Proteins:

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.

UNIT: III

Thermodynamics:

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).

UNIT: IV

Electrochemistry:

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.

UNIT: V

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.

BOOK FOR STUDY:

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

REFERENCE BOOKS:

1. Jain M.K, Sharma S.C. 'Modern Organic Chemistry', (2007), Vishal Publishing Co
2. Soni P.L. and Mohankatyal (1992) 'Text book of Inorganic Chemistry' 20^{th} revised edition, sultan chand.
3. . Bahl B.S, Arun Bahl and Tuli G.D. (2012), *Essentials of Physical Chemistry*, New Delhi Sultan Chand and sons.

(For the candidates admitted from 2015 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI
B.A/B.Sc./B.Com/B.R.SC/B.C.A/B.B.A DEGREE EXAMINATION SEMESTER-II

SBE-1 SOFT SKILL DEVELOPMENT

Credits -2
Hrs – 2/Week **Code: U15RE2SBT01**

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

UNIT I:

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.

UNIT II :

Interpersonal skills
Trust worthiness-interpersonal communication–art of listening, reading and writing–art of writing–building relationship-empathy.

UNIT III:

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

UNIT IV:

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.

UNIT V:

Self Development Plan
Concept and Need for Self Development Plan–Preparing Self Development Plan9 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.

REFERENCES:

Delhi Meena K.AyothiV. (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).Communications of skills for Professional Excellence,1st Ed., Grace Publishers,
Rathan ReddyB.(2005).Team Development and Leadership, Jaico Publishing House, Mumbai.

(For candidates admitted from 2015 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI–2
B.A./B.Sc.,/B.Com./BCA&BBA, DEGREE EXAMINATION
SEMESTER II
RURAL ENRICHMENT AND SUSTAINABLE DEVELOPMENT

Hrs – 2/Week **Code: U15RE2SBT02**
CREDITS :2

Course Objective:

The students are able to understand practically the Environmental concerns of rural areas and develop an alternative thinking through various field based intervention.

Unit–I
Village–Public Administration- Survey of natural resources and resource mapping of villages, village level Participating Approach (VLPA) – Role of NGO'S and SHG'S, Department of Rural development(central and state):

Unit–II
Green Revolution and industrialization cost climatic changes and mismanagement of natural resources- Reduced economic returns from agriculture-resultant social issues- poverty and farmer suicide- introduction to WTO, GATT and LPG and its impact on green Revolution.

Unit–III
Sustainable Development-Concepts , Environmental , social and economic aspects of sustainable development, sustainable development as solution to address rural issue-successful case studies from India

Unit-IV
Elements in sustainable development-Comparison and Compliments of Traditional water shed and modern water shed management techniques-water shed management practices-rain water harvesting, managing existing rain water drainage canals, desilting, buns construction, check dams, micro irrigation, agro forestry and alternative agriculture models and agriculture implements – Afforestation- Honey Bee rearing-dairyfarming.

.

Unit-V

Elements in sustainable development –addressing agriculture issues-traditional farming technology-organic farming-Zero budget farming-organic manures vermicompost-azolla cultivation panchakavya- amirthakaraisal, organic pesticides mulikaipuchiviratti-neem products-natural management in soil-precision farming soil fertility. Ecological sanitation-bio- diversity and natural resource-terrace farming-seed banking and kitchen garden.

REFERENCES:

1. Packages of organic practices from Tamil Nadu Center for Indian Knowledge System(CIKS)
.2.www.fao.org.in

(For Candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2

B.A. /B.Sc. / B.Com. / B.R.Sc. / B.C.A. DEGREE COURSE

LIFE ORIENTED EDUCATION

ETHICS – I: RELIGION AND VALUE SYSTEMS

HRS / WK :1 **CODE: U15VE2LVE01**

CREDITS :1 **MARKS : 100**

OBJECTIVES:

- To Understand My and Other Religions and Culture
- To Appreciate My and Other Religions and Culture
- To Learn from other Religions and Culture
- To Interact with My and Other Religions and Culture to enhance My faith in My religion.
- To Help the students to become aware of the negative forces of religions.

UNIT – I: RELIGION

God – concept of faith, Faith, Meaning, Definition, Nature, Characteristics and Basic values of different religions. Impact of Globalization on religion – Importance of worship in holy places – celebration, come-union, socialization.

UNIT – II: DIFFERENT RELIGIONS

Basic characteristics and basic thoughts- Buddhism, Christianity, Hinduism, Islam, Jainism and Sikhism

UNIT – III: UNITY OF RELIGION

Unity of Vision and Purpose- Respect for Other's Faith, 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 concept 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.R.Sc/B.C.A-DEGEE 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 – specialty of the gospel – main emphasis of the message – meaning and blessing of suffering and paschal joy in one's life.
Passion – Paschal mystery

REFERENCES:

4. Catechism of the Catholic Church published by Theological Publications in India for the Catholic Hierarchy of India, 1994
5. The Holy Bible Revised Standard Version with Old and New Testaments Catholic Edition for India.
6. VaalvinValizha – St. John's Gospel – Fr. Eronimus

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE(AUTONOMOUS) TRICHIRAPALLI-2.
B.A/ B.Sc/ B.Com/ B.R.Sc/ B.C.A DEGREE COURSES
LIFE ORIENTED EDUCATION
BIBLE STUDIES – I: NEW TESTAMENT

HRS / Wk :1

CODE: U15VE2LVBO1
CREDIT : 1
MARKS : 100

OBJECTIVE:

- Developing the passion for the Word of God – Jesus and inculcating 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-
- Messiah 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 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)
- Betrayal and the change in the life of 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)

UNIT – V: MISSIONARIES AND EVANGELISTS

- St.Thomas (John 20:24-31) & Missionary to India\Pandithar Rama Bai
- William Carrie
- Dr.Ida Scuddar& St. Britto (Oriyur)
- Amy Carcheal
- Mother Teresa (Calcutta)
- Devasagayam (Nagercoil)
- Staines & Family

REFERENCES:

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

புனித சிலுவை தன்னாட்சிக் கல்லூரி, திருச்சிராப்பள்ளி – 620 002.
தமிழாய்வுத்துறை
இளம் வணிகவியல் / இளங்கலை / இளம் அறிவியல் பட்ட வகுப்பு
இரண்டாம் ஆண்டு - மூன்றாம் பருவம் - நவம்பர் -2015 -2016
தாள் - III

Total Hours : 90 **Code : U15TL3TAM03**
Hrs : 6Hrs /Wk **Marks : 100**
Credit : 3

நோக்கங்கள்:

1. வாழ்வியல் நெறிகளாகிய அறம், பொருள், இன்பம், வீடுபேறு ஆகியவற்றின் மேன்மையை எடுத்துரைத்தல்
2. சமூக வாழ்க்கைப் பற்றிய விழிப்புணர்வினைத் தோற்றுவித்தல்
3. ஆன்மீக உணர்வுகளை வலுப்படுத்துதல்

பயன்கள்:

1. காப்பியங்களைப் பயில்வதன் மூலமாக மாணவர்கள் அறக்கருத்துக்களை உணர்ந்து கொள்ளுதல்.
2. சமூக மாற்றங்களைக் கண்டறிந்து மேம்பாடுகளை உருவாக்கச் செய்தல்
3. கலைநுட்பங்களையும் பண்பாட்டுச் சிறப்புக்களையும் உணர்ந்து கொள்ளச் செய்தல்

அலகு:1 செய்யுள்

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

அலகு:2 செய்யுள்

4. இரட்சணிய யாத்திரிகம் - மரணப் படலம்
5. சீறாப்புராணம் - ஒட்டகை பேசிய படலம்

அலகு:3

தமிழ் இலக்கிய வரலாறு

சோழர் காலம்

அலகு:4

நாடகம்

சத்திய வேள்வி – அய்க்கண்

அலகு:5

கோயிற்கலை - திட்டக்கட்டுரை, வினாடி வினா

பாட நூல்கள்

1. செய்யுள் - தமிழ்த்துறை வெளியீடு
2. தமிழ் இலக்கிய வரலாறு - தமிழ்த்துறை வெளியீடு
3. நாடகம்
   அய்க்கண் - சத்திய வேள்வி
4. கோயிற்கலை - தமிழ்த்துறை வெளியீடு

(for the candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-620002

DEPARTMENT OF HINDI

PART – I LANGUAGE HINDI FOR B.A, B.Sc & B.Com

HINDI PAPER-III POETRY, PREDICS, HISTORY OF HINDI LITERATURE

SEMESTER – III

HRS/WEEK : 6 **CODE: U15HN3HIN03**

CREDITS : 3 **MARKS : 100**

UNIT – I : Shubhagaman, Man, Tere ghar ked war bahuth hym Memory
poem : - Kabir das Ke Dohe - 6 Thulasidas Ke Dohe - 6
Rahim Ke Dohe - 6

UNIT- II : History of Hindi Literature :
Essay Type Questions : Veeragatha Kaal

UNIT- III : Bakthi Kaal

UNIT- IV : Poetics

a. Ras : Shringar, karun, Hasya, Veer
b. Alankar : Anupras, Yamak, Upama, Roopak
c. Chand : Choupayee, Baravai

UNIT- V : Kavi Parichaya : Ayodiya singh upadyaya Harioudh, Maithili Sharan Gupth, Siyaram Sharan Gupth, Kabir, Thulasi das

Books Prescribed :

8. Naveen Padhya Rathnakar – D.B.H.P. Sabha Publishers, Chennai-17
9. Pracheen Padhya Sangrah – D.B.H.P. Sabha Publishers, Chennai-17
10. Hindi Sahitya Ka Sanshitpta Itihas – Rajnath Sharma, Agrwal Publication, Uttar Prakash
11. Kavya Pradeep – Ram Bahori Shukla, Hindi Bhavan, Illahabad.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 2

DEPARTMENT OF FRENCH

SEMESTER III

PART I - LANGUAGE - FRENCH PAPER III [LANGUAGE & CIVILISATION (ÉCHO A2 2e édition)]

(For candidates admitted 2013 onwards)

HRS/WEEK : 6 CODE : U15FR3FRE03

CREDIT : 3 **MARKS : 100**

Unit 1 Vivement demain !

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.

Unit 2 Tu as du boulot ?

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 – le travail en France.

Unit 3 Qu'en pensez-vous?

L'emploi du subjonctif , l'expression de la quantité – revue de presse – entrée en politique – la naissance des départements –la vie politique - l'organisation administrative et politique de la France.

Unit 4 C'est tout un programme !

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)

Unit 5 On se retrouve

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.

TEXT BOOKS :

ECHO A2 – METHODE DE FRANÇAIS & CAHIER PERSONNEL D'APPRENTISSAGE

Authors: J. Girardet and J. Pécheur Publication: CLÉ INTERNATIONAL, 2010.

(for candidates admitted from 2014 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2.

2015 - 2016

I B.A., B.Sc., B.Com., B.R.Sc., B.C.A., B.B.A., SEMESTER III

PART II – ENGLISH III - GENERAL ENGLISH PAPER III

HOURS – 6 PER WEEK **CREDIT : 3**

CODE : U10EL3GEN03

OBJECTIVES

To reinforce the LSRW skills of students.
To enhance their study skills and literary skills through a selection of prose extracts.
To develop soft skills such as presentation and group discussion skills.
To strengthen sub skills including vocabulary, grammar, comprehension, argumentative and imaginative writing

UNIT I

A Little Bit of What You Fancy : *Desmond Morris*

UNIT II

The Avenger : *Anton Chekov*

UNIT III

Know When to Say 'It's None of Your Business': *Mark McCormack*

UNIT IV

The Second Crucifixion: *Larry Collins and Dominique Lapierre*

UNIT V

General Essay – 5 topics given
Idioms and Phrases - 20 Idioms and phrases given

BOOKS FOR REFERENCE

Anand, Renu .,& Rajeevan, Geetha. *Images of Life: An Anthology of Prose*. New Delhi: Foundation Books, 2007. Print.

List of Idioms and Phrases:

1. To tuck in
2. In tune with
3. To frown upon
4. In favour of
5. In vogue
6. To gloat at
7. On the contrary
8. Prompted by
9. To pale to nothing
10. To wax enthusiastic
11. To figure one out
12. Crystal clear

13. Grey area
14. To have second thoughts
15. On red alert
16. On a fool's errand
17. To be taken aback
18. To storm
19. Trouble spots
20. Flood of humanity

GENERAL ESSAY TOPICS

1. Women are not as intelligent as men.
2. The use of the internet and the computer.
3. Life in the next decade.
4. The ways of using the cell phone to minimize health hazards.
5. How will you save the planet?

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
SEMESTER III
MAIN CORE PAPER – : GENERAL CHEMISTRY – III

Theory:6 hrs./wk
Credits:6 **Code:U15CH3MCT04**
Course objectives:

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

UNIT I:
Second Law of Thermodynamics

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, the thermodynamic 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.

UNIT II:
Chemical Potential and Third Law of Thermodynamics:

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.

UNIT III:
s – block elements:

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.

UNIT IV:
p- block elements

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.

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

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

UNIT V:
Aromatic hydrocarbons

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, directive influence, orientation. Hammett equation - Substituent effect.

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

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

BOOKS FOR STUDY:

1. Puri B.R., Sharma. L.R. and Madan S. Pathania, (2008), 'Principles of Physical Chemistry' (35^{th} edition), New Delhi, Shoban Lal Nagin Chand and Co.
2. Jain M.K. (2003) 'Organic Chemistry (12^{th} Edition), New Delhi, Shoban Lal Nagin (35^{th} Edition), New Delhi, Shoban Lal Nagin Chand and Co.

BOOKS FOR REFERENCE:

1. Puri B.R. and Sharma L.R., (1989), 'Principles of Inorganic Chemistry', New Delhi, ultan Chand.
2. Lee, J.D. (1995). *A New Concise Inorganic Chemistry* (4th Ed.). London:ELBS.
3. Bahl B.S., Arun Bahl and Tuli (2007), Essentials of Physical Chemistry', New Delhi, Sultan chand and sons.
4. Bahl B.S., Arun Bahl (2010), A Text Book of Organic Chemistry', New Delhi, Sultan Chand and sons.
5. Soni P.L. and Chawla H.M., (1997) "Text Book of organic Chemistry", 27^{th} Edition, Sultan Chand and Sons.
6. Samuel Glasstone,(1974). *Thermodynamics for Chemists (* 3^{rd} printing). East-West Edn.
7. Clayden, Warrenn, Wothers, (2012). 'Organic chemistry', 2^{nd} Edition, Oxford University Press.
8. John Mc Murray, (2012). 'Organic chemistry', 8^{th} Edition, Internation Edition.
9. Paula Yurkanis Bruice, (2016). 'Organic chemistry', 8^{th} Edition, Pearson Education Ltd.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
SEMESTER III
MAINCORE – 5: VOLUMETRIC ANALYSIS – Theory Cum Lab -I

Hours: 4 Hrs./Week.
Credits: 4 **Code: U15CH3MCP05**

OBJECTIVES:

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.

UNIT: I
VOLUMETRIC ANALYSIS:

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.

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.

BOOKS FOR STUDY:

1. Puri B.R. and Sharma L.R., (2002), 'Principles of Inorganic Chemistry', Shoban Lal Nagin Chand and Co.
2. Venkateswaran V., Veeraswamy R., Kulandaivelu A.R., (1997), 'Basic Principles of Practical Chemistry', Second edition, Sultan Chand & Sons.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
SEMESTER III
SBE 3: INDUSTRIAL CHEMISTRY

Hours: 2 hrs./wk. **Code: U15CH3SBT03**
Credits: 2

Course objectives:

To gain knowledge in the manufacture of various industrial products like aspirin, soap and detergents, glass, cement, pigment and paper. To acquire knowledge about Dyes, Polymers and Fertilizers. To enable the students to gain knowledge in the field of industrial chemistry by facilitating visits to various chemical industries. To have practical experience in the preparation of soap, candle, dyeing of fabric etc.

UNIT I:

1.1 Pharmaceutical industries - Process development for industrial applications. Preparation of p-acetamol, aspirin and iburufen
1.2 Soaps and soapless detergents. Special varieties of soaps. Cleansing action of soaps. Synthetic detergents – composition.

Activity:

1. Visit to the industries. (Pharmaceutical and Soap industries)
2. 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.

Activity:

1. Visit to the dye industry.
2. 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.

Activity:

1. Polymer testing
2. Visit to the polymer industry

UNIT IV

4.1 Glass Industry – Raw materials. Manufacture Annealing, varieties of glass.
4.2 Port Land cement – raw materials, Manufacture, setting of cement, concrete.
4.3 Lead pigments – white lead, red lead - manufacture.

Activity:

Visit to the glass, cement, paint 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.

Activity:

Visit to the Paper industry and Fertilizer industry.

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', 6th Reprint, Sultan Chand & sons, New Delhi.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
SEMESTER III / V
SBE-4 : EXPERIMENTAL CHEMISTRY FOR LIFE SCIENCE[BOTANY AND ZOOLOGY]

Hours: 2 hrs.
Credits : 5 **Code: U15CH3SBT04/ U15CH5SBT04**

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 conductance of solutions.
5. Determination of Water parameters using water analyzer.
6. Separation of amino acids using paper chromatography.

Demonstration:

7. Extraction of phytoconstituents from a dried plant powder using Soxhlet apparatus.
8. Separation of o-nitrophenol and p-nitrophenol using column chromatography.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
SEMESTER III
ALLIED – 4 : ALLIED CHEMISTRY PAPER – I (FOR PHYSICS MAIN)

Hours: 4 Hrs/wk
Credit : 3 **Code: U15CH3AOT01**

OBJECTIVES:

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

UNIT: I

Fundamental Concepts

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.

UNIT: II

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.

UNIT : III

CHEMICAL BONDING:

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.

UNIT :IV

ELECTRICAL AND MAGNETIC PROPERTIES OF MOLECULES:

4.1 Dipolemoment – 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 Dipolemoment 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.

UNIT: V

Solutions and Phase equilibria:

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).

BOOKS RECOMMENDED

Text Books:

1. Vasudevan A.N.S. (1981), Ancillary Chemistry, Part I and Part II.
2. Veeraiyan .V (1997), Text Book of Allied Chemistry, Volume I and Volume II.

Reference Books:

1. Puri B.R. and Sharma L.R. and Kalia K.C. (1997), Principles of Inorganic Chemistry and Shoban lal Nagin chand and Co.
2. Puri B.R. Sharma L.R and Madan S. Pathania, (1994) Principles of Physical Chemistry, 35th edition, shoban Lal Nagin Chand and Co.
3. Parmer V.S. & Chawla B.M., (1973), "Principles of reaction mechanism in Organic Chemistry", 2nd edn. Sultan Chand.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
B.A./B.Sc./ B.Com./ B.C.A./B.B.A DEGREE COURSE
II YEAR: SEMESTER - III
(Students who are admitted from 2015 onwards)
GENDER STUDIES

Hours: 1Hr/wk **CODE: U15WS3GST01**
CREDITS: 1

Objectives

To make boys and girls aware of each other's strength and weakness

To develop sensitivity towards both genders in order to lead an ethically enriched life

To promote attitudinal change towards a gender balanced ambience and women empowerment

Unit I

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.

Unit II Women's Studies Vs Gender Studies: UGC's Guidelines – VII to XI Plans – Gender Studies :Beijing Conference and CEDAW-Exclusiveness and Inclusiveness.

Unit –III 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.

Unit – IV 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.

Unit – V

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.

BOOK FOR STUDY

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

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

HRS / WK :1 **CODE: U12VE4LVE02**
CREDIT :1 **MARKS : 100**

OBJECTIVES:

- To make the learners aware of various Social, Gender issues and Cyber Crimes.
- To make them aware of the property rights.
- To make them understand and appreciate the role of media, in facing the challenges on various life issues.

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: WOMEN AND MEDIA

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

UNIT – III: 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 – 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-Mother Teresa, Indira Gandhi, and 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, and twitter

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 PrettiNandhiniUpretti, jaipur 2000 "Women and problems of Gender Discrimination".
4. Thomas B.Jayaseelan, 2002, "Women: Rights and law" Indian Social Institute, New Delhi.

   Reni Jacob vol I & II, April- June 2004, "Vikasimi – The journal of Women's Empowerment, Ed,"

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

HRS / WK : 1 **CODE : U12VE4LVC02**
CREDIT : 1 **MARKS : 100**

OBJECTIVES:

- To instruct the students to live in relationship with God.
- To offer God's gift of the Holy Spirit.
- To build relationship with Jesus.
- To learn Sacraments and Prayer life through which a Christian is able to live in relationship with Christ.
- To enrich our devotion to Mother Mary and Saints.

UNIT – I: MISSION OF THE CHURCH

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

UNIT – II: PARTICIPATORY CHURCH (AS LAY FAITHFUL) AS A COMMUNITY

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 characteristic 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.

Sacraments – Initiation- Social – Healing (all the seven) - stress on Confession, Confirmation and Holy Communion - Sacramental: holy "things" used –their sanctity

UNIT – IV: SACRAMENTS AND SACRAMENTAL

Sacraments-Initiation-Social-Healing (all the seven)-stress on Confession, Confirmation and Holy Communion. Sacramental: holy "things"used-their sancity.

UNIT – V: MARY AND WOMEN IN THE BIBLE- RUTH, ESTHER, JUDITH

Mary as a young virgin- Disciple- Her role in the Catholic Church-Annual feasts- Pilgrimages- Devotion to Mary, Theologies. Saints in the Church- 10 women saints. Ex. Mother Teresa, St.Alphonse.

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.

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

HRS / Wk :1 **CODE: U12VE4LVBO2**
CREDIT :1 **MARKS : 100**

OBJECTIVE:

- Understanding the desires of God through Prophetic revelation and becoming sensitiveto 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, Proverbs 1-5,31)

UNIT – III: 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)

UNIT – IV: MINOR PROPHETS

- Brief Life History and teachings of
- Amos
- Jonah
- Micah
- Nahum
- Habakkuk

UNIT – V: 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)

REFERENCES:

1. Missionaries Biographies. 1995, Amazon.com
2. Russell Fueller (1999) The Text book of the Twelve Minor Prophets. Wipf&Stock Publishers, UK.
3. Willis Judson Beecher (2002) The Prophets and The Promise. Wipf& Stock Publishers, UK

புனித சிலுவை தன்னாட்சிக் கல்லூரி, திருச்சிராப்பள்ளி – 620 002.
தமிழாய்வுத்துறை
இளம் வணிகவியல் / இளங்கலை / இளம் அறிவியல் பட்ட வகுப்பு
இரண்டாம் ஆண்டு – நான்காம் பருவம் - 2015 – 2016
தாள் - IV

Total Hours : 75 **Code : U15TL4TAM04**
Hrs : 5Hrs /Wk **Marks : 100**
Credit : 3

நோக்கங்கள்:

1. மாணவர்களுக்குத் தமிழர்தம் வாழ்வியல் விழுமியங்களை உணர்த்துதல்.
2. அறநெறிகள் வாழ்க்கைக்கு வழிகாட்டும் விதத்தினை எடுத்துரைத்தல்
3. சிகரம் தொட்ட சாதனையாளரின் வாழ்வியலைப் புலப்படுத்துதல்
4. மொழித்திறன் வளர்த்தல்.

பயன்கள்:

1. வாழ்க்கையின் பல்வகை நிலைகளையும் உணர்ந்து செயல்படச் செய்தல்
2. தன்னைத் தானே நெறிப்படுத்திக்கொள்ள, பயன்பாடடைய இலக்கியம் வழிகாட்டுவதை புரிந்துகொள்ளச் செய்தல்.
3. இடைவிடாத முயற்சியின் வெற்றிப்படிகளைக் கண்டுணர்ந்து மேன்மை அடையச் செய்தல்.
4. இருமொழிப் புலமையை வளர்த்தல்.

அலகு:1 செய்யுள்

1. குறுந்தொகை

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

4.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

5. பதிற்றுப்பத்து - ஐந்தாம் பத்து

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

6. திருக்குறள்

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

அலகு:3

தமிழ் இலக்கிய வரலாறு (துறை வெளியீடு)

சங்ககாலம் - சங்கம் மருவியகாலம்

எட்டுத்தொகை, பத்துப்பாட்டு, பதினெண்கீழ்க்கணக்கு நூல்கள்

அலகு:4

வாழ்க்கை வரலாறு

அன்னை தெரசா - பா. தீனதயாளன்

அலகு:5

பொது – மொழிபெயர்ப்பு

பாட நூல்கள்

1. செய்யுள் நூல் - தமிழாய்வுத்துறை வெளியீடு
2. தமிழ் இலக்கிய வரலாறு - தமிழாய்வுத்துறை வெளியீடு
3. **வாழ்க்கை வரலாறு**

   பா.தீனதயாளன் - அன்னை தெரசா
4. மொழிபெயர்ப்பு - தமிழாய்வுத்துறை வெளியீடு

(for the candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-620002

DEPARTMENT OF HINDI

PART – I LANGUAGE HINDI FOR B.A, B.Sc & B.Com HINDI

PAPER-IV FUNCTIONAL HINDI & TRANSLATION SEMESTER – IV

HRS/WEEK : 5 **CODE: U15HN4HIN04**

CREDITS : 3 **MARKS : 100**

UNIT – I Functional Hindi

UNIT- II Adhunic Kaal **UNIT-**

III General Essays

Parishram Ka Mahatva, Anushasan, Paropakar, Jawaharlal Nehru, Deepavalli, Bharath Mein Computer

UNIT- IV Letter Writing

UNIT- V Anuvad Abhyas - III Books

Prescribed :

1. General Essays - D.B.H.P. Sabha Publishers, Chennai-17
2. Abinava Patra Lekhan - D.B.H.P. Sabha Publishers, Chennai-17
3. Anuvad Abhyas – III - D.B.H.P. Sabha Publishers, Chennai-17

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 2

DEPARTMENT OF FRENCH

SEMESTER IV

PART I - LANGUAGE - FRENCH PAPER IV [LANGUAGE & CULTURE (ÉCHO A2 2e édition)]

(For candidates admitted 2013 onwards)

HRS/WEEK : 5 CODE : U15FR4FRE04

CREDIT : 3 **MARKS : 100**

Unit 1 C'est la fête !

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– le calendrier – les fêtes traditionnelles, importées, francophones.

Unit 2 Vous plaisantez !
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.

Unit 3 On s'entend bien !
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.

Unit 4 À vos risqué et périls !

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– les jeunes issus de l'immigration.

Unit 5 La vie est dure
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 – la chanteuse Diam's – le film 'Le Couperet de Costa-Gavras'.

TEXT BOOKS :
ECHO A2 – METHODE DE FRANÇAIS & CAHIER PERSONNEL D'APPRENTISSAGE
Authors: J. Girardet and J. Pécheur Publication: CLÉ INTERNATIONAL, 2010.

(for candidates admitted from 2014 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2.

2015 - 2016

I B.A., B.Sc., B.Com., B.R.Sc., B.C.A., B.B.A., SEMESTER IV

PART II – ENGLISH IV - GENERAL ENGLISH PAPER IV

HOURS – 6 PER WEEK **CREDIT : 3**

CODE : U13EL4GEN04

OBJECTIVES

To strengthen the LSRW skills of students through inter-active approaches, participatory methods and activity oriented exercises.

To develop skills required for referential and independent learning.

To focus on writing skills like creative and comparative writing and book reviews.

To reinforce sub skills including vocabulary, grammar, dialogue, report writing and note making.

UNIT I: READ AND COMMUNICATE: HISTORICAL SKETCHES

The Renaissance

India under the British Raj

UNIT II: READ AND COMMUNICATE : MODERN FABLES

Nonchi Nona and Kotiya the Cat

The Competition

UNIT III: READ AND COMMUNICATE : MODERN FABLES

The Nightingale and the Rose

The Butterfly that Stamped

UNIT IV -READ AND COMMUNICATE : BIOGRAPHIES AND MODERN FABLES

Napoleon Bonaparte

The Hiding Place

UNIT V

GRAMMAR - Tenses

COMPREHENSION - General

COMPOSITION - 1. Note making
2. Dialogue
3. Creative Writing
4. Narrative Writing
5. Imaginative Writing

GENERAL ESSAY – 5 TOPICS

1. Should capital punishment be abolished?
2. Is a corruption- free India a dream?
3. The nuclear family and its consequent changes in society.
4. The threat of terrorism.
5. If man becomes immortal…

THINK BETTER - READ AND COMMUNICATE : MODERN FABLES

1 – 10 for Internal Testing

BOOKS FOR REFERENCE

Oranee Jansz : EXPLORATIONS *A Course in reading, thinking and communication skills*. New delhi: Cambridge university press. 2004. Print.

List of words \ compound words\phrases for making sentences:

1. Store house of knowledge
2. Genre
3. To be divided over
4. Taboo
5. To take over
6. Hump
7. Bushy
8. Tiered
9. To roll from side to side
10. Flickered
11. To sail through
12. To tremble all over
13. Ecstasy
14. Thunder-clap
15. Mousy-quite
16. Collision
17. Exiled
18. Revolution
19. To come round
20. To fight for a cause

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
SEMESTER IV
MAIN CORE PAPER – : GENERAL CHEMISTRY – IV

Theory: 5 hrs./wk
Credits: 5 **Code: U15CH4MCT06**

Course objectives:

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

UNIT I:

d-block elements:

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.

UNIT II

Halogen compounds

2.1 Alkyl halides – Nomenclature, structure, General methods of formation, 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 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, stability.

UNIT III

Chemical Kinetics I:

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.

UNIT IV

Chemical Kinetics II and Photochemistry:

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 a ctivation 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.

UNIT V:

Carbonyl compounds:

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)

5.4 α, β – unsaturated carbonyl compounds – preparation and properties, Mechanism of Michael addition.

BOOKS FOR STUDY:

1. Puri B.R., Sharma L.R. and Madan S. pathania, (1994), "Principles of Physical Chemistry', Shoban Lal Nagin Chand and Co, 35th edn.
2. Lee, J.D. (1995). *A New Concise Inorganic Chemistry* (4th Ed.). London:ELBS.
3. Puri B.R. and Sharma L.R., (2002), 'Principles of Inorganic Chemistry', Shoban Lal Nagin Chand and Co.
4. Soni P.L., Mohan Katyal, (1992), "Text Book of Inorganic Chemistry', Sultan Chand, 2oth revised edn.
5. M.K. Jain, "Modern Organic Chemistry", 4th Edition, Vishal Publising Co, Jalendhar

BOOKS FOR REFERENCE:

1. Gurtu J.N. and Amit Gurtu, (1979), 'Chemical Kinetics', 5th edn., Mittal K.K.
2. Madan R.D., (1987), 'Modern Inorganic chemistry', S. Chand and Company (PVT) limited. Ist edn.
3. Samuel Glasstone D.Sc. Ph.D., 'Text Book of Physical Chemistry', 2nd edn. (1974).
4. Parmar V.S. and Chawla H.M. (1978) "Principles of reaction mechanism in Organic Chemistry", 2nd edition, Sultan Chand.
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, (2015), Pragati Prakashan Educational Publishers.
8. Clayden, Warrenn, Wothers, (2012). 'Organic chemistry', 2nd Edition, Oxford University Press.
9. John Mc Murray, (2012). 'Organic chemistry', 8th Edition, Internation Edition.
10. Paula Yurkanis Bruice, (2016). 'Organic chemistry', 8th Edition, Pearson Education Ltd.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
SEMESTER IV
MAJOR ELECTIVE – 1 : PHYSICAL CHEMISTRY - THEORY CUM LAB – II
(SEPARATION TECHNIQUES AND VIRTUAL LAB EXPERIMENTS)

Hours: 5Hrs./wk
Credits : 5 **Code: U15CH4MEP01**

OBJECTIVES:

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

UNIT: I

Solution I:

1.1 Raoult's law, ideal solutions – criteria for ideal solution, Non ideal solutions – Type I, II and III solutions, vapour pressure – composition curves and boiling point – composition curves of completely miscible binary solutions.
1.2 Fractional distillation of binary liquid solutions – Type I, II and III solutions. Distillation of immiscible liquids-steam distillation.
1.3 Solutions of gases in liquids – Henry's law and Raoult's law.
1.4 Nernst distribution law & its applications.

UNIT:II
Solutions II and Distribution law

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.

PRACTICALS:

I. Separation of the given mixture into its constituents, Purification and determination of m.pt/B.pt of any one constituent

1. Solid Mixtures

a. Benzoic acid + m-dintrobenzene (Bicarbonate separation)

b. Benzoic acid + Biphenyl (Bicarbonate separation)

c. Benzoic acid + p- Toludine (HCl separation)

d. Phenol + m-dinitrobenzene (NaOH separation)

e. Cinnamic acid + m-dinitrobenzene (NaOH separation)

2. Liquid mixtures

a. Water + Ethyl acetate

b. Water + Toluene

c. Water + Ethyl methyl ketone

II. Chromatographic separation

a. Separation of amino acids by paper chromatrography

b. TLC separation of analgesics / dyes / quinones

III. Fractional distillation – Soxhlet apparatus (Demo)

IV. Virtual lab Experiments.

a. Freundlich and Langmuir`s Adsorption isotherms.

b. Determination of elevation in boiling point

c. Determination of depression in freezing point.

d. Calorimetry - Heat of Neutralization

e. Determination of viscosity of organic solvents.

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. A.S. Negi & S.C. Anand, " A Text book of Physical Chemistry", (1994) 3rd Edition, Wiley Eastern Ltd.
2. Arun Bahl, B.S. Bahl & G.D. Tuli, "Essentials of Physical Chemistry", (2014) S.Chand & company Pvt. Ltd.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
SEMESTER IV
MAJOR ELECTIVE – 1 : PHYSICAL CHEMISTRY - THEORY CUM LAB – II
(VERIFICATION OF COLLIGATIVE PROPERTIES)

Hours: 5Hrs./wk
Credits : 5 **Code: U15CH4MEP02**

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.

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 smosis.
1.3 Elevation in boiling point and depression in freezing point by a non volatile solute - hermodynamic 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.

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
SEMESTER IV
ALLIED – 5 : ALLIED CHEMISTRY PAPER II (FOR PHYSICS MAIN)

Hours : 4Hrs./Wk
Credit : 4 **Code: U15CH4A0T02**

Objectives:

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

UNIT: I

The Solid State

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

UNIT: II

Photochemistry:

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.

UNIT: III

Electrochemistry – I

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 $AgNO_3$.

UNIT :IV

Electrochemistry – II:

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.

UNIT: V

Chemical kinetics:

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.

BOOKS RECOMMENDED

Text Books:

1. Vasudevan A.N.S. (1981), Ancillary Chemistry, Part I and Part II.
2. Dr. V Veeraiyan (1997), Text Book of Allied Chemistry, Volume I and Volume II.

Reference Books:

1. Puri B.R. and Sharma L.R., (2002), 'Principles of Inorganic Chemistry', Shoban Lal Nagin Chand and Co.
2. Puri B.R. Sharma L.R and Madan S. Pathania, (1994) Principles of Physical Chemistry, 35th edition, shoban Lal Nagin Chand and Co.
3. Soni P.L. and Chawla H.M., (1997) 'Text Book of Organic Chemistry", 27th Edition, Sultan Chand and sons.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
SEMESTER IV
ALLIED 6: ALLIED CHEMISTRY PRACTICAL PAPER III
[FOR PHYSICS MAIN]

Hours: 4Hrs./wk.
Credits: 3 **Code: U15CH4AOP03**

Objectives:
To expose the students to the theory of volumetric analysis and also to develop practical skills by giving them certain experiments in volumetric analysis.

VOLUMETRIC ANALYSIS: (10 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

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)

BOOKS FOR STUDY:

1. Puri B.R. and Sharma L.R., (2002), 'Principles of Inorganic Chemistry', Shoban Lal Nagin Chand and Co.
2. Venkateswaran V., Veeraswamy R., Kulandaivelu A.R., (1997), 'Basic Principles of Practical Chemistry', Second edition, Sultan Chand & Sons.

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

HRS / WK :1

CODE: U12VE4LVE02
CREDIT :1
MARKS : 100

OBJECTIVES:

- To make the learners aware of various Social, Gender issues and Cyber Crimes.
- To make them aware of the property rights.
- To make them understand and appreciate the role of media, in facing the challenges on various life issues.

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: WOMEN AND MEDIA

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

UNIT – III: 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 – 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-Mother Teresa, Indira Gandhi, and 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, and twitter

REFERENCES:

5. Dr.M.Arumairaj et al., 1999, "Marching towards the Millenium ahead".
6. Thomas Anjugandam, 1999, "Grow Free Live Free" Salesian Publicaiton.
7. H.C PrettiNandhiniUpretti, jaipur 2000 "Women and problems of Gender Discrimination".
8. Thomas B.Jayaseelan, 2002, "Women: Rights and law" Indian Social Institute, New Delhi.

Reni Jacob vol I & II, April- June 2004, "Vikasimi – The journal of Women's Empowerment, Ed,"

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

HRS / WK : 1 **CODE : U12VE4LVC02**
CREDIT : 1 **MARKS : 100**

OBJECTIVES:

- To instruct the students to live in relationship with God.
- To offer God's gift of the Holy Spirit.
- To build relationship with Jesus.
- To learn Sacraments and Prayer life through which a Christian is able to live in relationship with Christ.
- To enrich our devotion to Mother Mary and Saints.

UNIT – I: MISSION OF THE CHURCH

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

UNIT – II: PARTICIPATORY CHURCH (AS LAY FAITHFUL) AS A COMMUNITY

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 characteristic 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.

Sacraments – Initiation- Social – Healing (all the seven) - stress on Confession, Confirmation and Holy Communion - Sacramental: holy "things" used –their sanctity

UNIT – IV: SACRAMENTS AND SACRAMENTAL

Sacraments-Initiation-Social-Healing (all the seven)-stress on Confession, Confirmation and Holy Communion. Sacramental: holy "things"used-their sancity.

UNIT – V: MARY AND WOMEN IN THE BIBLE- RUTH, ESTHER, JUDITH

Mary as a young virgin- Disciple- Her role in the Catholic Church-Annual feasts- Pilgrimages- Devotion to Mary, Theologies. Saints in the Church- 10 women saints. Ex. Mother Teresa, St.Alphonse.

REFERENCES:

3. "Vatican II Revised" Archbishop Angelo Fernandes Published by X.Diax de Rio S.J. Gujarat Sahitya Prakash, P.O.Box. 70, Gujarat, 388001, India.

4. "The Sacraments The Word of God at the Mercy of the Body" Claretian Publications, Malleswaram, Bangalore 560055.

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

HRS / Wk :1 **CODE: U12VE4LVBO2**
CREDIT :1 **MARKS : 100**

OBJECTIVE:

- Understanding the desires of God through Prophetic revelation and becoming sensitiveto 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, Proverbs 1-5,31)

UNIT – III: 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)

UNIT – IV: MINOR PROPHETS

- Brief Life History and teachings of
- Amos
- Jonah
- Micah
- Nahum
- Habakkuk

UNIT – V: 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)

REFERENCES:

1. Missionaries Biographies. 1995, Amazon.com
2. Russell Fueller (1999) The Text book of the Twelve Minor Prophets. Wipf&Stock Publishers, UK.
3. 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
SEMESTER V
MAIN CORE – 7: INORGANIC CHEMISTRY

Hours: 4hrs./wk.
Credits : 4 **Code: U15CH5MCT07**

Course objectives:

To learn about the nomenclature, isomerism, theories, distortion and stability of coordination complexes. To understand the structure of solids and defects in crystals. To learn the concepts of nuclear chemistry, important bio-inorganic molecules, lanthanide and actinide series.

UNIT I:

Co-ordination Chemistry:

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 and Effective atomic number (EAN).
1.3 Structural isomerism – hydrate isomerism, co-ordination isomerism, linkage isomerism, co-ordination position isomerism, ionization isomerism and polymerization isomerism.
1.4 Stereoisomerism – Geometrical isomerism and optical isomerism in 4 and 6 co-ordinated complexes.

UNIT II:

Co-ordination chemistry II:

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).

UNIT III**: Solid State**

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, CaC_2, CdI_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.

UNIT IV:

Nuclear Chemistry

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. Classifications 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.

UNIT V:

Bio-inorganic chemistry and f- block elements.

5.1 The porphyrin ring system. myoglobin and cytochrome-C - structure and biological functions. Blue copper proteins, Ferridoxin, 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 compounds, chemical reactivity. Separation of lanthanides.

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

BOOKS FOR STUDY:

1. Puri B.R. and Sharma L.R., (1989), Principles of Inorganic Chemistry, New Delhi, Sultan Chand.
2. Madan R.D., (1987), 'Modern Inorganic Chemistry', S.Chand and company (PVT) limited, Ist Edition.
3. Puri B.R., Sharma, L.R and Madan S. Pathania (2008), " Principles of Physical Chemistry" (35th Edition), New Delhi, Shoban Lal Nagin Chand and Co.
4. Gopalan, R., Ramalingam, V. (2001), " Concise Co-ordination Chemistry", Vikas Publishing House Pvt. Ltd.

BOOKS FOR REFERENCE:

1. Soni P.L. and Chawla H.M (2004).Text Book of Inorganic Chemistry (26th edn), New Delhi, Sultan Chand and sons.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
SEMESTER V
MAJOR CORE – 8: ORGANIC CHEMISTRY - I

Hours: 4hrs./wk.
Credits: 4 **Code: U15CH5MCT08**

Course objectives:

To expose the students to the preparations and properties of acids and their derivatives. To apprise the students with the knowledge of the preparations, properties, synthetic applications of nitrogen containing compounds. To give them the knowledge about amino acids, polypeptides and proteins. To update students about the concepts of aromatic and aliphatic hydroxyl compounds. To illuminate the students with the knowledge of carbohydrates.

UNIT I:

Organic acids and Derivatives:

1.1 General methods of preparation 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 di carboxylic acids.
1.4 Malonic and aceto acetic ester – characteristics and synthetic uses.

UNIT II:

Nitro Compounds and Amines:

2.1 Aliphatic nitro compounds – comparison between primary, secondary and tertiary Nitro compounds. 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 and aromatic amines. 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.

UNIT III:

Amino acids, Proteins and Nucleic acids:

3.1 Amino acids – introduction, classification, zwitter ions and iso electric point, preparation, 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.

UNIT IV:

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, preparation.

4.3 Phenols –: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.

UNIT V:

Carbohydrates:

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 – preparation, reactions and structures of maltose, lactose and sucrose (Structural elucidation not expected).
5.4 Polysaccharides : Starch and cellulose – properties and uses.

BOOKS FOR STUDY:

1. Soni P.L. and Chawla H.M., (1997) "Text Book of organic Chemistry", 27th Edition, Sultan Chand and Sons.
2. Subash Chandra Rastogi, Satiskumar, Agarwala, Ashok Kumar Sharma. " Natural Products" – Vol. I.

BOOKS FOR REFERENCE:

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

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
- SEMESTER V
MAIN CORE – 9: PHYSICAL CHEMISTRY – I
[ELECTRO CHEMISTRY AND PHASE RULE]

Hours : 4 Hrs./Wk.
Credits : 4 **Code: U15CH5MCT09**

Course objectives:
The students will learn the basic concepts of electrolytic conductance, understand the different types of Electro chemical cells, EMF of cell and its measurement, thermodynamics of reversible cells, basic principles of corrosion and overvoltage, phase rule and its application to separation of metals from ores and alloys

Electrolytic Conduction - I

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.

UNIT II:

Electrolytic Conduction - II

2.1 Kohlrausch's law – statement, applications of Kohlrausch's law – calculation of molar conductance at infinite dilution for weak electrolytes and determination of transport number.
2.2 Applications of conductance measurements – determination of α 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.

UNIT III:

Electrochemical Cells - I

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.

UNIT IV:

Electrochemical Cells - II

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.

UNIT V:

Phase equilibria and Phase Rule:

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 and carbon di-oxide.
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.

BOOKS FOR STUDY:

1. Puri B.R., Sharma L.R. and Madan Pathania S. (1994), "Principles of Physical Chemistry", 35th edition, Shobanlal nagin Chand and Co.
2. Samuel Glasstone D.Sc., Ph.D., (1974) "Text Book of physical Chemistry", 2nd edition.

BOOKS FOR REFERENCE:

1. A.S. Negi & S.C. Anand, " A Text book of Physical Chemistry", (1994) 3rd Edition, Wiley Eastern Ltd.
2. Arun Bahl, B.S. Bahl & G.D. Tuli, "Essentials of Physical Chemistry", (2014) S.Chand & company Pvt. Ltd.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
SEMESTER V
MAJOR ELECTIVE – 2 : DAIRY CHEMISTRY

Hours : 5hrs/week **CODE: U15CH5MET01**

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.

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
SEMESTER V
MAJOR ELECTIVE – 2 : POLYMER CHEMISTRY

Hours : 5hrs/week
Credits: 4 **Code: U15CH5MET02**

OBJECTIVES:

To expose the students to important concepts about polymers.

UNIT I:

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:

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:

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:

4.1 Polymer degradation – definition, types.
4.2 Thermal degradation, mechanical degradation.
4.3 Photo degradation, oxidative degradation – rubber oxidation, ozone oxidation.

UNIT V:

5.1 Compounding – compounding materials and their significances.
5.2 Fabrication – Techniques – Compression, injection, lamination mouldings.
5.3 Applications of polymers and plastics.

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

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(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
SEMESTER V
MAJOR ELECTIVE – 2 : CHEMISTRY OF BIOMOLECULES

Hours: 5 Hrs,/Wk.
Credits : 4 **Code: U15CH5MET03**

Course objectives:

To make the students to learn about carbohydrates, lipids, proteins, enzymes, blood and bile pigments.

UNIT I:

Carbohydrates:

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.

UNIT II:

Lipids:

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.

UNIT III:

Proteins:

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.

UNIT IV:

4.1 Enzymes – properties, classification, mechanism of enzyme action, Factors influencing enzyme action, enzyme inhibitors. (Coenzymes not needed).
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.

UNIT V:

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.

BOOKS FOR STUDY:

1. Ambika Shanmugam, 'Fundamentals of Biochemistry for medical students', July 1982, 4th edn., 1983 Navabharat offset works.

BOOKS FOR REFERENCE:

1. Dulsy Fatima, L.M.Narayanan and Co-workers – BioChemistry 1993, Saras publication.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
SEMESTER VI
MAIN CORE PAPER – 11: ORGANIC CHEMISTRY - II

Hours: 5hrs./wk.
Credits : 5 **Code: U15CH6MCT12**

Course objectives:

To learn about optical isomerism, geometrical isomerism and conformational analysis. To expose the students to different types of molecular rearrangements. To apprise the students about the chemistry of heterocyclic compounds. To make them understand the general methods of elucidation of the structure and few individual natural products.

UNIT I:

Stereochemistry I

1.1 Isomerism-Types, examples. Tautomerism-Types, 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 spirans – Elementary treatment only. Optical isomers of lactic, tartaric and malic acid - Structures and preparations.

UNIT II:

Stereochemistry II:

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.
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.

UNIT III:

Molecular Rearrangements

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.

UNIT IV:

Heterocyclic compounds:

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 pyridine with Aniline.
4.4 Condensed Hetero cyclics - Indole, Quinoline, isoquinoline - synthesis and reactions.

UNIT V:

Natural Products:

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, sources and deficiency diseases and structural elucidation of Ascorbic acid and Pyridoxine.

BOOKS FOR STUDY:

1. I.L. Finar Vol-II, Organic Chemistry.
2. Parmar V.S. and Chawla H.M. (1978) "Principles of reaction mechanism in Organic Chemistry", 2nd edition, Sultan Chand.
3. Soni P.L. and Chawla H.M. (1997) "Text Book of Organic Chemistry", 27th edition, Sultan Chand.
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.

BOOKS FOR REFERENCE:

1. Jani M.K. "Organic Chemistry", 12th edition, Shoban Lai Nagin Chand and Co.
2. Advanced Organic Chemistry by Jerry March.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
SEMESTER VI
MAIN CORE – 12 : PHYSICAL CHEMISTRY – II [SPECTROSCOPY]

Hours : 5 Hrs./Wk.
Credits : 5 **Code: U15CH6MCT13**

Course objectives:

To study the basic principles and applications involved in Rotational spectra, IR spectra, Raman spectra, Electronic spectra, Mass spectra, NMR spectra and ESR spectra.

UNIT I:

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.

UNIT II:

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.

UNIT III:

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.

UNIT IV:

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.

UNIT V:

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.

BOOKS FOR STUDY:

1. Colin Bannwell N and Elaine McCash M, Fundamentals of molecular spectroscopy, 4th edition, McGraw hill Publishing company limited.
2. Sharma L.R. (1989) Elementary Organic spectroscopy, Chand S. and Co.

BOOKS FOR REFERENCE:

1. Russell S. Drago, (1978). Physical methods in Inorganic Chemistry, East West student edition.
2. Manas Chanda (1972), Atomic structure and Chemical Bond Including Molecular Spectroscopy, Tata McGraw-Hill Publishing Company Ltd.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
SEMESTER VI
MAJOR ELECTIVE – 3- ENVIRONMENTAL POLLUTION

Hours: 5Hrs/Wk
Credits : 5 **Code: U15CH6MET01**

GENERAL OBJECTIVES:

To learn the various forms of pollution and contaminants of the environment, solid waste management and environment acts.

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.

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.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
SEMESTER VI
MAJOR ELECTIVE – 3 : DYE CHEMISTRY

Hours: 5 Hrs,/Wk.
Credits : 5 **Code: U15CH6MET02**

General Objectives:

To make the students understand and learn about the different types of dyes, properties, applications and hands on training on dyeing.

UNIT I:
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 righteners.

UNIT II
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:
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

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.

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 coloursits.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
- SEMESTER VI
MAJOR ELECTIVE – 3 : FOOD CHEMISTRY

Total Hours : 75
Hours: 5 Hrs,/Wk.
Credits : 4 **Code: U15CH6MET03**

General objective:
The student learns various concepts of all the nutrients, food preparation, preservation and adulteration.

UNIT 1-NUTRIENTS –I **15 Hrs**

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.

Extra reading/Keywords: *Organic sources of nutrients*.

UNIT 2 -NUTRIENTS –II **15 Hrs**

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. Fibre – functions, requirements and sources. Effects of deficiency of fibre.
2.3 Algae and fungi as foods, Toxicants naturally present in foods. Fermented foods and pickles.

Extra reading/Keywords: *Preparation of Spirulina and dosage*

UNIT 3 - FOOD PREPARATION **15 Hrs**

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 – description, advantages and disadvantages.

Extra reading/Keywords: *Obesity*

UNIT 4 - FOOD PRESERVATION **15 Hrs**

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.

Extra reading/Keywords: *Organic insecticides*

UNIT 5 - FOOD ADULTERATION AND TASTE SENSATION 15 Hrs

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.

Extra reading/Keywords: *Adulteration in Maida*

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

TEXT BOOKS:

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
SEMESTER VI
MAJOR ELECTIVE – 3 : ANALYTICAL CHEMISTRY

Hours: 5hrs./wk.
Credits : 5 **Code: U15CH6MET04**

Course objectives:

To learn about the laboratory hygiene and safety, data analysis. To understand the concepts and application of dipole moment and magnetic properties. To understand the principles, types of precipitation and application of thermogravimetric analysis. To learn the principles, types of photochemical reactions, instrumentation and colorimetric estimation.

UNIT I:

Laboratory, Hygiene and Safety:

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.
1.3 First Aid techniques – Precautions to avoid poisoning – Treatment for specific poisons – Laboratory safety Measures.

UNIT: II

Data Analysis:

2.1 The mean, The median, significant numbers, confidence limits, precision and accuracy standard deviation.
2.2 Errors – Types of errors, correction of determinate errors.
Methods for improving accuracy – Rejection of data – Q test. Tests of significance – The F-test and the t-test. Presentation of tabulated data – Scatter diagram – Method of least squares – S.I. units.

Separation Techniques:

2.3 Precipitation – solvent extraction – chromatography – Types, Colum chromatography – Thin layer chromatography.
2.4 Paper chromatography – Paper electrophoresis – Ion exchange chromatography – Gas liquid chromatography.

UNIT III:

3.1 Dipolemoment 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 Measurements 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.

UNIT IV:

Gravimetric analysis and Thermo analytical methods:

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, 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.

UNIT: V

Visible Spectrophotometry and Colorimetry:

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.

BOOKS FOR STUDY:

1. Puri B.R. and Sharma L.R., (1989), Principles of Inorganic Chemistry, New Delhi, Sultan Chand.
2. Puri B.R., Sharma, L.R and Madan S. Pathania (2008), " Principles of Physical Chemistry" (35^{th} Edition), New Delhi, Shoban Lal Nagin Chand and Co.

BOOKS FOR REFERENCE:

1. Gopalan R, Subramanian PS and Rengarajan K (1993) 'Elements of Analytical Chemistry' Second revised edition, Sultan chand.
2. Gurdeep R. Chatwal, Sham K. Anand (2005) Instrumental methods of chemical analysis, Himalaya publishing house.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
SEMESTER V & VI
MAJOR CORE – 10: PRACTICAL PAPER IV/V

Hours: 8hrs./wk. **Code: U15CH5MCP10/**
Credits: 5 **U15CH6MCP11**

Course objectives:

Student acquires the skill in gravimetric analysis, preparation of organic compounds and analyses various organic compounds.

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.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (Autonomous), TIRUCHIRAPPALLI – 2
PG AND RESEARCH DEPARTMENT OF CHEMISTRY
SEMESTER V & VI
MAIN CORE – 13: MAIN PRACTICAL V/IV

Hours: 8hrs./wk. **Code: U15CH5MCP11/**
Credits : 5 **U15CH6MCP10**

Course objectives:

To expose the students to develop practical skills in few physical chemistry experiments.

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.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-2
B.SC. CHEMISTRY - SEMESTER VI
SBE 5: LABORATORY TECHNIQUES

Hours: 2 hrs./wk. **Code: U15CH6SBT05**
Credits: 2

Course objectives:

To understand the principles involved in various chromatographic techniques and various separation techniques. To gain knowledge about green techniques, adsorption and adsorption isotherms. To acquire knowledge about adulteration and food additive and methods to detect the adulterants and food additives. To develop skills in various experimental techniques.

UNIT I:
Chromatography - I
1.1 Types of chromatography, column chromatography, thin layer chromatography.
1.2 HPLC

UNIT II:

Chromatography - II
2.1 Paper chromatography, paper electrophoresis.
2.2 Ion exchange chromatography.

UNIT III:

Green Techniques:
3.1 Twelve principles of Green Chemistry – Green catalyst.
3.2 Microwave induced reaction, ultrasound assisted green synthesis.

UNIT IV
Adsorption:

4.1 Adsorption types and adsorption isotherms- Freudlich and Langmuir isotherms
4.2 Applications of Adsorption

UNIT V
Food Preparation
Food preservation: Principles and methods of food preservation. Causes of food spoilage. Various methods to detect the adulterants and food additives.

BOOKS FOR STUDY:

1. Srivastava A.K., Jain P.C., (2008), Instrumental approach to chemical Analysis, 4th Revised Edition, S. Chand, New Delhi.
2. Puri B.R., Sharma L.R., Madan .S. Pathania, (2014), 'Principles of Physical Chemistry', Vishal Publishing Co., Jalandhar.
3. Gopalan, R., Subramanian, P.S. and Rengarajan K., (2003) "Elements of Analytical Chemistry" 3rd edition, Sultan Chand and sons.
4. Ahluwalia, V.K. (2013) " A Text Book of Green Chemistry", Narosa Publishing House, New Delhi.

(For candidates admitted from 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2

SEMESTER VI

RESEARCH METHODOLOGY

Hrs – 2/Week **CODE: U15DS6SBT06**

CREDITS -2

General Objective:

Students get introduced to concept of research and to carryout research projects.

Unit I Introduction to research:

Definition - Types – Nature and Scope of Research – Research Design – Plagiarism

Unit II – Data Collection

Types – Primary and Secondary data collection – Data processing –Hypothesis Testing

Unit III – Plan and Execution

Methodology – Work Plan and Execution – Analysis –Interpretation - Documentation

Unit IV - Format and Presentation of Project Report Art

of writing and Structure of Project report – Viva Voce **Unit –**

V Project –

Project Work (Applying Real Expertise in the Project Work)

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 50marks.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. India

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
B.A. /B.Sc. / B.Com. / B.R.Sc./ B.C.A. DEGREE COURSE
LIFE ORIENTED EDUCATION
ETHICS – III: FAMILY AND CAREER DEVELOPMENT

HRS / Wk :1 **CODE: U13VE6LVE03**
CREDIT :1 **MARKS : 100**

OBJECTIVES:

- To help the students learn skills, knowledge, talent to lead a meaningful life.
- To help the students understand marriage life.
- To make the students learn skills of nurturing family and children.
- To make them aware of emotional intelligence and choose their carrier.

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: MOTHERHOOD

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", VaigaraiPathipagam.
4. Grose. D.N. (2000), "A text book on Value Education", Dominant Publishers.

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2
B.A./B.Sc/B.Com/B,R.SC/B.C.A DEGREE COURSES
LIFE ORIENTED EDUCATION CATECHISM – III:
LITURGY AND CHRISTIAN LIFE

HRS / WK :1 **CODE:U12VE6LVC03**
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 become a living witness 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. –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 – church – laws 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 for 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.

HOLY CROSS COLLEGE (AUTONOMOUS), TRICHIRAPALLI-2.
B.A/B.SC/B.COM/B.R.SC/B.C.A – DEGREE COURSES
LIFE ORIENTED EDUCATION
BIBLE STUDIES – III: ESSENCE OF CHRISTIAN FAITH

HRS / Wk : 1 **CODE: U12VE6LVBO3**
CREDIT :1 **MARKS : 100**

Objective:

- Prepare to practice Christian principles in family, church and society as a 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: MAARIAGE 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)
- Entertainments (I Cor 10: 23)

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
- Freedom of Options, Time Management, Work Ethics (I Peter 2: 11-25)

UNIT – V: ROLE IN CHURCH AND SOCIETY

- Man is the temple of God (I Cor 3: 11-17, 6: 19-20)
  Individual responsibility in Gospel work
- Church –Body of Christ (I Cor 12: 14-27)
- Unity (John 17: 20-23, Mat 10: 37-39, 16:24-26, Mark 13: 11-13)
- Discipleship (I & II Timothy, Titus)
- Social Responsibilities (Phil 2; 1-11, James 1: 27, 2: 14-17, 4: 17, 5: 14-15)

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.