HOLY CROSS COLLEGE (AUTONOMOUS)

Affiliated to Bharathidasan University
Nationally Accredited (3rd Cycle) with 'A' Grade by NAAC
College with Potential for Excellence.
Tiruchirappalli - 620002.

PG DEPARTMENT OF BIOCHEMISTRY
Programme: B.Sc. BIOCHEMISTRY
2018-2019

PO No.	Programme Outcomes *Upon completion of the B.Sc. Degree Programme, the graduate will be able to*
PO-1	To enable to get quality education in the areas of Biochemistry
PO-2	Acquire practical skills to gather information, assess, create and execute new ideas to develop entrepreneurial skills.
PO-3	Gain Proficiency in basic laboratory techniques and able to apply the scientific method on lab to land
PO-4	Inculcate a domestic and international perspective and be competent enough in the area of life sciences.
PO-5	Learn to recognize potential laboratory safety and conserve nature and the environment.

PSO No.	Programme Specific Outcomes *Upon completion of these courses the student would*
PSO-1	Will use current biochemical and molecular techniques and carry out experiments
PSO-2	Monitoring the changes in modern life styles leads to modern diseases
PSO-3	Develop skills in cultivation of plants.
PSO-4	Prepare them to do higher studies in other biological fields like Genetic, Entomology, Biological Oceanography etc
PSO-5	Developed critical thinking skills/laboratory techniques to be capable of designing, carrying out ,interpreting scientific experiments

HOLY CROSS COLLEGE (AUTONOMOUS)
PG DEPARTMENT OF BIOCHEMISTRY
(Students admitted from the year 2018 onwards)
B. Sc., BIOCHEMISTRY - COURSE PATTERN
2018-2019

Semester	Part	Course	Title Of The Course	Code	Hrs/ Weak	Credits	Marks
I	I	Language	Tamil Paper I/ Hindi Paper I / French Paper I	U15TL1TAM01/ U18HN1HIN01/ U16FR1FRE01	6	3	100
	II	English	English Paper I	U15EL1GEN01	6	3	100
	III	Major Core 1	Fundamentals for Biochemistry (theory cum lab)	U15BC1MCT01	7	5	100
		Allied -1 (Compulsory)	Food and Nutrition	U15BC1ACT01	4	4	100
		Allied -2 (Compulsory)	Nutrition and Dietetics Practicals	U15BC1ACP02	4	3	100
	IV	Environmental studies	Environmental studies	U18RE1EST01	1	1	100
		Value Education	Ethics/Bible Studies/Catechism	U15VE2LVE01/ U15VE2LVB01/ U15VE2LVC01	1	-	-
				Total	**29**	**20**	**600**
II	I	Language	Tamil Paper II/ Hindi Paper II/ French Paper II	U15TL2TAM02/ U18HN2HIN02/ U16FR2FRE02	5	3	100
	II	English	English Paper II	U15EL2GEN02	6	3	100
	III	Major Core 2	Chemistry of Biomolecules	U15BC2MCT02	5	5	100
		Major Core 3	Practicals – I (Analysis of Biomolecules)	U15BC2MCP03	5	4	100
		Allied -3 (Compulsory)	Dietetics	U15BC2ACT03	4	3	100
	IV	Skill Based Elective–1	Soft Skill Development	U15RE2SBT01	2	2	100

		Skill Based Elective–2	Rural Enrichment and Sustainable Development	U18RE2SBT02	2	2	100
		Value Education	Ethics/Bible Studies/Catechism	U15VE2LVE01/ U15VE2LVB01/ U15VE2LVC01	1	1	100
		Internship/Field work / Field project (Extra credit)		U18SP2ECC01		2	100
				Total	**30**	**25**	**900**
III	I	Language	Tamil Paper III / Hindi Paper III / French Paper III	U15TL3TAM03/ U15HN3HIN03/ U16FR3FRE03	6	3	100
	II	English	English Paper III	U15EL3GEN03	6	3	100
	III	Major Core -4	Analytical Biochemistry	U15BC3MCT04	5	5	100
		Major Core- 5	Human Physiology	U15BC3MCT05	5	5	100
		Allied 4 (Optional)	Microbiology - General	U15BC3AOT04	4	3	100
	IV	Skill Based Elective-3	Pain Relief Formulations & Cosmetics	U15BC3SBP03	2	2	100
		Gender Studies	Gender Studies	U15WS3GST01	1	1	100
		Value Education	Ethics/Bible Studies/Catechism	U15VE4LVE02/ U15VE4LVB02/ U15VE4LVC02	1	-	-
				Total	**30**	**22**	**700**
IV	I	Language	Tamil Paper IV / Hindi Paper IV / French Paper IV	U15TL4TAM04/ U15HN4HIN04/ U16FR4FRE04	5	3	100
	II	English	English Paper IV	U15EL4GEN04	6	3	100
	III	Major Core-6	Enzymes	U15BC4MCT06	5	5	100
		Major Elective 1	Cell Biology/ Biophysical Chemistry	U15BC4MET01/ U15BC4MET02	5	5	100
		Allied -5 (Optional)	Microbiology - Applied	U15BC4AOT05	4	4	100
		Allied- 6 (Optional)	Microbiology Practicals	U15BC4AOP06	4	3	100
	IV	Value	Ethics/Bible	U15VE4LVE02/ U15VE4LVB02/	1	1	100

		Education	Studies/Catechism	U15VE4LVC02			
		Internship/Field work / Field project (extra credit)		U18SP4ECC01		2	100
				Total	**30**	**26**	**800**
V	III	Major Core - 7	Intermediary Metabolism	U15BC5MCT07	5	4	100
		Major Core - 8	Molecular Biology	U15BC5MCT08	5	4	100
		Major Core - 9	Immunology	U15BC5MCT09	5	4	100
		Major Core - 10	Practical-II (Enzymes and Analytical Techniques)	U15BC5MCP10	5	4	100
		Major Elective-2	Drug Biology/ Biostatistics	U15BC5MET01/ U15BC5MET02	5	5	100
		Non Major Elective-1	First Aid Management/Clinical Biochemistry and Microbiology	U15BC5NMT01/ U15BC5NMT02	2	2	100
		Skill Based Elective 4	Food Preservation Technology	U15BC5SBP04	2	2	100
		Value Education	Ethics/Bible Studies/Catechism	U15VE6LVE03/ U15V64LVB03/ U15VE6LVC03	1	-	
				Total	**30**	**25**	**700**
VI	III	Major Core - 11	Genetic Engineering	U15BC6MCT11	6	5	100
		Major Core - 12	Clinical Biochemistry	U15BC6MCT12	6	5	100
		Major Core -13	Practical-III (Clinical & Immunochemical analysis)	U15BC6MCP13	6	5	100
		Major Elective-3	Plant Biochemistry/ Basics of Bioinformatics/ Pharmaceutical Chemistry and Pharmacognosy	U15BC6MET01/ U15BC6MET02/	5	5	100

				U15BC6MET03			
	IV	Non-major Elective -2	Nutrition and Dietetics/ Home Management	U15BC6NMT01/ U15BC6NMT02	2	2	100
		Skill Based Elective 5	Tools for Bioinformatics	U19BC6SBT05	2	2	100
		Skill Based Elective 6	Research Methodology	U15DS6SBT06	2	2	100
		Value Education	Ethics/Bible Studies/Catechism	U15VE6LVE03/ U15V64LVB03/ U15VE6LVC03	1	-	-
	V	Extension activity	RESCAPES-Impact Study on students.	U15RE6ETF01	-	1	100
		Internship/Field work / Field project (extra credit)		U18SP6ECC01		2	100
				Total	**30**	**29**	**900**
				TOTAL	**179**	**147**	**4600**

For Candidates admitted from 2015 onwards)

HOLY CROSS COLLEGE (Autonomous), Tiruchirappalli - 620002.

PG & RESEARCH DEPARTMENT OF TAMIL

First Year - Semester – I

Course Title	தமிழ்த்தாள் - 1
Total Hours	**90**
Hours/Week	**6 Hrs Wk**
Code	**U19TL1GEN01**
Course Type	**Theory**
Credits	**3**
Marks	**100**

General Objectives:

தமிழ் இலக்கியப் பரப்பையும், பாரம்பரியத்தையும் அறிமுகப்படுத்துதல்.

- To find out the ways to handle the Tamil language effectively and productively.
- To introduce the tradition and grammar of Tamil language.
- To encourage the creative development.
- Creating curiosity to live a better life .
- Helps in creating healthy thoughts.

Course Objectives:

CO No.	Course Objectives
CO-1	தமிழ் இலக்கியப் பரப்பையும்,விழுமியங்களையும் அறிமுகப்படுத்துதல்.
CO-2	தமிழ் மொழியின் தொன்மை, தாய்மொழிப்பற்று, தன்னம்பிக்கை சூழல்களை எதிர்கொள்ளும் திறன் முதலியவற்றை அறிந்து கொள்வர்.
CO-3	கவிதையின் வாயிலாக அன்பு உணர்வினை வளர்க்கச் செய்தல்.

CO-4	கலைச்சொற்கள் வாயிலாக பிறமொழிச் சொற்களை ஆராயும் தன்மைப் பெறுவர்.
CO-5	படைப்பாற்றல் திறனை வளர்த்துக்கொள்வர்.

அலகு:1 செய்யுள்

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

Key Words (Extra Reading)

1. ந. காமராசு கவிதைகள்
2. தமிழன்பன் கவிதைகள்

அலகு:2 செய்யுள் **18Hrs**

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

Key Words (Extra Reading)

1. ந.முத்துக்குமார் கவிதைகள்
2. செனட்ரியூ கவிதைகள்

அலகு:3 **18Hrs**

தமிழ் இலக்கிய வரலாறு

தமிழாய்வுத்துறை வெளியீடு 20-ஆம் நூற்றாண்டு (தற்காலம்)

Key Words (Extra Reading)

தமிழ் இலக்கிய வரலாறு -மு.வரதராசன்

அலகு:4

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

அலகு:5

பொதுப்பகுதி - கலைச்சொற்கள் **18Hrs**

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

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	To evaluate the importance of Tamil in terms of patriotism, self- discipline and unity.	PSO 1	U
CO-2	To evaluate poems and enrich knowledge in religious faith, preserving nature, social atrocities against women and resistance.	PSO 2	E
CO-3	To enhance the creative spirit among the youth through the present Tamil literatures	PSO 2	AN
CO-4	To be aware about human rights and humanism through short stories	PSO 3	AP
CO-5	To learn the culture of different languages	PSO 4	U

பார்வை நூல்கள் **பாட நூல்கள்**

செய்யுள் - தமிழாய்வுத்துறை வுத்துறை வெளியீடு

தமிழ் இலக்கிய வரலாறு - தமிழாய்வுத்துறை வெளியீடு

சிறுகதைத் தொகுப்பு - தமிழாய்வுத்துறை வெளியீடு

கலைச்சொற்கள் - தமிழாய்வுத்துறை வெளியீடு

(For the candidates admitted from June 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-620002

DEPARTMENT OF HINDI

SEMESTER – I

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

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

Course Objectives (CO):

The learner will be able to:

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

UNIT – I **(18 Hours)**

1. Aatma Nirbharatha
2. Idgah
3. Sangya

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

UNIT- II **(18 Hours)**

1. Mahatma Gandhi

2. Vusne Kaha Tha

3. Sarva Naam

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

UNIT- III **(18 Hours)**

1. Sabhyata Ka Rahasya
2. Karva Va Ka Vrat

3. Visheshan

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

UNIT- IV **(18 Hours)**

1. Bharat Ek Hai

2. Sharandhata

3. Kriya

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

UNIT- V **(18 Hours)**

1. Mitrata

2. Vapasi

3. Ling Aur Vachan

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

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

Course Outcomes:
The learner will be able to:

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

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

Reference Books :

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

(For candidates admitted 2016 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2

DEPARTMENT OF FRENCH

SEMESTER I

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

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

Course Objectives(CO):

The learner will be able to

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

Unit 1 Parcours d'initiation ;Vouscomprenez (15Hours)

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

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

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

Unit 2 Autravail! (15Hours)

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

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

Unit 3 Onsedétend! (15Hours)

La conjugaison des verbes irréguliers, le future proche, les pronoms après une préposition – les loisirs

– proposer, accepter, refuser, demander une explication – première approche de l'espace de France, repérages de quelques lieux de loisirs

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

Unit 4 Racontez-moi ! ; Bonvoyage! (30Hours)

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

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

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

Unit 5 Bonappétit! (15Hours)

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

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

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

TEXT BOOKS :

ECHO A1 – METHODE DE FRANÇAIS & CAHIER PERSONNEL D'APPRENTISSAGE
Authors:J.GirardetandJ.PécheurPublica
tion:CLÉINTERNATIONAL,2013

Books for Reference:

La Conjugaison – Nathan
French made easy – Beginners level - Goodwill
Publishing House Je parle français I –Abhay Publications
Le français avec des jeux et des activités
- I Langue et la civilisation – I – Mauger
Bleu Note : Texts given in the Extra
Reading (Key Words) must
betestedonlythrough

(for candidates admitted from June 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS), Tiruchirapalli – 620002

PG AND RESEARCH DEPARTMENT OF ENGLISH

I YEAR UG – SEMESTER I

PART II – ENGLISH 1 - GENERAL ENGLISH I

HOURS : 6 **CODE : U15EL1GEN01**

CREDIT : 3 **MARKS: 100**

OBJECTIVES

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

UNIT I - I, ME, MYSELF

Listening for **s**pecific information in instructions and directions

Speaking about oneself, family and friends, likes, dislikes, strengths, weaknesses, profession, talents, emotions, feelings, incidents, reactions, opinions, views, aim, vision.

Reading for comprehension of routine work.

Writing -Paragraph guided

Grammar- Articles, Prepositions, Punctuation

Vocabulary-Meanings, Synonyms, Antonyms

Composition –GuidedCreative writing

TEXTS

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

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

UNIT II -MY FAMILY AND FRIENDS

Listening to identify the persons/ places/ things from descriptions

Speaking -Describing incidents, favorite places, traits of a person, analyzing the nature of a person.

Reading to get specific information and to analyze characters

Writing -Letters (personal),paragraphs-family profile and history

Grammar -adjectives and verbs

Vocabulary-synonyms and antonyms in context

Composition - Guided paragraph

TEXTS

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

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

UNIT III -THE WORLD AROUND ME

Listening To identify specific information

Speaking –Discussing and expressing opinions

Reading To infer meaning

Writing Descriptive and Diary writing

Grammar Uses of 'be' Verbs – subject verb concord

Vocabulary Coining new words with Prefix and suffix- converting one part of speech to another

Composition - Essay writing

TEXTS

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

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

UNIT IV - MY CONCERN AND RESPONSIBILITIES

Listening to short speeches and getting main concern- Global comprehension

Speaking Expressing opinions, concerns and responsibilities

Reading To detect one's perspective

Writing Debate and Dialogue

GrammarSentence patterns (5 basic types)

VocabularyAppropriate words in the context ,coinage of new words , use of phrases

Composition-Imaginative writing

TEXTS

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

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

UNIT V - MY PROFESSIONAL WORLD

Listening to short profile to get details –global comprehension

Speaking Discussion on secrets of success learnt from success stories

Reading to infer meaning – to trace the development and analyze the ratio of development

Writing resume and E-mail writing

Grammar- Four Types of sentences

Vocabulary-Idioms and phrases- meaning

Composition – Formal and imaginative writing

TEXTS

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

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

PRESCRIBED BOOK:

English for Communication –PoGo publication Trichy

(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

First Year - Semester – I

COURSE TITLE	**MAJOR CORE 1 – FUNDAMENTALS OF BIOCHEMISTRY**
TOTAL HOURS	**75**
HOURS/WEEK	**7 HRS/WK**
CODE	**U15BC1MCT01**
COURSE TYPE	**THEORY**
CREDITS	**5**
MARKS	**100**

General objective:

The student will be able to apply, analyze and evaluate the different bonds present in Biomolecules.

Course Objectives:

CO No.	Course Objectives
CO-1	Understand and analyze the type of bonds present in Biomolecules, and implement the knowledge in the sustenance of living cells
CO-2	Understand the types of isomerism exhibited by the organic compounds and apply its role in structural organization of biomolecules.
CO-3	Understand the exchange of gases occurring in our body and apply the principles of various electrochemical techniques in the concentration measurements.
CO-4	Understand the laws of thermodynamics and different types of reactions and apply their role in cellular functions
CO-5	Understand and apply the laboratory hygiene and safety aspects to be followed while working in laboratory and demonstrate the basic technique to be adopted in lab like preparation of solution, titrating and colorimetry.

UNIT: I

CHEMICAL BONDING **15 Hrs**

Ionic bond formation and factors favoring the formation, lattice energy, Born- Haber cycle & characteristics. Covalent bond – Formation of single and multiple bonds -characteristics – VSEPR theory – shapes of simple molecules. Hydrogen bond – Nature, type and properties, effect on compounds. Applications of hydrogen bond. Importance of bonds in biomolecules:

glycosidic linkages in carbohydrates, non covalent interactions that determine the three-dimensional structures of proteins and nucleic acids - Hydrogen bonding, hydrophobic interaction, ionic bonds, and Vander Waals force.

(Extra reading/key words: Protein Structure, Nucleic acid structure)

UNIT: II **15 Hrs.**

STEREOCHEMISTRY OF ORGANIC COMPOUNDS

Different types of isomerism – A general idea. Tautomerism – Keto-enol, Amido – Imido, Lactam – lactim and Nitro –aci nitro. Geometrical isomerism – Maleic and fumaric acids. Optical Isomerism – Elements of symmetry, isomerism of compounds containing asymmetric carbon atom – Lactic and tartaric acids, Resolution, Racemisation, Autoracemisation, Asymmetric synthesis, Walden Inversion, Configuration – D and L rotations, R and S notations.

(Extra reading/key words: Isomers of Biomolecules)

UNIT: III **15 Hrs**

GASEOUS STATE

Dalton's law of partial pressure – Henry's law – Gas analysis in biological systems – pCO_2& pO_2 Gaseous exchanges in the lungs arterial & ventral capillaries.

ELECTRO CHEMICAL TECHNIQUES

Principles of ECT – Reference electrodes, measurement of pH by glass electrode. Oxygen electrode - Principle, operation of a Clark electrode and application of oxygen electrode.

(Extra reading/key words: Hypoxia, biochips, acidemia)

UNIT: IV **15 Hrs**

BASIC THERMODYNAMICS

First and second law of thermodynamics.Heat and work – various forms of energy,terminologies viz.,heat, process, heat capacity, enthalpy, entropy and heat content, isothermal, adiabatic, reversible and irreversible processes, free energy, molar heat capacity and relation between Cp and Cv.

CHEMICAL KINETICS: Rate, rate law, specific rate constant – order as applied to first, second, zero and fractional order reactions, molecularity.

(Extra reading/key words: Fossils and nuclear fuels)

UNIT: V **15 Hrs**

BIOCHEMICAL CALCULATIONS & LAB SAFETY

Definitions of pH& pOH – buffer solutions – Preparations and uses - buffer action – Henderson equation –pH of body fluids – buffers in body fluids – measurement of pH by indicator. Concentration expression – Normality, Molarity, Molality & Mole fraction. Principles of titrimetric analysis – acid base, redox & Precipitation titrations. Laboratory hygiene & safety – Corrosive, flammable, explosive, carcinogenic & poisonous chemicals – storage handling & disposal – proper maintenance of reagent antidotes – first aid.

(Extra reading/key words: Hazardous wastes)

Practical Work: 2 X15= 30 Hrs

1. Weighing and making up of solution
2. Calculation of different strengths of solution.
3. Preparation of standard curve
4. Estimation of ferrous ion by titrimetric method.

Note: Extra Reading/ Key Words are only for internal testing (Seminar / Assignments)

Course Outcomes

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Recognize the structure and function of carbohydrates, lipids, amino acids, proteins, nucleotides, and nucleic acids.	PSO 1	U
CO-2	Recognize and draw structural isomers (constitutional isomers), stereoisomers including enantiomers and diastereomers, racemic mixture, and meso compounds.	PSO 2	U
CO-3	explain the relationship between kinetic energy and temperature of a gas; between temperature and the velocity of a gas; and between molar mass and the velocity of a gas	PSO 2	R
CO-4	discuss the three laws of thermodynamics and their applications	PSO 3	An
CO-5	Define solubility, percent concentration, molarity, mole fraction, and molality.	PSO 4	An

TEXT BOOKS:

1. P.L. Soni H.M. Chawla [1994] Text Book of Organic Chemistry, Sultan Chand and sons, New Delhi.

BOOKS FOR REFERENCE:

1. P.L. Soni [1994] – Text Book of Inorganic Chemistry Sultan Chand and sons, New Delhi.
2. Upadhayay A., Upadhayay K & Nath N. (1993) Biophysical chemistry 1st edn., Himalaya Publishing House.
3. Bahl. B.S., Tuli. G.D. and Arun Bahl : Essentials of physical chemistry.
4. Murray R.K. Granner D.K. Mayes P.A Rodwell V.W. Harper's Biochemistry – 24th edn., A Lange medical Book – Prentice Hall International Inc.,

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(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

First Year - Semester – I

COURSE TITLE	**ALLIED 1 (COMPULSORY) - FOOD AND NUTRITION**
TOTAL HOURS	**60**
HOURS/WEEK	**4 HRS/WK**
CODE	**U15BC1ACT01**
COURSE TYPE	**THEORY**
CREDITS	**4**
MARKS	**100**

General objective:

The student learns about the nutritional status of an individual and the importance of various food constituents.

Course Objectives

CO No.	Course Objectives
CO-1	Understand and apply the concept of nutritional foods and status for good health
CO-2	Understand the categorization and assessment of nutritional foods status and national nutrition institutions roles.
CO-3	Understand the differential functions of nutritional food constituents and deficiency states.
CO-4	Analyze the minimum requirements of macro- and micro-nutrition and also mineral values.
CO-5	Understand and analyze the function of vitamin and their comparison of direct and indirect calculation in the energy requirements.

UNIT: I

NUTRITIONAL STATUS **12 Hrs**

Introduction to nutrition – Food as a source of nutrient, functions of food, definition of nutrition, classification of nutrients. Interrelationship between Nutrients and Health - visible symptoms of good health. Loss of nutrient value – light, heat, leaching of nutrients

COMMUNITY NUTRITION

Assessment of Nutritional Status – Anthropometry, Malnutrition – Definition, causes of Malnutrition. International organizations, National agencies in community nutrition - FAO, WHO, UNICEF and CARE, ICDS, Midday meal programme, Role of National Institutions- ICMR, CSIR, NIN, CFTRI. ***(Extra reading/key words: Malnutrition in Indian Children)***

UNIT: II

FOOD CONSTITUENTS **12 Hrs**

Carbohydrates – kinds, function, sources, requirements, deficiency. Fibres – Definition, classification, sources, role of fiber in human nutrition.

Fats - kinds, function, sources, RDA. Saturated and unsaturated fatty acids. Cholesterol deficiency (phyrnoderma).

Proteins – Kinds, function, sources, evaluation of protein quality (PER, BV, and Nbalance). Deficiency state – Kwashiorkor and Marasmus.

(Extra reading/key words: Applications of nanostructured materials in food science)

UNIT: III

MINERALS **12 Hrs**

Mineral Nutrition: **Macro Nutrients** – Calcium, Phosphorous Magnesium, Sodium, Potassium, Sulphur, Chlorine. **Micro Nutrients** – Iron, Iodine, Copper, Cobalt, Zinc, Manganese, Fluorine, Selenium, Bromine, Molybdenum- their distribution, sources, absorption, metabolism, functions, deficiency and requirements.

WATER-Importance, distribution, functions, sources, water balance, impairment, dehydration, edema.

(Extra reading/key words: Health hazards of drinking demineralized water)

UNIT: IV **12 Hrs**

VITAMINS

Vitamins – definition, classification (structure not included) A, D, E, K, C, B complex (B1, B2, B6, B12, Folic acid, Biotin, Choline) - sources, distribution, absorption, metabolism, function, requirement, deficiency conditions and allowance. Hypervitaminosis A and D.

(Extra reading/key words: clinical applications of vitamins)

UNIT: V **12 Hrs**

ENERGY

Definition of Calorie and joule, measurement of Calorific values of foods, physical, physiological fuel value. Basal metabolism – (BMR), factors affecting BMR, specific dynamic action of foods, energy needs of the body measurement of energy balance of the body. Direct and indirect calorimetry. Calculation of energy requirement, the ideal proportion of calories from protein, carbohydrates and fats. ***(Extra reading/key words: Application of Photoelectric Colorimeter)***

Note: Extra Reading/ Key Words are only for internal testing (Seminar / Assignments)

Course Outcomes

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Demonstrate the knowledge and understanding of the fundamental concepts in food and nutrition.	PSO 1	U
CO-2	assess the nutritional status of individuals in various life-cycle stages	PSO 2	R
CO-3	Determine nutrition-related conditions and diseases by applying knowledge of metabolism and nutrient functions, food sources, and physiologic systems.	PSO 2	An
CO-4	Utilize the knowledge from the physical and biological sciences as a basis for understanding the role of food and nutrients in health and disease processes.	PSO 3	R
CO-5	Describe the differences and relationships between food, diet and nutrients and understand how food nourishes the body**.**	PSO 4	An

TEXT BOOK:

1. Swami Nathan, M. (1985) Advanced Text Book on Food and Nutrition. 2nd Edn. The Bangalore printing and publishing Co., Ltd.

BOOKS FOR REFERENCE:

1. Davidson. S.Passmore, R.Brook JF and Truswell (1985) Human Nutrition and Dietetics. The English Language Book society, Living Stone. (Latest Edition)

2. David, S. Robinson, Food Biochemistry and Nutritional Value. Longman Scientific and Technical, John Wiley and sons, Inc., New York.

3. Raheena Begum, M. (1989) A Text Book of Foods, Nutrition and Dietetics Sterling Publishers Pvt., Ltd., New Delhi.

4. Shynbhangini, A. Joshi, (1992) Nutrition and Dietetics, Tata McGraw- Hill Publishing Co., Ltd., New Delhi.

5. Sue Rodwell Williams, (1985), "Nutrition and Diet Therapy" The C.V Mosby Saint Louis.

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(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

First Year - Semester – I

COURSE TITLE	**ALLIED 2(COMPULSORY):NUTRITION & DIETETICS PRACTICALS**
TOTAL HOURS	**60**
HOURS/WEEK	**4 HRS /WK**
CODE	**U15BC1ACP02**
COURSE TYPE	**PRACTICAL**
CREDITS	**3**
MARKS	**100**

General Objective:

This course will provide students with an understanding of Principles of nutrition and dietetics.

Course Objectives:

CO No.	Course Objectives
CO-1	Apply the knowledge of physical and biological sciences for understanding the role of food and nutrients in health and disease processes.
CO-2	Apply the knowledge of dietetics in providing nutrition counseling and education to individuals, groups, and communities
CO-3	Evaluate nutrition information based on scientific reasoning for clinical, community, and food service application.
CO-4	Apply technical skills, knowledge of health behavior, clinical judgment, and decision-making skills when assessing and evaluating the nutritional status of individuals and communities and their response to nutrition intervention.
CO-5	Analyze strategies for food access, procurement, preparation, and safety for individuals, families, and communities.

I. **QUANTITATIVE ANALYSIS:**

Estimation of Phosphorous, Calcium and Magnesium in milk.

Estimation of Iron in Greens.

Acidity in curds.

Standardization of common food preparations

Estimation of the amount of energy in the food sample

II. **ENERGY CONTENT IN FOOD**

Wet combustion

Bomb Calorimetry

III **DAILY FOOD GUIDE**

Basic Five Food Groups

Foods costing

Food adulteration

IV. **PRACTICAL RELATED EXPERIENCE:**

1. Preparation and weaning foods for infants.
2. Planning, preparing and evaluating menu for preschool age, school age, Adolescence and adult. Planning, preparing and evaluating menus for Special conditions like pregnancy, lactation and old age.
3. Modifying normal diets and preparation of soft, clear liquid diets.
4. Planning, preparation, serving and evaluation of the diets for
   a. Obesity and underweight
   b. Diabetes mellitus
   c. Diarrhoea, Constipation
   d. Peptic Ulcer
   e. Atherosclerosis, hypertension
   f. Hepatitis, Cirrhosis
   g. Nephritis
   i. Low and medium cost diets for deficiency diseases protein, Energy, iron, Vitamin A.

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Describe the food choices to improve the nutritional status of individuals, groups and/or populations	PSO 1	R

CO-2	Evaluate nutrition information based on scientific reasoning for clinical, community, and food service application	PSO 2	An
CO-3	Implement nutritional counseling and education to individuals, groups, and communities throughout the lifespan using a variety of communication strategies**.**	PSO 2	An
CO-4	Analyze the nutritional constituents of food products.	PSO 3	An
CO-5	Describe the differences and relationships between food, diet and nutrients and understand how food nourishes the body**.**	PSO 4	U

TEXT BOOK:

1. Swaminathan M. (2000). Essentials of Food and Nutrition, Bangalore Printing and Publishing Co. Ltd. Bangalore.

BOOKS OF REFERENCE:

1. Bhavana Sabarwal (1999). Principles and Practices of Dietetics, Ajay Verma Commonwealth Publishers.

2. Mike Espy (1996). Nutrition, Surabhi Publishers Jaipur.

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(For candidates admitted from 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2

/B.Sc./B.Com/B.R.SC/B.C.A/ B.B.A DEGREE EXAMINATION

SEMESTER I / V

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

General Objectives:

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

Course Objectives:

The student will be able to

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

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

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

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

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

Unit III – Environmental Pollution **3hrs**

Causes, effects and control of water, and air pollution – global warming – ozone depletion – nuclear hazards. Population growth at national and global level
World food production – effects of modern agriculture on land ecosystems – GMOs and related issues .Environmental pollution and diseases – malaria, chikungunya

Extra reading (Key Words): *Environmental factors affecting human behavior*

Unit IV – Disaster Management **3hrs**

Bomb Threat – Earthquake – Explosion – Hazardous material spill / release – campus shooting – Terrorist incidence – Financial emergency – a sudden health emergency, unexpected loss of income, death in the family or other family emergency. Rent in arrears and risk of eviction. Natural disasters

Extra reading (Key Words): *Causative factors of any 2 disasters*

Unit V – Environment and Social Issues
3hrs

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

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

Course Outcomes:

1.Explain the importance of the various natural resources.

2. Analyze the concepts, structure and types of ecosystem. Add note on thebiodiversity concepts

3.Evaluate the effect of the different types of pollution

4.Explains the various disaster management.

5.Discuss the need of environment and the social issues

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.

Nebel, B.J. and Wright, R.T.(1996). Environmental Science, Prentice Hall, New Jersey

Odum, E.P.(2008) Fundamentals of Ecology.Indian Edition. Brooks / Cole.

Sharma, B.K. and Kaur (1997). Environmental Chemistry. Goel Publishing House, Meerut.

Sharma, B.K. and Kaur, (1997). An Introduction to Environmental Pollution. Goel Publishing House, Meerut.

Sinhe, A.K. Boojh, R. and Vishwanathan, P. N. (1989). Water Pollution Conservation and Management, Gyansdaya Prakashan, Nainital.

(For Candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI -2

B.A/B. Sc /B.Com/ B.C.A-DEGREE COURSES

LIFE ORIENTED EDUCATION

CATECHISM – I: GOD OF LIFE

HRS / WK : 1

CREDIT : 1 **CODE: U15VE2LVC01**

MARKS : 100

OBJECTIVES:

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

UNIT – I: CREATION AND COVENANT

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

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

UNIT – II: GOD OF THE PROPHETS

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

UNIT – III: GOD OF WISDOM

God experience through wisdom Literature, its origin and growth

UNIT – IV: SYNOPTIC GOSPELS

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

UNIT – V: LUKE'S GOSPEL

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

REFERENCES:

1. Catechism of the Catholic Church published by Theological Publications in India for the Catholic Hierarchy of India, 1994

2. The Holy Bible Revised Standard Version with Old and New Testaments Catholic Edition for India.
3. Vaazhvin Vazhiyil – St. John's Gospel- Fr. Eronimus
4. God's Word nourishes A catholic approach to the Scriptures Dr. Silvano Renu Rita, O.C.V. STD and Dr. Mascarenhas Fio S.J. D.mim. Catholic Bible I

5. Documents of Vatican II – St. Paul's Publications, Bombay 1966.

(For Candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2

B.A/B. Sc/B.Com /B.C.A-DEGREE COURSES
LIFE ORIENTED EDUCATION
ETHICS – I: RELIGIONS AND VALUE SYSTEMS

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

CREDITS : 1 **MARKS : 100**

OBJECTIVES:

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

UNIT – I: RELIGION

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

UNIT – II: DIFFERENT RELIGIONS

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

UNIT – III: UNITY OF RELIGION

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

UNIT – IV: FUNDAMENTALISM, COMMUNALISM AND SECULARISM

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

UNIT – V: VALUE SYSTEMS

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

REFERENCES:

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

(For Candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE(AUTONOMOUS) TRICHIRAPALLI-2.

B.A/B.Sc/B.Com /B.C.A-DEGREE COURSES

LIFE ORIENTED EDUCATION

BIBLE STUDIES – I: NEW TESTAMENT

HRS / WK : 1 **CODE: U15VE2LVBO1**

CREDIT : 1 **MARK:100**

OBJECTIVE:

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

UNIT – I: BIBLE – THE WORD OF GOD

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

UNIT – II: MINISTRY OF JESUS

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

UNIT – III: CHURCH – BIRTH AND GROWTH

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

1. Comparison between early Church and present Church.

UNIT – IV: DISCIPLES AND APOSTLES

1. Mother Mary (Mother of Jesus) (Luke 1: 27-35, John 2: 1-12, 19:35, Acts 1: 13-14)
2. St. Peter (Luke 22:1-7,Acts 2:1-41,12:1-17)
3. St. Andrew (Mat 4:18-20,John 1:35-42,6:1-14)
4. St. Stephen (Acts 6,7)

5. St. Paul (Acts 8,9,14,17,26 and 28)
6. St. Thomas (John 20:24-31)

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

1. I & II Corinthians
2. Galatians
3. Ephesians
4. Philippians
5. I & II Timothy
6. Titus

REFERENCES:

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

(For Candidates admitted from 2015 onwards)

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

PG & RESEARCH DEPARTMENT OF TAMIL

First Year - Semester – II

Course Title	தமிழ்த்தாள் - **II**
Total Hours	**75**
Hours/Week	**5 Hrs Wk**
Code	**U19TL2GEN02**
Course Type	**Theory**
Credits	**3**
Marks	**100**

General Objectives:

இறைச்சிந்தனை வழி மாணவர்களை ஒருமுகப்படுத்துதல்.

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

Course Objectives:

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

அலகு:1செய்யுள் **15 Hrs**

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

key Words (Extra Reading)

1. அற்புதத்திருவந்தாதி - காரைக்கால் அம்மையார்
2. திருவாய்மொழி - நம்மாழ்வார்

அலகு:2செய்யுள் **15 Hrs**

6. மீனாட்சியம்மை பிள்ளைத்தமிழ் - குமரகுருபரர்
7. இரட்சணிய யாத்திரிகம் (சிலுவைப்பாடு) - எச்.ஏ.கிருட்டிணப்பிள்ளை
8. வேதநாயக சாஸ்திரியார் பாடல்கள் - - வேதநாயசாஸ்திரியார்
9. நபிகள்நாயக மான்மியமஞ்சரி - செய்குதம்பிப்பாவலர்

key Words (Extra Reading)

1. நந்திக்கலம்பகம்
2. குற்றாலக்குறவஞ்சி –திரிகூடராசப்பக்கவிராயர்

அலகு:3 **15 Hrs**

தமிழ் இலக்கிய வரலாறு –

பல்லவர்காலம்

நாயக்கர்காலம்

அலகு:4 **15Hrs**

படைப்பிலக்கியம் - புதினம்

கல்கி - பார்த்திபன் கனவு

key Words (Extra Reading)

வில்லோடு வா நிலவே – வைரமுத்து

அலகு:5 **15 Hrs**

கடிதம் எழுதுதல்

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

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	to evaluate the religious works and the growth of religious literature	PSO 1	U
CO-2	to bring-out the similarities in religious teachings and to ensure unity	PSO 2	AN
CO-3	to learn about the personalities about the Kings and their personalities	PSO 2	AP
CO-4	to enrich literature by reading, increase creativity and strengthen the vocabulary	PSO 3	U
CO-5	To learn the art of writing	PSO 4	U

பார்வை நூல்கள் **கடித இலக்கியம**

செய்யுள் - தமிழாய்வுத்துறை வெளியீடு

தமிழ் இலக்கிய வரலாறு - தமிழாய்வுத்துறை வுத்துறை வெளியீடு

நாவல் கல்கி - பார்த்திபன் கனவு

. - பயிற்சி ஏடு

(For the candidates admitted from June 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-620002

DEPARTMENT OF HINDI

SEMESTER – II

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

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

Course Objectives (CO):

The learner will be able to:

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

UNIT – I **(15 Hours)**

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

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

UNIT- II **(15 Hours)**

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

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

UNIT- III **(15 Hours)**

1. Ashad ka ek dhin
2. Gaban
3. Kriya Visheshan

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

UNIT- IV **(15 Hours)**

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

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

UNIT- V **(15 Hours)**

1. Ashad ka ek dhin
2. Gaban
3. Yojak(Samuchaya Bhodak) Aur Dhyodak (Vismyadhi Bhodak) *Extra Reading (Key Words): Poos Ki Raat, Shatranj Ke Khiladi*

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

Course Outcomes:

The learner will be able to:

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

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

Reference Books :

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

Manak Hindi Vyakaran: ChandraBhan ‘Rahi’;SreyaPrakashan, Illahabad

(For candidates admitted 2016 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2

DEPARTMENT OF FRENCH

SEMESTER II

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

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

Course Objectives (CO):

The learner will be able to

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

Unit 1 Quellejournée! (15Hours)

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

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

Unit 2 Qu'on est bienici! (12Hours)

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

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

Unit 3 Souvenez-vous ? (12Hours)

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

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

Unit 4 Ons'appelle ? (12Hours)

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

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

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

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

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

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

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

TEXT BOOKS :

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

Books for Reference:

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

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

(for candidates admitted from June 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS), Tiruchirapalli – 620002

PG AND RESEARCH DEPARTMENT OF ENGLISH

I YEAR UG – SEMESTER I

PART II – ENGLISH 2 - GENERAL ENGLISH II

HOURS : 6 **CODE : U15EL2GEN02**

CREDIT : 3 **MARKS: 100**

OBJECTIVES

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

UNIT I – SELF

Listening- Specific information from demonstration and instructions, transfer of information.

Speaking - Sharing expressions, dreams and expressing opinions.

Reading -Skimming and Scanning for specific information, reading for local comprehension.

Writing - Story Writing

Grammar - Articles and Sentence Pattern

Vocabulary - Meanings, Synonyms, Antonyms

Composition - Transfer of information: Paragraph to Bar graph/pie chart

General Essay - Courage is the key to success

TEXTS

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

UNIT II – STRENGTHS

Listening - Listening to a process

Speaking - Telephone Etiquette

Reading - Loud reading with pause, intonation and expression in dialogue form

Writing - Writing about oneself (strengths& weaknesses, Have's & Have not's)

Grammar- Subject verb agreement, Prepositions

Vocabulary- One word substitute in the context

Composition- Letter Writing - informal letters

General essay – A bird in hand is worth two in bush.

TEXTS

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

UNIT III - POSITIVE SHORTCOMINGS

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

TEXTS

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

UNIT IV POTENTIALS

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

TEXTS

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

UNIT V ACHIEVEMENTS

Listening - Listening to comparisons and arguments
Speaking - Performance
Reading - In-depth reading
Writing - Script writing of story to play

Grammar - Question Tags
Vocabulary - Homophones
Composition - Essay Writing
General essay - The reward of hard work.

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

(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

First Year - Semester – II

COURSE TITLE	**MAJOR CORE 2: CHEMISTRY OF BIOMOLECULES**
TOTAL HOURS	**75**
HOURS/WEEK	**5**
CODE	**U15BC2MCT02**
COURSE TYPE	**THEORY**
CREDITS	**5**
MARKS	**100**

General Objective:

The students will be able to understand the classification, types of reactions catalysed, structure, mechanism of action of enzymes and their applications in various industries.

Course Objectives:

CO No.	Course Objectives
CO-1	Understand and demonstrate how the structure of biomolecules determines their chemical properties and reactivity
CO-2	Understand the amino acid structures, describe their physical and chemical properties
CO-3	Understand and analyse the primary, secondary, tertiary and quaternary structure in proteins and identify the types of interactions important in each case
CO-4	Understand the structure of nucleic acids, DNA, and RNA
CO-5	Evaluate the structural and conformational freedom of biomolecules including proteins, DNA/RNA, carbohydrates and key metabolites/co-factors

UNIT: I **15 Hrs**

CARBOHYDRATES

Introduction: Natural occurrence and physiological importance, classification - aldoses and ketoses, mono, oligo and polysaccharides, structural elucidation of glucose. Reactions of

carbohydrates due to glycosidic OH, alcoholic OH and functional (aldehyde and ketone) groups.**Di and trisaccharides**: Occurrence, structure and physiological importance of maltose, sucrose, lactose, cellobiose, trehalose and raffinose. **Polysaccharides:** Occurrence, structure and physiological importance of starch, glycogen, cellulose, hemicellulose, dextrin, chitin, inulin, pectin, agar – agar. Glycosaminoglycan's - occurrence, structure and physiological importance of hyaluronic acid, heparin and chondroitin sulfates.Sugar derivatives of biological importance - Amino sugars, deoxy sugars, sugar phosphates; cell-wall polysaccharides, blood group substances.

(Extra reading/key words: Soy polysaccharide fiber)

UNIT: II **15 Hrs**

AMINO ACIDS

Introduction to amino acids and proteins: Structure and classification of amino acids (common amino acids of proteins). Non standard and non protein amino acids, Essential amino acids - their structure and importance. The acid base properties of amino acids (amphoteric nature of amino acids, titration curve of acids), color reactions of amino acids, physical properties and chemical properties of amino acids.

(Extra reading/key words: Phylogenetic analysis)

UNIT: III **15 Hrs**

PROTEINS

Proteins: Peptide bonds - formation and chemical nature. Classification of protein based on structure – (fibrous and globular proteins); based on function (simple, conjugated and derived proteins). Structure of protein: Primary, secondary, tertiary and quaternary structure of proteins. Determination of amino acid composition and protein sequence. Ramachandran plot-basic concepts.

(Extra reading/key words: Cystic fibrosis, CRTR protein)

UNIT: IV **15 Hrs**

FATTY ACIDS AND LIPIDS:

Introduction occurrence and classification of lipids.

Fatty acids : Classification, physical and chemical properties of fatty acids, distribution of naturally occurring fatty acids, essential fatty acids and their importance. Fats: Triglycerides, waxes and polyunsaturated fatty acids and their importance, properties; rancidity of fats. Chemical constants of fats, detergents- their action and importance. Compound lipids –

Sphingolipids, glycolipids and sulpholipids; Derived lipids – Sterols, hormones, carotenoids, bile acids, terpenes

(Extra reading/key words: Prostaglandins, cardiac cycle)

UNIT: V **15 Hrs**

NUCLEIC ACIDS

Introduction to nucleic acids: DNA and RNA - their difference and similarities, structure of nitrogen bases - normal and rare, properties of base, nucleosides and nucleotides, physical and chemical properties of RNA and DNA. Isolation, separation and purification of DNA and RNA). RNA –Types. DNA polymorphism, different forms of DNA (A,B&Z), unusual structure of DNA, linkages in nucleotides and nucleosides, Watson – Crick model of DNA, Protein-Nucleic Acid (PNA) –Chromatin network, DNA –drug interaction examples –Ethidium Bromide–drug interaction.

(Extra reading/key words: replication, transcription, supercoil DNA)

Note: Extra Reading/ Key Words are only for internal testing (Seminar / Assignments)

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Explain the significance of hydrophobic and hydrophilic forces for the structure of biomolecules with examples	PSO 1	U
CO-2	Explain the significance of steric effects for the structure of biomolecules and give examples.	PSO 2	U
CO-3	Discuss the four structure levels of proteins	PSO 2	R
CO-4	Draw the basic structure of carbohydrates, nucleic acids, peptides/proteins and lipids.	PSO 3	U
CO-5	Name the functional groups in carbohydrates, nucleic acids, peptides/proteins and lipids.	PSO 4	An

TEXT BOOKS:

1. J.L. Jain, (2005): Fundamentals of Biochemistry, 6th Revised Edition, Sultan Chand and Company, New Delhi Company, New York.

BOOKS FOR REFERENCE:

1. P.L. Soni and Mohan Katyal [2000] – Text Book of Inorganic Chemistry (a Modern Approach) Sultan Chand and sons, New Delhi.

2. R.K. Murray, D.K. Granner and P.A. Mayes (2003): Harper's Illustrated Biochemistry, 25th Edition, New Delhi: Tata McGraw Hill Publishing Company Ltd.

3. A.L. Lehninger, D.L. Nelson and M.M. Cox (1993): Principles of Biochemistry, 2nd edition, CBS Publishers and Distributors.

4. David Rawn, J., (2004): Biochemistry, Panima Publishing Corporation, New Delhi.

5. E.S. West, W.R. Todd and H.S. Mason (1974): Text book of Biochemistry, 4th Edition, New Delhi, Oxford and IBH.

6. James Darnell, Harvey Lodish and David Baltimore (1990): Molecular Cell Biology, 2nd Edition, Scientific American Books, W.H. Freeman and

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(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

First Year - Semester – II

COURSE TITLE	**MAJOR CORE 3: PRACTICAL –I ANALYSIS OF BIOMOLECULES**
TOTAL HOURS	**75**
HOURS/WEEK	**5**
CODE	**U15BC2MCP03**
COURSE TYPE	**PRACTICAL**
CREDITS	**4**
MARKS	**100**

General Objective:

This course will provide students with an understanding of Qualitative and quantitative Principles of Biomolecules.

Course Objectives

CO No.	Course Objectives
CO-1	understand the biological functions of biomolecules
CO-2	identify and analyse the chemical and biochemical properties of biomolecules
CO-3	understand principles, theory and calculations of each experiment
CO-4	Perform quantitative and qualitative analysis of known standards as well as unknown samples develop problem-solving skills and to nurture professional attitudes.
CO-5	Understand the applicability of the biochemical methods to realistic situations.

I QUALITATIVE ANALYSIS:

1. Reactions of simple sugars - glucose, fructose, galactose, xylose, lactose, maltose, sucrose, starch and dextrin.

2. Reactions of proteins – solubility, Biuret, Millon's and Xanthoproteic tests, denaturation by heat, pH change, precipitation by heavy metals and by acidic reagents, color reactions of amino acids like Try, Tyr, Arg, Pro, His.
3. Reactions of lipids – Solubility, saponification, acrolein test for unsaturation, Liebermann–Burchard test for cholesterol.

II QUANTITATIVE ANALYSIS

1. Estimation of reducing sugar by Benedict's titrimetric method.
2. Estimation of amino acids by formal titration.
3. Determination of acid number of an edible oil.
4. Estimation of Iodine value
5. Estimation of saponification value of fat
6. Estimation of DNA by diphenylamine method
7. Estimation of RNA by orcinol method.

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Gain technical experience and handle adjustable micro pipettes in a reproducible manner	PSO 1	U
CO-2	Demonstrate the use of standard curves.	PSO 2	An
CO-3	Plan experiments, write protocols	PSO 2	U
CO-4	Perform logical reasoning and criticizing data	PSO 3	R
CO-5	Name the functional groups in carbohydrates, nucleic acids, peptides/proteins and lipids.	PSO 4	An

TEXT BOOK

1. J. Jayaraman (2011). Laboratory Manual in Biochemistry, New Age International Pvt Limited.

BOOK FOR REFERENCE

1. Shivaraja Shankara YM, Ganesh MK, Shivashankara AR (2012). Laboratory Manual for Practical Biochemistry, Jaypee Brothers,Medical Publishers Pvt. Limited.

(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

First Year - Semester – II

COURSE TITLE	**ALLIED 3 (COMPULSORY): DIETETICS**
TOTAL HOURS	**60**
HOURS/WEEK	**4**
CODE	**U15BC2ACT03**
COURSE TYPE	**THEORY**
CREDITS	**3**
MARKS	**100**

General objective:

The student able to understand, analyze and apply the basis for recommending the dietary allowances for different groups.

Course Objectives:

CO No	Course Objectives
CO-1	Apply the guidelines of planning a healthy diet to various groups of people in the practice scenario
CO-2	Analyze the interventions to affect change and enhance wellness in diverse individuals and groups
CO-3	Analyze the nutritional care process to identify nutrition-related problems, and determine and evaluate nutrition interventions
CO-4	Apply food safety principles related to food, management
CO-5	Analyze data for assessment and evaluate data to use in planning the dietary recommendation

UNIT: I **12 Hrs**

NUTRITION IN HEALTH

Basis for recommending the dietary allowances, factors to be considered in formulating diets for different income groups.

Food faddism & the faulty food habits. Nutritive value of common Indian recepies.

NUTRITION FOR SPECIAL GROUP

Nutrition in pregnancy – Physiological stages in pregnancy, nutritional requirements, foods selection. Nutrition during lactation: Physiology of lactation, Nutritional requirements. Nutrition during infancy – Growth and development, Nutritional requirements, Breast feeding, problems in weaning – proportion of carbohydrates and proteins in weaning food. Infant formula, introduction of supplementary foods.

(Extra reading/key words: Smartphone Applications for Promoting Healthy Diet and Nutrition)

UNIT: II **12 Hrs**

NUTRITION FOR CHILDREN

Nutrition during early childhood - Growth and nutrient needs, nutrition related problems, feeding pattern. Nutrition of school children: Nutritional requirements, importance of snacks, school lunch. Nutrition during adolescence – growth and Nutrient needs, Food choices, Eating habits, Factors influencing. Nutrition of adults: Sedentary, moderate and heavy activity needs. Geriatric Nutrition: factors affecting food intake and nutrient use, nutrient needs, Nutrition related problems.

(Extra reading/key words: Child Nutrition Programs)

UNIT: III **12 Hrs**

NUTRITION IN DISEASE

Concepts of diet therapy. Growth and scope of dietetics, purposes and principles of therapeutic diet, modification of normal diets based on causative factors. Special feeding methods (Tube feeding, IV feeding). Classification of therapeutic diets. Diet in obesity and underweight. Diet in febrile conditions: Typhoid, Tuberculosis, Malaria, Pneumonia and influenza. Exchange list in diet planning.

(Extra reading/key words: Metabolomics as a tool in nutritional research)

UNIT: IV **12 Hrs**

DIETETIC MANAGEMENT OF DISEASES

Gastro intestinal tract diseases: peptic ulcer (Gastric and duodenal), gastritis, Diarrhoea, dysentery and constipation.Diseases of the liver – Hepatitis and Cirrhosis. Diabetes Mellitus, anemia.

Diseases of the renal system: glomerulo nephritis, nephrotic syndromes, renal stones, uremia.

(Extra reading/key words: Survey on ulcer patients in a selected locality)

UNIT: V **12 Hrs**

Diet in disease of cardiovascular system – atherosclerosis, hypertension, hyperlipidemia, and different sodium restricted diets. Diet in Hypo and hyperthyroidism. Diet in allergy – Definition, classification, manifestations, common food allergies, tests for allergy, dietetic treatment.

Nutrition in cancer, Nutrition in Immune system dysfunction and AIDS.

(Extra reading/key words: *Nutrition support in metabolic disorders****)***

Note: Extra Reading/ Key Words are only for internal testing (Seminar / Assignments)

Course Outcomes:

CO No	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Demonstrate coherent and advanced knowledge of the principles and concepts associated with nutrition and dietetics.	PSO 1	R
CO-2	Demonstrate understanding of the etiology, pathophysiology and clinical features of diseases and conditions that require dietary modification.	PSO 2	R
CO-3	Apply knowledge of food, nutrition, dietetics and health to the nutritional care of children, adolescents, adults and old age people and their families.	PSO 2	An
CO-4	Translate current scientific knowledge of diseases and conditions into practical nutritional advice for patients.	PSO 3	U
CO-5	Demonstrate a professional approach to dietetic practice.	PSO 4	An

TEXT BOOKS:

1. Srilakshmi, B., (1997). Dietetics, New Age International (P) limited publishers, New Delhi.

BOOKS FOR REFERENCE:

1. Davidson,S.Passmore, R.Brook J.F and Truswell (1975), Human Nutrition and Dietetics. The English Language Book society, living stone, (Latest Edition)

2. David, S. Robinson, Food Biochemistry and Nutritional value. Longman Scientific and technical John Wiley and son, Inc., New York.

3. Raheena Begum, M. (1989) A text book of Foods, Nutrition and Dietetics,Steeling Publishers Pvt., Ltd., New Delhi

4. Shunbhagini, A. Joshi, (1992) Nutrition and Dietetics, Tata McGraw –Hill Publishing co., Ltd., New Delhi.

5. Anita F.P (1973), Clinical Dietetics and Nutrition Oxford University press London.

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(For the candidates admitted from 2015onwards)

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI

B.A/B.Sc./B.Com/B.R.SC/B.C.A/ B.B.A DEGREE EXAMINATION

SEMESTER- II

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

General Objective:

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

Course Outcomes:

The student will be able to

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

UNIT I:6 hrs Individual Capacity Building

Self awareness- building self-esteem- importance of having a strong self – esteem – developing positive attitude-. Anchoring on principles: Universal principles and values – forming & inculcating values- Leadership skills.

Extra reading / Key Words: *Biographies of any 2 Indian leaders*

UNIT II :6 hrs Interpersonal skills

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

Extra reading / Key Words: *Tips for building relationship*

UNIT III:6 hrs Corporate skills

Vision, mission and goals: Concepts, vision setting, goal setting, Individual and Group goals, Concept of synergy, team building, group skills.
Extra reading / Key Words: *Group dynamics and communication skills*

UNIT IV: 6 hrs

Management skills
Developing Body Language – Practicing etiquette and mannerism –Stress Management – Time Management Prioritization Importance and urgent activities- Time management to move towards life vision.
Extra reading / Key Words: *Polite conversations and dialogue skills*

UNIT V: 6 hrs

Self Development Plan
Concept and Need for Self Development Plan – Preparing Self Development Plan 9 Format is used to complete the self development Plan), Monitoring and Evaluation of self Development plan – Developing indicators for self development introduction to National Skill Development Mission.
Extra reading / Key Words: *Case study*

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

Course Outcome:

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

REFERENCES:

Alex K.(2012) Soft Skills – Know Yourself & Know the World, S. Chand & Company Ltd., New Delhi Meena K. Ayothi V. (2013). A Book on Development of Soft Skills (Soft Skills: A Road Map to Success), P.R. Publishers & Distributors, Trichy.
Francis Thamburaj S.J. (2009). Communication soft skills for Professional Excellence, 1st Ed., Grace Publishers, Rathan Reddy B.(2005). Team Development and Leadership, Jaico Publishing House, Mumbai.

(For candidates admitted from 2018 onwards)

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

SEMESTER II / III

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

General Objective:

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

Course Objectives:

The student will be able to:

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

Unit – I **6hrs**

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

Extra reading/Key word: *resource mapping tools*

Unit –II **6hrs**

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

Extra reading / Key word:*Practices in India*

Unit – III **6hrs**

Elements in Alternative Agriculture models ,Vermi compost, Amirthakarasal ,Mulligai Azolla,

Puchiviratti and neem products

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

Unit IV- **6hrs**

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

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

Unit -V **6hrs**

Leadership and Man Management – duties of citizen, leadership Training – Types, qualities – Discipline, Duty, Moral – Man Management, Civil Defense – Aims, Types, Services, Problems

Extra reading/Key word: *Defense recruitment modes.*

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

Course Outcome:

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

REFERENCES:

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

(For Candidates admitted from 2015 onwards)

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

PG & RESEARCH DEPARTMENT OF TAMIL

Second Year - Semester – III

Course Title	தமிழ்த்தாள் - **III**
Total Hours	**90**
Hours/Week	**6 Hrs Wk**
Code	**U15TL3TAM03**
Course Type	**Theory**
Credits	**3**
Marks	**100**

General Objectives:

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

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

Course Objectives:

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

அலகு:1 செய்யுள் **18 Hrs**

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

Key Words (Extra Reading)

சீவகசிந்தாமணி

அலகு:2 செய்யுள் **18 Hrs**

4. இரட்சணிய யாத்திரிகம் - மரணப்படலம்

5. சீறாப்புராணம் - ஒட்டகை பேசிய படலம்

அலகு:3 **18 Hrs**

தமிழ் இலக்கிய வரலாறு

சோழர் காலம்

அலகு:4 **18Hrs**

நாடகம்

சத்திய வேள்வி – அய்க்கண்

Key Words (Extra Reading)

யாருக்கும் வெட்கமில்லை - சோ

அலகு:5 **18 Hrs**

கோயிற்கலை

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

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	To learn the life of the people through the epic stories	PSO 1	U
CO-2	to learn the values taught by religion	PSO 2	AN
CO-3	Tostudy about the period of The King Chola, its epics, literature and grammar books	PSO 2	R
CO-4	to learn about the dramatic skills	PSO 3	U
CO-5	toteach students to evaluate the art, culture and other aspects of the temples in Tamil Literature.	PSO 4	U

பாட நூல்கள்

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

For the candidates admitted from June 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-620002

DEPARTMENT OF HINDI

SEMESTER – III

Course Title	**PART – I LANGUAGE** **HINDI- III-MEDIEVAL–MODERN POETRY AND HISTORY OF HINDI LITERATURE-1** **(Veergadha Kal Aur Bakthi Kal)**
Total Hours	**90**
Hours/Week	**6Hrs/Wk**
Code	**CODE: U15HN3HIN03**
Course Type	**Theory**
Credits	**3**
Marks	**100**

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

Course Objectives (CO):

The learner will be able to

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

UNIT – I **(18 Hours)**

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

(Pravarithiyan, Kavi, Rachanayean)

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

UNITII **(18 Hours)**

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

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

UNIT- III **(18 Hours)**

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

Sakha **Extra Reading (Key Words)**:*Rahim*

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

Extra Reading (Key Words):

UNIT- V **(18 Hours)**

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

Sakha **Extra Reading (Key Words):**
Bihari satsai

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

Course Outcomes:

The learner will be able to:

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

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

Prescribed Books

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

Reference Books :

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

(For candidates admitted 2016 onwards)

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

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

General Objective: To enable the students to understand the French cultural aspects and apply the grammar learnt in appropriate situations.

Course Objectives (CO):

The learner will be able to

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

Unit 1 Vivementdemain! (18Hours)

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

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

Unit 2 Tu as duboulot? (18Hours)

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

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

Unit 3 Qu'enpensez-vous? (18Hours)

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

politique

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

Unit 4 C'est tout unprogramme! (18Hours)

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

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

Unit 5 Onse retrouve (18Hours)

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

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

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

TEXT BOOKS :

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

Books for Reference:

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

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

(for candidates admitted from June 2017 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS), Tiruchirapalli – 620002

PG AND RESEARCH DEPARTMENT OF ENGLISH

I YEAR UG – SEMESTER I

PART II – ENGLISH 3 - GENERAL ENGLISH III

HOURS : 6 **CODE : U15EL3GEN03**

CREDIT : 3 **MARKS: 100**

GROWING WITH VALUES

Objectives:

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

UNIT I – Love, Faith and Hope

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

TEXTS

"Hope" by Emily Dickinson **(Internal Testing)**

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

UNIT II – Perseverance

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

Composition – Creative writing

TEXTS

Mother to Son by Langston Hughes**(Internal Testing)**

1.**The Perseverance of a Spider.**

2. Two Gentlemen of Verona by A.J Cronin

3. Faith of determination and perseverance (about Walt Disney)

UNIT III – Tolerance/Benevolence/Compassion

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

TEXTS:

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

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

UNIT IV – Essential Life Skills/ Resilience

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

TEXTS:

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

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

UNIT V – The Art of Living

Listening- for comparing and contrasting (personality/lives of two people)
Speaking- reporting from the magazine / newspaper

Reading - read the passage to draw inference / parallel reading [making connections]
Writing- creative writing
Grammar –'If' clause
Vocabulary – coinage, idioms and phrases
Composition – creative writing/imaginative writing

TEXTS:

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

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

(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

Second Year - Semester – III

COURSE TITLE	MAJOR CORE 4: ANALYTICAL BIOCHEMISTRY
TOTAL HOURS	75
HOURS/WEEK	5
CODE	U15BC3MCT04
COURSE TYPE	THEORY
CREDITS	5
MARKS	100

General Objective:

The student will be able to get a comprehensive technical knowledge in Life sciences

Course Objectives

CO No.	Course Objectives
CO-1	Understand the working principles, tools and techniques of various analytical methods
CO-2	Understand and analyze the principles and applications of chromatography in research and related experiments.
CO-3	Apply the knowledge for the separation of proteins/peptides by selecting appropriate separation techniques.
CO-4	Apply the principle of electrophoresis to understand certain functionalities of Biomolecules.
CO-5	Apply the principle of radioisotopes to understand certain functionalities of isotopes

UNIT: I **15 Hrs**

SPECTROMETRIC METHODS

Basic principles of electromagnetic radiation, energy, wave length, wave number, absorption and emission spectra. Beer-Lambert law- Colorimetry and Spectrophotometry, Emission spectra, Spectro fluorometry - principles, instrumentation and applications in vitamin assays (riboflavin and Thiamine), flame photometry and atomic absorption spectrophotometry – application and NMR and ESR – Principle and applications.

(Extra reading/key words: Picosecond spectroscopy)

UNIT: II **15 Hrs**

CHROMATOGRAPHY

Chromatography: Principle, materials, methods and applications of Paper chromatography, Thin layer chromatography, Column chromatography, Molecular sieve chromatography, Gas – Liquid chromatography, Adsorption, Partition and Ion exchange chromatography, Affinity chromatography, High performance liquid chromatography and HPTLC.

(Extra reading/key words: nanoliquid chromatography)

UNIT: III **15 Hrs**

CENTRIFUGATION METHODS

Basic principles of sedimentation, centrifugal force, Svedberg constant, types of centrifuges & rotors. Preparative ultracentrifugation – differential and density gradient. Analytical ultracentrifuge and its application in determination of molecular weight of proteins and nucleic acids.

(Extra reading/key words: commercial application)

UNIT: IV **15Hrs**

ELECTROPHORETIC TECHNIQUES

General principles, factors affecting the migration rate-electric field, sample, buffer and the supporting medium. Types- Tiselius moving boundary electrophoresis, electrophoresis with paper, cellulose acetate, starch, agarose and polyacrylamide gel. SDS-PAGE, 2D electrophoresis, Immuno electophoresis, High voltage electrophoresis and isoelectric focusing.

(Extra reading/key words: microchip electrophoresis)

UNIT: V **15 Hrs**

RADIOISOTOPE TECHNIQUES

Atomic structure, radiations, types of radioactive decay, half life period, units of radioactivity detection and measurement of radioactivity – Methods based on ionization & excitation (GM counter & scintillation counter)- advantages and disadvantages, Autoradiography. Applications of radioisotopes in the elucidation of metabolic pathway, clinical diagnosis and radio dating. Safety aspects of the use of radio isotopes.

(Extra reading/key words: radionuclide generator)

Note: Extra Reading/ Key Words are only for internal testing (Seminar / Assignments)

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Understand the basic concepts and principles of biochemical techniques (spectrophotometry,)	PSO 1	R, U
CO-2	Understand how various chromatography detection	PSO 2	R
CO-3	Explain the theoretical principles of selected instrumental methods within centrifugation methods, and main components in such analytical instruments.	PSO 2	U
CO-4	Integrate different analytical techniques to solve analytical and bioanalytical problems in electrophoresis,	PSO 3	R
CO-5	Understand the physical principles of a range of isotopes in biology	PSO 4	An

TEXT BOOK:

1. Keith Wilson and John Walker (2004): Principles and Techniques of Practical Biochemistry, 5th edition, United Kingdom, Cambridge University Press

BOOKS FOR REFERENCE:

1. G.R. Chatwal and S. Anand (1999): Instrumental Methods of Chemical Analysis, Himalaya Publishing, Mumbai

2. Srivastava V.K. and K.K. Srivastava (1981): Introduction to Chromatography-Theory and Practicals, 2nd edition, S. Chand and Company, New Delhi.

3. Chatwal. G. and S. Anand (1995): Spectroscopy (atomic and molecular), Himalaya Publishing House, Mumbai.

4. Sharma B.K. (1993): Chromatography, 1st edition Goel publishing House.

5. A. Upadhyay, K. Upadhyay and N. Nath (2003): Biophysical Chemistry,3rd edition, Himalaya Publishing House, New Delhi

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(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

Second Year - Semester – III

COURSE TITLE	MAJOR CORE 5 - HUMAN PHYSIOLOGY
TOTAL HOURS	75
HOURS/WEEK	5
CODE	U15BC3MCT05
COURSE TYPE	THEORY
CREDITS	5
MARKS	100

General objective:

The student learns about the structure, operational mechanism and functions of the various organs and organ system in human body.

Course Objectives:

CO No.	Course Objectives
CO-1	Understand and apply the structure and functions of digestive system and apply their mechanisms
CO-2	Understand and apply the mechanism of circulatory and various body fluids and its function
CO-3	Understand and apply the structure and functions of respiration and excretory system
CO-4	Understand the anatomy of nervous and muscular system and understand apply their mechanism.
CO-5	Analyse the functions of reproductive system and their mechanisms

UNIT: I **15 Hrs**

DIGESTIVE PHYSIOLOGY

Gross anatomy of the alimentary canal, digestive glands- salivary, gastric and biliary glands secretion and function. Digestion and absorption of carbohydrates, proteins and lipids

(Extra reading/key words: intestinal imaging)

UNIT: II **15 Hrs**

BODY FLUID AND CIRCULATORY SYSTEM

Body fluids – Extracellular fluid, plasma volume, interstitial fluid, transcellular fluid, intracellular fluid, ionic composition of body fluids, imbalances in sodium and potassium lends, body buffers, lymph-formation, composition and flow.

Basic structure and function of heart, rhythmicity of heart, origin and conduction of heart beat, cardiac cycle, heart sounds, Blood pressure, heart rate, Cardiac output, electrocardiogram.

(Extra reading/key words: cardio vascular disorders)

UNIT: III **15 Hrs**

RESPIRATION AND EXCRETORY PHYSIOLOGY

Respiration – Definition, Basic structure of lungs, transport gases (CO_2& O_2). Excretion: Basic structure and function of kidney, structure of nephron, glomerular filtration rate, tubular transport maximum, tubular load, formation of urine. Normal and abnormal constituents of urine.

(Extra reading/key words: respiratory mechanics, rapid diagnosis of respiratory tract infection)

UNIT: IV **15 Hrs**

NERVOUS AND MUSCULAR SYSTEM

Structure of neuron, nerve impulse and neurotransmission, synapse –chemical and electrical synapse, functional properties of nerve fiber, action potential. Reflex action and reflex arc.

Molecular organization, mechanism of excitation and contraction of striated muscles, neuromuscular functions, Biochemistry of muscle contraction.

(Extra reading/key words: gene therapy for neuromuscular disorders)

UNIT: V **15 Hrs**

REPRODUCTIVE PHYSIOLOGY:

Male reproductive system- structure, primary sex organs (Testis), accessory sex organs, spermatogenesis.Female reproductive system- structure, primary sex organs (ovaries), accessory sex organs, oogenesis and menstrual cycle

(Extra reading/key words: hormonal therapies, artificial insemination)

Note: Extra Reading/ Key Words are only for internal testing (Seminar / Assignments)

Course Outcomes

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Explain the major organ systems, and list the organs associated with each.	PSO 1	U
CO-2	Describe the structure of major human organs and explain their role in the maintenance of healthy individuals.	PSO 2	U,R
CO-3	Explain the interplay between different organ systems and how organs and cells interact to maintain biological equilibria.	PSO 2	An
CO-4	Explain how the activities of organs are integrated for maximum efficiency	PSO 3	R
CO-5	Explain the role of sex organs in the process of reproduction	PSO 4	An

TEXT BOOK:

1. Chatterjee, C.C. (1985) Human Physiology, Vol. I & Vol. II published by A. K. Chatterjee, India.

BOOKS FOR REFERENCE:

1. Talwar G.P. (1980) Text Book of Biochemistry, Prentice – Hall of India.

2. Guyton, A.C. (1991) Text Book of Medical Physiology W.B Saunders Company, Philadelphia, London, Toronto.

3. Harper, H.A., Rodwell, V.W. Mayes.P.A [1997]. Review of Physiological chemistry, A Lange Medical Publications, Maruzen Asia Pvt., Ltd.,

4. Murray, R.K.Gramer, D.K. Mayes, P.A and Rodwell, V.W. (1999).Harper's Biochemistry, 25th Edn. A Lange Medical Book, Prentice- Hall International.

5. West, E.S., Todd,W.R., Mason, H.S. and Bruggen, J.T.V. (1974). Text Book of Biochemistry. The Macmillan Company, Collier – Macmillan Limited/London.

6. Frederic.H.Martini., William. C. Ober., Clare W. Garrison. (2006). Fundamentals of Anatomy and Physiology 7th Edn, Pearson Benjamin Cummings Publications, San Francisco.

(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

Second year - Semester– III

COURSE TITLE	ALLIED- 4 (OPTIONAL): MICROBIOLOGY – GENERAL
TOTAL HOURS	60
HOURS/WEEK	4
CODE	U15BC3AOT04
COURSE TYPE	THEORY
CREDITS	3
MARKS	100

General objective:

The student learn about the history, scope of microbiology, classification, types, morphology, reproduction and control of microorganism.

Course Objectives:

CO No.	Course Objectives
CO-1	Analyse the diversity of microorganisms, microbial growth and metabolism.
CO-2	Identify bacterial cell structure and function ways microorganisms play an *integral role* in disease,
CO-3	Understand and apply the major taxonomic groups when classifying microorganisms.
CO-4	Explain the role of microorganisms in food and industrial production and preservation
CO-5	Evaluate and apply the most appropriate sterilization or disinfection approach for controlling the growth of microorganisms and explain how they work

UNIT: I **12 Hrs**

HISTORY AND SCOPE OF MICROBIOLOGY:

Scope of Microbiology, History – Discovery era; Transition period; Golden age; twentieth century. Differences between Prokaryotes and Eukaryotes. Classification of Microorganism-Numerical taxonomy, General properties and principles of classification of microorganisms - Haeckel's and Whittaker's – Carl Woese-3 domain Concept. An introduction to microscopy-

A brief account on Principles and applications of different microscopes- Compound, Dark field, Bright field, Phase contrast, Fluorescent and Electron microscope.

(Extra reading/key words: pioneers of microbiology)

UNIT: II **12 Hrs**

BACTERIA - MORPHOLOGY AND ITS GROWTH CHARACTERISTICS

Bacteria: Nomenclature, morphology and fine structure- flagella, pili, capsule ; Cell wall- Gram positive bacteria and Gram Negative bacteria; Nutritional requirements, nutritional types; Growth curve; Types of Culture medium, Culture methods, Cultural characteristics, Identification.

(Extra reading/key words: single bacteria)

UNIT: III **12 Hrs**

BACTERIA AND VIRUSES

Brief and general account: Mycoplasmas, Rickettsiae, Chlamydia, Myxobacteria. Viruses: General properties and types - TMV, T-even phage-Morphology and reproduction.

(Extra reading/key words: diagnostic testing)

UNIT: IV **12 Hrs**

STRUCTURE AND REPRODUCTION OF ALGAE, FUNGI AND PROTOZOA

Cyanobacteria: General account on structure, reproduction. **Actinomycetes**: General account on structure, reproduction. **Microalgae**: General account on structure and reproduction. *Chlorella, Volvox, Diatoms*. **Microfungi**: General account on structure and reproduction of *Yeast, Mucor, Penicillium, Aspergillus*. **Protozoa**: General account on structure and reproduction of *Entamoeba, Paramecium, Plasmodium, Trypanosoma.*

(Extra reading/key words: biofilm mechanics)

UNIT: V **12 Hrs**

CONTROL OF MICROORGANISMS: Concept of Sterilization - Definition of sterilization, dry and moist heat, **Physical Agents** - High temperatures, Low temperatures, Desiccation, Radiation, Filtration. **Chemical Agents** – Characteristics of an ideal antimicrobial chemical agent, Phenols, Alcohols, Halogens, Heavy metals, Dyes, Detergents, Aldehydes, Gaseous agents. **Antibiotics**- Classification based on their mode of action- Penicillin, Polymyxins, Streptomycin, Sulfonamides and other chemotherapeutic agents, antibiotic resistance.

(Extra reading/key words: microbial food safety)

Note: Extra Reading/ Key Words are only for internal testing (Seminar / Assignments)

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Understand the basic microbial structure and function and study the comparative characteristics of prokaryotes and eukaryotes.	PSO 1	U
CO-2	Describe diversity of microorganisms, bacterial cell structure and function, microbial growth and metabolism, and the ways to control their growth by physical and chemical means	PSO 2	U
CO-3	Understand the concepts of pathogenicity, virulence, and epidemiology	PSO 2	U,R
CO-4	Explain the general bacteriological and microbial techniques	PSO 3	An
CO-5	Explain the processes used by microorganisms for their replication, survival, and interaction with their environment, hosts, and host populations;	PSO 4	An

TEXT BOOK:

1. Pelczer M.J. Chan E.C. S Noel R.Krieg, (2004) Microbiology, Fifth Edn., Tata McGraw Hill publishing company Limited, New Delhi.

BOOKS FOR REFERENCE:

1. Ananthanarayan R. & Jeyaraman Paniker C.K (1999): Text Book of Microbiology, Fifth Edn, Orient Longman Limited, New Delhi.
2. Lansing M.Prescott, John P.Harley, Donald A. Klein (2005): Microbiology, 6th Edn, Tata Mc Graw – Hill Companies, New York.
3. Power C.B & Daginawala H.F (1996): General Microbiology volume I & II. Himalaya Publishing House, Bombay.
3. Purohit S.S (1999): Microbiology Fundamentals and Applications, Agro Botanical Publishers, India.
4. Sharma P.D. (2005): Microbiology, Rastogi and Co., Meerut.
5. Stainer R.Y. Ingraham J.L., wheels M.L. (2004): General Microbiology, Macmillan, London.

(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

(Students admitted from the year 2018 onwards)

Second Year - Semester III

COURSE TITLE	SBE 3: PAIN RELIEF FORMULATION AND COSMETICS
TOTAL HOURS	30
HOURS/WEEK	2
CODE	U15BC3SBP03
COURSE TYPE	PRACTICAL
CREDITS	2
MARKS	100

General Objective:

This course is one of the most advanced introductions in Pain relief and cosmetic production.

Course Objectives:

CO No.	Course Objectives
CO-1	Understand the working principles, tools and techniques of preparative methods
CO-2	Understand and analyze the principles and applications of formulations in research and related experiments.
CO-3	apply the knowledge for the preparation of lotions and creams
CO-4	Apply the principle and understand certain functionalities of preparations.
CO-5	Analyze data for assessment and evaluate data to use in recommendation understand and evaluate the strengths, limitations and creative use of techniques for problem-solving.

PREPARATION OF

1. Turpentine liniment
2. Soap liniment
3. Pain balm preparation.
4. Simple ointment & Sulphur ointment
5. Calamine lotion

6. Calamine Benzoate Lotion

7. Cold cream

8. Vanishing cream

9. Hair cream

10. Liquid tincture of liquor ice

11. Compound Tincture of Benzoin

12. Tincture of Orange

13. Shampoo

14. Nail bleach

15. Cuticle remover

16. Compound syrup of ferrous phosphate

17. Commercial cough syrup

18. Talcum powder

19. Baby powder

20. Tooth powder.

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Apply the knowledge of preparing conventional dosage formulations	PSO 1	An
CO-2	Develop their interview skills	PSO 2	R
CO-3	Explain the relationship between disease and formulations	PSO 2	U,R
CO-4	Discuss the preparations and their applications	PSO 3	R,An
CO-5	Define solubility, percent concentration, molarity, mole fraction, and molality.	PSO 4	An

BOOKS FOR REFERENCE:

1. Arthur J. Winfield, R. Michael and E. Richard, Pharmaceutical Practice (2000), 3rd edition, Elsevier Publication.

(For candidates admitted from 2015 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2 B.A./B.Sc./ B.Com./B.C.A./B.B.A DEGREE COURSE

SEMESTER – III / VI

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

General Objective:

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

Course Objectives:

The student will be able to

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

Unit I **3 hrs**

Concepts of Gender:

Sex-Gender-Biological Determination-Patriarchy-Feminism-Gender Discrimination-Gender Division of Labour -Gender stereotyping – Gender Sensitivity-Gender Equity – Equality – Gender Mainstreaming – Empowerment.

Extra reading /Key Words: *Acts on gender*

Unit II **3 hrs**

Women's Studies Vs Gender Studies:

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

Extra reading /Key Words: *Origin of Women's studies in India*

Unit–III **3hrs**

Areas of Gender Discrimination:

Family – Sex Ratio – Literacy – Health – Governance – Religion Work Vs Employment – Market – Media – Politics – Law – Domestic Violence – Sexual Harassment – State Politics and Planning.

Extra reading / Key Words: *Survey of level of discrimination*

Unit–IV **3hrs**

Women Development and Gender Empowerment:

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

Extra reading/Key Words: *Case study*

Unit–V **3hrs**

Women's Movements and Safeguarding Mechanism: In India National / State Commissionfor 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 – 73rdAmendment for PRIs.

Extra reading / Key Words: *Laws on gender equality*

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

Course Outcome:

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

REFERENCES:

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

Bharathidasan University, Tiruchirappalli

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

(For Candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2

B.A. /B.Sc. / B.Com. / BBA/ B.C.A. DEGREE COURSE LIFE ORIENTED EDUCATION

ETHICS – II: EMPOWERMENT OF WOMEN

HRS / WK : 1 **CODE: U15VE4LVE02**

CREDIT : 1 **MARKS : 100**

OBJECTIVES:

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

UNIT – I: GENDER ISSUES

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

UNIT – II: SOCIAL ISSUES RELATED TO WOMEN

Eve teasing, Rape, Dowry, Harassment in marriage, Divorce and Widows Remarriage, HIV

& AIDS, Transgender, Female Genocide, sex workers, trafficking, fugitive, Female foeticide, handicapped children and women and evils of drug abuse.

UNIT – III: WOMEN AND MEDIA

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

UNIT – IV: WAYS OF EMPOWERING WOMEN

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

UNIT – V: CYBER CRIME AGAINST WOMEN

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

REFERENCES:

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

(For Candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE(AUTONOMOUS) TRICHIRAPALLI-2.

B.A/B.Sc/B.Com /B.C.A – DEGREE COURSES

LIFE ORIENTED EDUCATION

BIBLE STUDIES – II: OLD TESTAMENT

HRS / WK :1 CODE: U15VE4LVBO2

CREDIT : 1 MARKS : 100

OBJECTIVE:

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

UNIT – I: PURPOSE OF LIFE

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

5. Noah (Gen 6-9); Abraham (Gen 12-18);

6. Joseph (Gen 37-40); Moses (Exo 4-5);
7. Joshua (Joshua 1-8)

UNIT – II: JUDGES AND KINGS

I. Judges: Deborah (Judges 4); Samson (Judges 6-8); Gideon (Judges 13-16)

J. Kings**:** David (I Sam 17-31, II Sam 1-12); Solomon (I Kings 1-11)

UNIT – III: MINOR PROPHETS

Brief Life History and teachings of

II. Amos

JJ. Jonah
KK. Micah
LL. Nahum
MM. Habakkuk

UNIT – IV: MAJOR PROPHETS

Brief Life History and teachings of

III Isaiah (Is 1,6,11,36-38,40-42,44,50,53,61)

JJJ Jeremiah (Jer 1-3,7-12,18-19,23)
KKK Ezechial (chapters 1,2,3,5,8,12 visions)
LLL Daniel (Daniel 1-6)

UNIT – V: WOMEN IN THE BIBLE

Women in the Old Testament

1. Eve (Gen 3)

2. Ruth (Ruth 1-4)
3. Hannah (I Sam 1:1-28)
4. Esther (Esther 1-6)

REFERENCES:

1. Russell Fueller (1999) The Text book of the Twelve Minor Prophets. Wipf &Stock Publishers, UK.

2. Willis Judson Beecher (2002) The Prophets and The Promise. Wipf & Stock Publishers, UK

(For Candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2

B.A./ B.Sc/ B.Com/ BBA/ B.C.A - DEGREE COURSES

LIFE ORIENTED EDUCATION

CATECHISM – II: CHURCH AND SACRAMENTS

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

CREDIT : 1 **MARKS : 100**

OBJECTIVES:

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

UNIT – I: MISSION OF THE CHURCH

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

UNIT – II: PARTICIPATORY CHURCH

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

UNIT – III: THE FUNCTIONARY CHURCH AND I

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

UNIT – IV: SACRAMENTS

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

UNIT – V: MARY AND SAINTS

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

REFERENCES:

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

(For Candidates admitted from 2015 onwards)

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

PG & RESEARCH DEPARTMENT OF TAMIL

Second Year - Semester – IV

Course Title	தமிழ்த்தாள் - **IV**
Total Hours	**75**
Hours/Week	**5 Hrs Wk**
Code	**U15TL4TAM04**
Course Type	**Theory**
Credits	**3**
Marks	**100**

General Objectives:

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

- Make the student to understand the cultural and tradition of Tamilians.
- Student will learn to understand the different religions
- Understand the depth of Tamil Literature & Culture.
- Know about the structure of the family, manners and discipline.
- Know about the rights of equality.

Course Objectives:

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

CO-5	மொழிப்பெயர்ப்புத்திறனை வளர்த்தல்.

அலகு:1 செய்யுள் **15 Hrs**

1. குறுந்தொகை

1. கொங்கு தேர் வாழ்க்கை அஞ்சிறைத் தும்பி - இறையனார்
2. யாரும் இல்லை தானே கள்வன் - கபிலர்
3. வேம்பின் பைங்காய்என் தோழி தரினே – மிளைக்கந்தன்
4. உள்ளது சிதைப்போர் உளரெனப் படாஅர் - பாலை பாடிய பெருங்கடுங்கோ
5. நோற்றோர் மன்ற தோழி – குறுங்குடி மருதன்

2. நற்றிணை

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

3. கலித்தொகை

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

அலகு:2 **15 Hrs**

அகநானூறு

1.வானம் வாய்ப்பக் கவினிக் கானம் - சீத்தலைச் சாத்தனார்

2. எம்வெங் காம மியைவதாயின் - மாமூலனார்

5.புறநானூறு

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

6. பதிற்றுப்பத்து - ஐந்தாம் பத்து

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

7. திருக்குறள்

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

அலகு:3 **15 Hrs**

தமிழ் இலக்கிய வரலாறு

சங்ககாலம் - சங்கம் மருவியகாலம்

எட்டுத்தொகை, பத்துப்பாட்டு, பதினெண்கீழ்க்கணக்கு நூல்கள்

அலகு:4 **15 Hrs**

வாழ்க்கை வரலாறு

அன்னை தெரசா - பா. தீனதயாளன்

மநல றுழசனள (நுஒவசய சுநயனனபெ)

அக்னி சிறகுகள் - அப்துல் கலாம்

அலகு:5 **15 Hrs**

பொது– மொழிப்பெயர்ப்பு

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

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	To develop an attitude to consider other living beings as equals	PSO 1	U
CO-2	To learn about the life style oftraditional Tamil literature	PSO 2	AN
CO-3	to be inspired by the traditional culture and values	PSO 2	R
CO-4	To study about the dedicated service of mother Theresa and to practice the same	PSO 3	U
CO-5	to enhance skills in translation	PSO 4	C

1. செய்யுள் - தமிழாய்வுத்துறை வெளியீடு

2. தமிழ் இலக்கிய வரலாறு - தமிழாய்வுத்துறை வெளியீடு

3. வாழ்க்கை வரலாறு

பா.தீனதயாளன் - அன்னை தெரசா

4. மொழிப்பெயர்ப்பு - தமிழாய்வுத்துறை வெளியீடு

(For the candidates admitted from June 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-620002

DEPARTMENT OF HINDI

SEMESTER – IV

Course Title	**PART – I LANGUAGE HINDI -IV FUNCTIONAL HINDI & TRANSLATION**
Total Hours	**75**
Hours/Week	**5Hrs/Wk**
Code	**CODE: U15HN4HIN04**
Course Type	**Theory**
Credits	**3**
Marks	**100**

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

Course Objectives (CO):

The learner will be able to

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

UNIT – I **(15 Hours)**

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

UNIT- II **(15 Hours)**

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

Extra Reading (Key Words): *Vyavasayikata*

UNIT- III **(15 Hours)**

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

Extra Reading (Key Words): *Kisan*

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

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

Extra Reading (Key Words): *Hamara Bharat* Circular

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

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

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

Course Outcomes:

The learner will be able to:

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

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

Prescribed Books

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

Reference Books :

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

(For candidates admitted 2016 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2

DEPARTMENT OF FRENCH

SEMESTER IV

Course Title	**PART I – LANGUAGE - FRENCH PAPER IV (**LANGUAGE & CULTURE (ÉCHO A2 2e édition)
Total Hours	75
Hours/Week	5 Hrs/Wk
Code	U16FR4FRE04
Course Type	Theory
Credits	3
Marks	100

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

Course Objectives (CO):

The learner will be able to

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

Unit 1 C'est lafête! (18Hours)

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

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

Unit 2 Vousplaisentez! (18Hours)

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

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

Unit 3 On s'entendbien! (18Hours)

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 deconversation
– sujets d'étonnement.

Extra Reading (Key Words): les taboos

Unit 4 À vos risqué etpérils! (18Hours)

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

Extra Reading (Key Words):les sportifs français

Unit 5 La vieest dure (18Hours)

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

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

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

TEXT BOOKS :

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

Books for Reference:

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

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

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

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

EMPLOYABILITY SKILLS

OBJECTIVES:

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

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

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

TEXTS

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

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

Listening to differentiate dutyfrom obligation.
Speaking – Discussing one's knowledge about different subjects, learning skills, thirst for knowledge, learning form experiences.
Reading for comprehension exhibiting higher perception of life's experiences.
Writingparagraphs with cause and reason, analyzing motives behind people's actions and behavior.
Grammar – use of cohesive devices
Vocabulary – figures of speech– simile, metaphor.
Composition –

1. Excellence is not a destination, it is a continuous journey that never ends – Brian Tracy
2. To be perfect is to change often – Winston Churchill

TEXTS

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

UNIT III – Team skills

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

TEXTS

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

UNIT IV – Communication skills for interpersonal relationship

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

TEXTS

1.The Refund by Fritz Karinthy

UNIT V –Presentation skills

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

TEXTS

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

(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

Second Year – Semester IV

COURSE TITLE	MAJOR CORE 6: ENZYMES
TOTAL HOURS	75
HOURS/WEEK	5
CODE	U15BC4MCT06
COURSE TYPE	THEORY
CREDITS	5
MARKS	100

General Objective:

The students will be able to understand the classification, types of reactions catalysed, structure, mechanism of action of enzymes and their applications in various industries.

Course Objectives:

CO No.	Course Objectives
CO-1	Understand the classification, structure, properties and functions of enzymes.
CO-2	Understand and apply the knowledge of techniques for isolation and purification of enzymes.
CO-3	Understand the mechanism of action of enzymes and analyse the different types of catalysis
CO-4	Understand and apply the kinetic studies in the derivation of the M.M equation and their modification and understand different types of inhibition.
CO-5	Apply and evaluate the role of enzymes in different areas like industries, clinical labs etc.

UNIT: I **15 Hrs**

CLASSIFICATION AND STRUCTURE:

Nomenclature and classification of enzymes (EC System) – structure of ribonuclease and Lysozymes. Co-factors – coenzymes- metalloenzymes- Isozymes - LDH

(Extra reading/key words: plasma enzymes, antioxidant enzymes)

UNIT: II **15 Hrs**

ISOLATION AND PURIFICATION OF ENZYMES:

Classical methods of purification and crystallization. Homogenization – Separation of cellular organelles by differential centrifugation (intercellular localization). Separation based on solubility differences, isoelectric precipitation, salting in and salting out, dialysis, solvent fractionation, Chromatographic techniques and Electrophoresis.

(Extra reading/key words: calmodulin)

UNIT: III **15 Hrs**

MECHANISM OF ENZYMES ACTION

Energy of activation, catalytic mechanism of enzyme action-lock & key theory and induced fit model, acid base catalysis, covalent catalysis, metal ion catalysis, electrostatic catalysis, catalysis through proximity and orientation effects, catalysis by preferential transition state binding.

(Extra reading/key words: ribonuclease, carboxy peptidase)

UNIT: IV **15 Hrs**

ENZYME KINETICS:

Specificity – stereo specificity and geometric specificity. Michaelis-Menten equation, Line weaver Burk plot. Enzyme inhibition- mechanism of competitive, noncompetitive inhibition, allosteric. Factors regulating enzyme action viz., pH, temperature, substrate and enzyme concentration.

(Extra reading/key words: salivary amylase)

UNIT: V **15 Hrs**

ENZYME TECHNOLOGY AND ITS APPLICATION:

Industrial use – Amylases and proteases – pectinase for juice clarification; papain for meat tenderization; collagenase for hide purification.

Glucose oxidase strips for glucose detection and invertase in sugar hydrolysis. Biotechnological applications of exo and endonuclease. Immobilized enzymes and its applications. Biosensors, abzymes, and biochips.

(Extra reading/key words: SGOT, SGPT)

Note: Extra Reading/ Key Words are only for internal testing (Seminar / Assignments)

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Remember and understand the major classes of enzyme and their functions in the cell	PSO 1	R, U
CO-2	Explain the role of co-enzyme cofactor in enzyme catalyzed reaction	PSO 2	U
CO-3	Differentiate between equilibrium and steady state kinetics and analyzed simple kinetic data and estimate important parameter (Km. Vmax, Kcat etc.)	PSO 2	R
CO-4	Define and describe the properties of enzymes in and regulates biochemical pathways (inhibition, allosterism)	PSO 3	R
CO-5	Elaborate the use of enzymes in industries.	PSO 4	An

TEXT BOOK:

1. Keith Wilson and John Walker (2004): Principles and Techniques of Practical Biochemistry, 5th edition, United Kingdom, Cambridge University Press.

BOOKS FOR REFERENCE:

1. Stryer, L. (1980) Biochemistry WH.Freeman and Company NewYork.
2. West. E.S., Todd W.R., Mason. H.S. & Bruggen J.T. (1996) Text Book of Biochemistry Fourth Edn. The Macmillan Company, London.
3. Murray R.K. Granner D.K. Mayes P.A. Rodwell V.W. (1996) Harper's Biochemistry – 24th Edition. A Lange Medical Book, Prentice Hall International Inc.
4. Renuka Harekrishnan (2000). An Introduction to Biomolecules & Enzymes.III Edn. Indrajit Pathipagam, Madurai.
5. Donald Voet & Judith G. Voet (1995) Text Book of Biochemistry Second Edition – (1995), By John Wiley & sons, Inc.

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(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

Second Year - Semester – IV

COURSE TITLE	MAJOR ELECTIVE 1 – CELL BIOLOGY
TOTAL HOURS	75
HOURS/WEEK	5
CODE	U15BC4MET01
COURSE TYPE	THEORY
CREDITS	5
MARKS	100

General Objective:

The students learn the basic structure and functioning of a cell and the organization of a cell, which would give a better understanding about the concepts in the forth coming papers.

Course Objectives:

CO No.	Course Objectives
CO-1	understand the structure of cell and its components and their functions
CO-2	understand and apply the morphology, genome information and functions various cell organelles
CO-3	understand and apply the functions of lysosomes
CO-4	understand and apply functions of nucleus and nucleolus; understand the chemistry of chromosomes and their role in X-linked inheritance
CO-5	understand various events in cell cycle, mitosis and meiosis

UNIT: I **15 Hrs**

STRUCTURE AND FUNCTIONS OF CELL MEMBRANE

Ultra structure of a cell. Cytoplasm: physical and biological properties. Plasma membrane: Ultra structure and membrane models viz., unit membrane and fluid mosaic. Permeability functions – Passive, facilitated and active diffusion and endocytosis. Membrane receptors-GPCR, RTKase and signalling

(Extra reading/key words: cell culture)

UNIT: II **15 Hrs**

CELLULAR COMPONENTS I

Mitochondria: Morphology, ultra structure and functions.

Endoplasmic reticulum: Morphology, ultra structure, types, role in cell secretion and other functions.

(Extra reading/key words: mitochondrial diseases)

UNIT: III **15 Hrs**

CELLULAR COMPONENTS II

Golgi complex: Morphology, ultra structure, role in cell secretions, glycosylation and other functions. Lysosomes: Morphology, chemistry, ultra structure and functions.

(Extra reading/key words: inheritance of Golgi apparatus)

UNIT: IV **15 Hrs**

CELLULAR COMPONENTS III

Nucleus: Ultra structure and functions. Nucleolus: Ultra structure and functions.

Chromosomes: Morphology, structure, types, chemistry, organization and functions.'

(Extra reading/key words: genetic inheritance)

UNIT: V **15 Hrs**

CELL CYCLE

Cell cycle-Events during cell cycle, measurement of cell cycle, Centrosome – Morphology, ultra structure and functions, duration spindle mechanics, mitotic inhibitors, meiosis and its significance.

(Extra reading/key words: CCI therapies)

Note: Extra Reading/ Key Words are only for internal testing (Seminar / Assignments)

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Understand the structures and purposes of basic components of prokaryotic and eukaryotic cells, especially macromolecules, membranes, and organelles	PSO 1	U
CO-2	Explain how these cellular components are used to generate and utilize energy in cells	PSO 2	An

CO-3	Describe the cellular components underlying mitotic cell division	PSO 2	R
CO-4	Apply their knowledge of cell biology to selected examples of changes or losses in cell function.	PSO 3	An
CO-5	Understand responses to environmental or physiological changes, or alterations of cell function brought about by mutation.	PSO 4	U

TEXT BOOK

Powar.C.B. Cell Biology, Himalaya publishing House, Delhi, 1996.

BOOKS FOR REFERENCE:

1. Verma P.S and V.K Agarwal – Cell Biology, S.Chand and company Ltd., New Delhi, 1998.

2. De Robertis E.D.P, and De Robertis E.M.,Cell and Molecular Biology, 8th Edn. B.I.Waverly pvt. Ltd., New Delhi, 1995.

3. Freifelder.D., Molecular Biology, N.K.Mehra for Narosa publishing House New Delhi, 1990.

4. Kleinsmith, L.J and Kish V.M., Principles of Cell Biology Harper and Row publishers, New York, 1998.

5. Alberts et al., Molecular Biology of the Cell, 6th edn,

6. Alberts et al., 2008, Molecular biology of the cell, Garland science, USA, 5th edn

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(Students admitted from the year 2018 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
PG DEPARTMENT OF BIOCHEMISTRY
B.Sc., BIOCHEMISTRY Second Year - Semester–IV

COURSE TITLE	**MAJOR ELECTIVE 1 – BIOPHYSICAL CHEMISTRY**
TOTAL HOURS	**75**
HOURS/WEEK	**5**
CODE	**U15BC4MET02**
COURSE TYPE	**THEORY**
CREDITS	**5**
MARKS	**100**

General Objective:

The student learns about the laws, concepts and theories of physical chemistry applied in biological systems.

Course Objectives

CO No.	Course Objectives
CO-1	To develop a general understanding of how physical laws govern biological processes.
CO-2	To Acquire basic knowledge about how physical methods can be applied to understand biological processes.
CO-3	To relate between structure, functions and dynamics of biological macromolecules.
CO-4	To understand and analyze the forces governing protein folding and misfolding.
CO-5	Developing an understanding on how statistical mechanics can be applied to understand the properties of biological membranes

UNITI

GASEOUS STATE : Dalton's law of partial pressures – Henry's law – Gas analysis in biological systems – PC02 and PO2 gaseous exchange in the lungs arterial and ventral capillaries.

UNIT : II

CHEMICAL KINETICS : Rate – Definition and Methods of determination – Rate Laws – Specific rate constant –Order as applied to first, second, zero and fractional order reactions – Molecularity.

UNIT :III

THERMODYNAMICS : Heat and work – various forms of energy – Interconversion of forms of energy – Definition of heat, temperature and heat capacity.

First and second law of thermodynamics – Clausius - Claypeyron equation – Definition of enthalpy, entropy and heat content - Isothermal, Adiabatic, reversible and irreversible processes – Classical example of equipartition of energy.

Hess's law and its application – Free energy changes during chemical reactions. Bond energies and heat of combustion Calculation of free energy change from equilibrium constant of biological transformations – Kirchoff's equation.

Definition of pH and pOH – Buffer solutions – Preparation and uses – Buffer action – Henderson equation – pH of body fluids Buffers in body fluids – Red blood cells and tissues – Measurement of pH by indicators, Hydrogen electrode and glass electrode method.

UNIT : IV

COLLOIDAL STATE : Size of colloidal particles – Types of colloidal dispersions (Sol, aerosols, emulsion forms, gels) Preparation of lyophilic and lyophobic sols – protective colloids – Gold number – Stability of colloids – precipitation – coagulation – Flocculation.

Properties of colloids – colligative, properties, optical properties, Electrical properties.

Gasometric phenomenon and osmoregulation in the body – Electrosomosis - Electrophoresis.
Importance and applications of colloids.

UNIT V:

ELECTROCHEMICAL TECHNIQUES: Principles of electrochemical techniques – reference electrodes, Measurement of PH by glass electrode, ion selective electrodes and gas sensors. Redox potentials principles potentiometric titrations oxygen electrode - principle, operation of a Clark electrode, applications of oxygen electrode. **Course Outcomes:**

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Understand the basic concepts and principles of physical in Biochemical reactions.	PSO 1	R, U
CO-2	Understand the chemical kinetics.	PSO 2	R
CO-3	Explain theThermodynamic laws of biochemical reactions.	PSO 2	U

CO-4	Understand the various states of molecules.	PSO 3	R
CO-5	Understand the physical principles Electrochemical techniques.	PSO 4	An

TEXT BOOK:

1. Keith Wilson and John Walker (2004): Principles and Techniques of Practical Biochemistry, 5th edition, United Kingdom, Cambridge University Press

BOOKS FOR REFERENCE:

1. G.R. Chatwal and S. Anand (1999): Instrumental Methods of Chemical Analysis, Himalaya Publishing, Mumbai

2. A. Upadhyay, K. Upadhyay and N. Nath (2003): Biophysical Chemistry,3rd edition, Himalaya Publishing House, New Delhi

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(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

Second Year – Semester IV

COURSE TITLE	ALLIED 5 (OPTIONAL): MICROBIOLOGY-APPLIED
TOTAL HOURS	60
HOURS/WEEK	4
CODE	U15BC4AOT05
COURSE TYPE	THEORY
CREDITS	4
MARKS	100

General objective:

The student learns about the application of microbes in various fields.

Course Objectives:

CO No.	Course Objectives
CO-1	Apply the knowledge of fermentation in the production of enzymes, antibiotics and alcohols.
CO-2	Evaluate the Various strategies in the Physiochemical methods in food and dairy microbiology
CO-3	Analyze the microbial evaluation in the methods of aquatic and agriculture
CO-4	Analyse the effect of microbes in and air and water borne diseases.
CO-5	Evaluate the role of microbes in different diseased conditions.

UNIT: I **12 Hrs**

INDUSTRIAL MICROBIOLOGY:

Fermentation- definition, basic concept, design of fermentor- Fermentation Products – enzymes, antibiotics, alcohols – microbes involved, fermentation process of ethyl alcohol, vinegar, penicillin, commercial importance of the products. Effluent treatment.

(Extra reading/key words: microbes in medicine)

UNIT: II **12 Hrs**

FOOD MICROBIOLOGY:

Normal flora of fresh food, food spoilage & food poisoning. Physicochemical methods in food preservation.

DAIRY MICROBIOLOGY:

Normal flora of milk, pasteurization, milk products – curd, cheese, butter, fermented milk. Milk borne diseases- – *Staphylococcal enterotoxin poisoning and Salmonellosis*

(Extra reading/key words: solar water pasteurization)

UNIT: III **12 Hrs**

AGRICULTURAL AND AQUATIC MICROBIOLOGY:

Soil microorganisms - types, influence on soil, nitrogen cycle, nitrogen fixation, soil fertility, biofertilizer, Biogas. An introduction to marine microbes.

(Extra reading/key words: mobilization of nutrients)

UNIT: IV **12 Hrs**

MEDICAL MICROBIOLOGY I

An introduction to Medical Microbiology.

Types and analysis of **air microorganism**, air borne diseases – meningitis, chicken pox, and measles. Types and analysis of **water microorganism**, water borne diseases – polio, cholera.

Zoonotic diseases: Anthrax, Rabies, swine flu – causative agents, pathogenesis and preventive measure.

(Extra reading/key words: drug-resistant infections)

UNIT: V **12 Hrs**

MEDICAL MICROBIOLOGY II

Common bacterial, viral diseases of man - diphtheria, tuberculosis, pneumonia, whooping cough, typhoid, leprosy, tetanus, viral hepatitis, AIDS – causative organism, basic structure, toxicity, pathogenicity, clinical symptoms, preventive measures.

(Extra reading/key words: immune assays)

Note: Extra Reading/ Key Words are only for internal testing (Seminar / Assignments)

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Explain the role of microorganisms in food production and preservation, and their ability to cause food-borne infections.	PSO 1	U
CO-2	Demonstrate with examples the vital role of microorganisms in biotechnology, fermentation, medicine, and other industries important to human	PSO 2	R

	well being.		
CO-3	Demonstrate that microorganisms have an indispensable role in the environment, including elemental cycles, biodegradation, etc.	PSO 2	R
CO-4	Know various culture media and their applications and also understand various physical and chemical means of sterilization	PSO 3	An
CO-5	Know the general bacteriology and microbial techniques for isolation of pure cultures of bacteria, fungi and algae	PSO 4	An

TEXT BOOK:

1. Ananthanarayan.R. and Jeyaram Paniker C.K. (1986) Text Book of Microbiology, Orient Longman Limited Madras.

BOOKS FOR REFERENCE:

1. Pelczer M.J. Chan E.C.S. Noel R. Krieg (1993 Microbiology), Fifth Edn., Tata McGraw Hill publishing company Ltd., New Delhi.
2. Ananthanarayan.R. and Jeyaram Paniker C.K. (1986) Text Book of Microbiology, Orient Longman Limited Madras.
3. Frazier W.G. (1958) Food Microbiology. McGraw Hill Book of Company New York.
4. Power C.B. & Daginawala H.F. (1996) General Microbiology Volume I & II. Himalaya Publishing House, Bombay.
5. Stainer R.Y. Ingraham JL.Wheels M.L. & Painter P.R. (1992) General Microbiology, Macmillan, London.
6. Sharma P.D. (1993) Microbiology, Rastogi and Co., Meerut.
7. Purohit S.S (1992) Microbiology-Fundamentals and applications, Agro Botanical Publishers, India.

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(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

Second Year – Semester IV

COURSE TITLE	**ALLIED 6 (OPTIONAL): MICROBIOLOGY – PRACTICALS**
TOTAL HOURS	**60**
HOURS/WEEK	**4**
CODE	**U15BC4AOP06**
COURSE TYPE	**PRACTICALS**
CREDITS	**3**
MARKS	**100**

General Objective:

The student will be able to concentrate on commonly used laboratory tests to develop competencies in the interpretation of results

Course Objectives:

CO No.	Course Objectives
CO-1	Understand and apply the knowledge of the theory and practice of various laboratory tests and methods.
CO-2	understand and apply microbial investigations to develop a clinical diagnosis
CO-3	Understand the laboratory safety and in routine and specialized microbiological laboratory skills applicable to microbiological research or clinical methods, including accurately reporting observations and analysis.
CO-4	Understand how to assess microbial test results and their involvement in the assessment of different bacterial infections and diseases.
CO-5	Integrate the knowledge gained on Microbiology, preservation technology, antibiotic resistances bacterial examinations in order produces the process of making fermentation products

1. Cleaning, Preparation and sterilization of glassware's.
2. Preparation of media for bacteria, fungi and actinomycetes.
3. Inoculation methods.
4. Isolation of pure culture by streak plate & pour plate method.
5. Preservation of cultures – Stab and Slant cultures.

6. Staining of Microorganism – Gram stain, acid fast, methylene blue, Negative staining; Fungal staining – Lactophenol cotton blue
7. Hanging drop preparation.
8. Bacteriological examination of soil and milk.
9. Growth curve.
10. Wine production by yeast.
11. Antibiotic disc assay.
12. Enumeration of coliform organism.

Course Outcomes

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Demonstrate practical skills in the use of tools, technologies and methods common to microbiology, and apply the scientific method and hypothesis testing in the design and execution of experiment	PSO 1	U, R, An
CO-2	Evaluate the microbiological concepts and basic research findings through description, interpretation, and analysis	PSO 2	R
CO-3	Demonstrate and employ practical skills with both classical and modern laboratory techniques	PSO 2	U
CO-4	Apply the microscopic evaluation for microbes	PSO 3	An
CO-5	Demonstrate the various methods in culture methods	PSO 4	An

TEXT BOOK

1. Ananthanarayan.R. And Jeyaram Paniker C.K. (2009) Text Book of Microbiology, Orient Longman Limited Madras.

BOOKS FOR REFERENCE

1. Emanuel Goldman, Lorrence H Green (2015) Practical Handbook of Microbiology, LIC, CRC Press.

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(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

Third Year – Semester V

COURSE TITLE	MAJOR CORE 7: INTERMEDIARY METABOLISM
TOTAL HOURS	75
HOURS/WEEK	5
CODE	U15BC5MCT07
COURSE TYPE	THEORY
CREDITS	4
MARKS	100

General Objective:

The student will be able to explain the reactions involved in the breaking down and building up of Biomolecules.

Course Outcomes

CO No.	Course Objectives
CO-1	Understand the energy-yielding and energy-requiring reactions in life as well as apply and evaluate the role of high energy compounds in driving cellular processes
CO-2	Understand the diversity of metabolic regulation and evaluate how this is specifically achieved in different cells
CO-3	Understand and analyze how these biochemical processes are not isolated but tightly integrated, with specific control sites and key junctions
CO-4	Apply and evaluate the various reactions which decide the fate of carbohydrates, lipids, amino acids and its derivatives required for the functioning of cells.
CO-5	Analyze and evaluate the fate of purine and pyrimidine nucleotides through their synthesis and breakdown mechanisms and also understands the mechanism of detoxification in living cells.

UNIT: I **15 Hrs**

BIOENERGETICS

Free energy and entropy changes in biological system, coupling of endergonic and exergonic processes. High energy phosphate compounds: structure and importance of ATP. Biological oxidation – ETC, Inhibitors ETC, Oxidative phosphorylation-uncoupling inhibitors,

ionophores. Photosynthesis – Dark and light reaction- C3 and C4 and CAM pathways and their significance

(Extra reading/key words: ATP synthesis)

UNIT: II **15 Hrs**

METABOLISM OF CARBOHYDRATES

Carbohydrate metabolism – Glycogenesis, Glycogenolysis, Glycolysis, Citric acid cycle, Glyoxylate cycle, Gluconeogenesis, HMP shunt pathway, Uronic acid pathway. Regulation of carbohydrate metabolism.

(Extra reading/key words: Futile Cycles)

UNIT: III **15 Hrs**

METABOLISM OF LIPIDS & STEROIDS

Biosynthesis of fatty acids and some important phospholipids. Degradation of fats – beta oxidation of saturated and unsaturated fatty acids, Metabolism of triglycerides, degradation of phospholipids. Metabolism of ketone bodies. Steroids – Biosynthesis and degradation of cholesterol – importance.

(Extra reading/key words: plant lipids)

UNIT: IV **15 Hrs**

AMINOACID METABOLISM

Amino acid pool. Deamination, transamination, transmethylation decarboxylation. Urea cycle, Overview – synthesis and degradation of amino acid- phenyl alanine, methionine, tyrosine and alanine

(Extra reading/key words: microbial amino acids)

UNIT: V **15 Hrs**

METABOLISM OF NUCLEIC ACIDS

Biosynthesis (denova and salvage pathway) of purines and pyrimidines with reference to the sources of atoms in the purine and pyrimidine molecules. Catabolism of purines and pyrimidines. Detoxication mechanisms – conjugation, hydrolysis, reduction and oxidation with examples.

(Extra reading/key words: nucleic acid sensors)

Note: Extra Reading/ Key Words are only for internal testing (Seminar / Assignments)

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	explain the general design of metabolic pathways based on bioenergetics principle	PSO 1	U
CO-2	describe how carbohydrates, lipids and nitrogenous compounds are synthesized and degraded	PSO 2	R
CO-3	explain how metabolic pathways are regulated and recognize the biochemical basis of some diseases arising defects in metabolism	PSO 2	R
CO-4	have a holistic view on metabolism, and recognize how different pathways are functionally interlinked and how they are regulated by extracellular and intracellular signals	PSO 3	R,An
CO-5	recognize how metabolism can be related issues in lifestyle, health and disease	PSO 4	R,An

TEXT BOOKS:

1. Murray *et al*(2006) Harper's Biochemistry, Twenty seventh Edn.,Prentice Hall,International Inc.

BOOKS FOR REFERENCE:

1. Lehninger, A.L.Nelson, D.L. and Co., M.M. (2013). Principles of Biochemistry, CBS publishers and Distributors, India.

2. Stryer, L. (2006) Biochemistry, W.H. Freeman and Company,New York.,

3. Dr. S. Ramakrishnan, K.G.Prasannan & R.Rajan (1994). Second Edn, Text Book of Medical Biochemistry, Orient Longman Limited, Madras.

(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

Third Year – Semester V

COURSE TITLE	MAJOR CORE 8: MOLECULAR BIOLOGY
TOTAL HOURS	75
HOURS/WEEK	5
CODE	U15BC5MCT08
COURSE TYPE	THEORY
CREDITS	4
MARKS	100

General Objective:

The student learn about the basic principles of inheritance and the significance of the organization of genome mechanisms in the expression of genetic material and its regulation.

Course Objectives:

CO No.	Course Objectives
CO-1	Understand the structural organization of cell organelles and analyze the ultra-structure of cell organelles and their functions.
CO-2	Understand the biological process of prokaryotic and eukaryotic DNA replication machineries.
CO-3	Understand and analyze the cellular mechanism of transcriptions and translational machineries.
CO-4	Understand and analyze the cellular mechanism of translations and translational machineries.
CO-5	Understand the basic concept of operon and DNA recombination systems in bacteria

UNIT: I **15 Hrs**

GENETIC CARRIERS

Nucleic acids as carriers of genetic information. Nucleosomes: organization of DNA. Three levels of DNA packaging in Eukaryotic chromosomes, C-value paradox

(Extra reading/key words: Levels of organization, genome function)

UNIT: II **15 Hrs**

REPLICATION OF DNA

DNA as genetic material and replication; General features of replication, Semi conservative method: mechanism, experimental evidence. Enzymology, events at the replication fork, rolling circle method, inhibitors of DNA replication

(Extra reading/key words: PCR)

UNIT: III **15 Hrs**

TRANSCRIPTION:

Transcription in prokaryotes and Eukaryotes – initiation, elongation, termination, inhibitors of transcription, antisense RNA. Post transcriptional processing of mRNA, Transcriptional inhibitors-Mechanism. Gene regulators – Lac and Try operon

(Extra reading/key words: Biological Complexity, Mechanochemical pattern formation)

UNIT: IV **15 Hrs**

TRANSLATION

The genetic code and its features. Protein synthesis *in* prokaryotes and Eukaryotes. Post translational modification of protein. Translational inhibitors-Mechanism.

(Extra reading/key words: Biological Alternative cell death mechanisms, Molecular mechanism of Tumor necrosis factor (TNF) signaling)

UNIT: V **15 Hrs**

GENE REGULATION & MUTATION:

Enzyme induction, repression, operon concept, Lac operon, try operon, coordinate regulation, positive and negative regulation DNA damage, DNA Mutation, DNA repair and chromosomal aberrations

(Key ubiquitination)

Note: Extra Reading/ Key Words are only for internal testing (Seminar / Assignments)

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Understand and apply the principles and techniques of molecular biology.	PSO 1	U
CO-2	Discuss the most significant discoveries and	PSO 2	U,R

	theories through the historical progress of biological scientific discoveries, and their impacts on the development of molecular biology.		
CO-3	Explain the principles and laws of inheritance at the cell, individual and population levels.	PSO 2	U
CO-4	Explain concepts such as gene structure and function, gene regulation, microbial genetics, mutation and DNA repair, PCR and sequencing, cancer genetics and evolution.	PSO 3	U,R
CO-5	Describe how gene expression is regulated at different levels, how tissue-specific expression is achieved and exemplify how gene expression can be manipulated and studied experimentally	PSO 4	R,An

TEXT BOOK:

1. Freifelder D., Molecular Biology, Jones and Bartlett, Boston USA, 1989.

BOOKS FOR REFERENCE:

1. Gardner., Principles of Genetics, Wiley Eastern Ltd, New York, 1984.
2. Griffiths, A, J.F., An Introduction to genetic analysis Freeman and company, New York, 1993.
3. Lewis Richi, Human Genetics: Concepts and its application 8th Edn. Tata Mc. Graw Hill New Delhi, 2005.
4. Ursula Goodenough., Genetics, Holt Reinhart and Winston, New York, 1985.
5. Tamarein, Robert H., Principles of Genetics, Tata Mc. Graw Hills, New Delhi, 2004.
6. De Robertis E.D.P, and De Robertis E.M.,Cell and Molecular Biology, 8th Edn. B.I Waverly Pvt. Ltd., New Delhi, 1995.

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(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

Third Year – Semester V

COURSE TITLE	MAJOR CORE-9: IMMUNOLOGY
TOTAL HOURS	75
HOURS/WEEK	5
CODE	U15BC5MCT09
COURSE TYPE	THEORY
CREDITS	4
MARKS	100

General Objective:

The student learns about the structure, mechanisms of action and functional roles of the immune system.

Course Objectives:

CO No.	Course Objectives
CO-1	Understand and apply the types of immunity and lymphoid organs and lymphocytes
CO-2	Understand antigen, immunoglobulins and role of vaccines and apply their role in vaccination
CO-3	Understand and apply the various immune response and types of immunity
CO-4	Understand the types of hypersensitivity and apply the mechanism of autoimmunity
CO-5	Apply the principles behind various immunological techniques.

UNIT: I **15 Hrs**

ORGANS AND CELLS OF IMMUNE SYSTEM

Types of immunity: Innate and acquired, Passive and active.

Lymphoid organs: Primary and secondary lymphoid organs-thymus, bone marrow, bursa fabricius, spleen, lymph node, GALT & BALT.

Lymphocytes: Macrophages, T and B cells –origin, differentiation and functions.

Role of lymphokines and cytokines in an immune response.

(Extra reading/key words: tumor associated macrophages)

UNIT: II **15 Hrs**

COMPONENTS OF IMMUNE SYSTEM

Antigen: Super Antigen, haptens – structure, general properties and functions. Tumour antigens- properties

Immunoglobulin: structure, types & functions. Genetic basis of Antibody diversity.

Vaccines and Toxoids, preparation and immunization.

Complements: Components, mode of activation, classical and alternate pathway and its functions.

(Extra reading/key words: nanoparticle vaccines)

UNIT: III **15 Hrs**

IMMUNE RESPONSES

Acquired Immune Response: Primary and Secondary immune response.

Humoral immunity: Antigen recognition, cell interactions, clonal proliferation, interleukins, antibody synthesis, regulation of antibody synthesis. Cell mediated immunity: Role of cytotoxic T lymphocytes, TD cells, NK cells and macrophages. Immunity to infection: Mechanism, Antigenic drift, antigenic shift, antigen mimicry, antigenic masking, antigenic variation.

(Extra reading/key words: immune boosters)

UNIT: IV **15 Hrs**

IMMUNE REACTIONS

HLA: structure & functions, HLA typing, organ transplantation

Autoimmunity: Concept, mechanism & autoimmune diseases viz., Grave's diseases, SLE, serum sickness and Rheumatoid arthritis.

Hypersensitivity: Definition, mechanism & types with example.

(Extra reading/key words: molecular identification)

UNIT: V **15 Hrs**

IMMUNOLOGICAL TECHNIQUES

Production of antisera, agglutination and precipitation reactions, immune diffusion, immune electrophoresis and immune fluorescent techniques.

Principle, technique and applications of RIA, ELISA.

(Extra reading/key words: enzyme-linked immunosorbent spot [ELISPOT])

Note: Extra Reading/ Key Words are only for internal testing (Seminar / Assignments)

Course Outcomes

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	State the role of the immune system in the human body	PSO 1	U
CO-2	Describe the function of phagocytes in the non-specific immune system. Define the role of B-lymphocytes in the humoral response	PSO 2	An
CO-3	Describe professional antigen presenting cells and define their purpose	PSO 2	U,R
CO-4	Define the major histocompatibility complexes (MHCs) type 1 and 2 and explain their functions	PSO 3	U
CO-5	Explain how T-cells aid in eliminating pathogens from the body. List the symptoms of the inflammatory response and explain their causes.	PSO 4	R,An

TEXT BOOK:

1. Kuby, T. (1994) Immunology, W.H. Freeman & company, New York.

BOOKS FOR REFERENCE:

1. Chakravarthy.A.K. (1996) Immunology, Tata MC Graw Hill publishing company Limited. New Delhi.

2. Daniel P.Stites & Abbas I. Tarr (1991) Basis and Clinical Immunology,Prentice – Hall International Inc.,

3. Sell.S. (1987). Basic immunology–An Introduction, IV Ed.,Saunders college publications, Philadelphia.

4. Roit. I.M, (1998) Essential Immunology, 6th Edn. EIBS/Blackwell scientific Publication, Oxford.

5. Fathima, D. & Armugam (1996). Immunology, Saras Publication. Kanyakumari.

6. Nandini.S. (1994) – Immunology Introductory text book. New age Int, (P) Ltd. Publication, New Delhi.

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(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

Third year – Semester V

COURSE TITLE	**MAJOR CORE 10:PRACTICALS –II ENZYMES & ANALYTICAL TECHNIQUES**
TOTAL HOURS	**75**
HOURS/WEEK	**5**
CODE	**U15BC5MCP10**
COURSE TYPE	**PRACTICAL**
CREDITS	**4**
MARKS	**100**

Course Objective:

CO No.	Course Objectives
CO-1	Gain an enhanced overall understanding of enzyme assays and in particular the influence of various physicochemical characteristics upon enzyme activity.
CO-2	Gain an understanding of buffers and their importance in the context of pH control.
CO-3	Apply and analyze the basics of the major analytical techniques including sample preparation, standardization and data analysis for each technique and develop interpersonal and teamwork skills
CO-4	Evaluate the theory and practice of protein purification, chromatography, electrophoresis, centrifugation, and other essential methods in modern molecular bioscience
CO-5	Analyze data for assessment and evaluate data to use in planning the dietary recommendation understand and evaluate the strengths, limitations and creative use of techniques for problem-solving.

ENZYMES:

1. Preparation of acid phosphatase from potatoes, effect of pH, Temperature, Enzyme and Substrate concentration on the enzyme.
2. Preparation of amylase- total activity, specific activity, effect of pH, temperature, and substrate concentration on the enzyme.
3. Preparation of Line weaver – Burk plot and determination of Michaelis Menten constant of acid phosphatase and amylase.

ANALYTICAL TECHNIQUES

1. Rectangular Paper chromatography.
2. Circular Paper chromatography.
3. Thin layer chromatography of amino acids
4. Separation of plant pigments by column chromatography
5. Electrophoresis.

Course Outcomes

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Acquire direct laboratory experience in spectrophotometry	PSO 1	U
CO-2	Recognize and draw structural isomers (constitutional isomers), stereoisomers including enantiomers and diastereomers, racemic mixture, and meso compounds.	PSO 2	U,R
CO-3	Learn how to calculate and present the resultant data in tabular and graphical format.	PSO 2	U,An
CO-4	Have insight in the physico-chemical properties of proteins that underlie purification methods.	PSO 3	R
CO-5	Gain an appreciation of working as part of an integrated research team	PSO 4	An

TEXT BOOK:

1. J. Jayaraman (2011). Laboratory Manual in Biochemistry, New Age International Pvt Limited.

BOOKS FOR REFERENCE

1. Prof. Sklayrov A.Ya., Fomenko I.S., Klymyshin D.O, Nasaduk Ch.M. (2016). Laboratory Manual for Biological Chemistry.

2. Richard F. Venn. (2003). Principles and Practice of Bioanalysis. Taylor and Francis Inc. New York.

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(Students admitted from the year 2018 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
PG DEPARTMENT OF BIOCHEMISTRY
B.Sc., - BIOCHEMISTRY Third Year–Semester V

COURSE TITLE	**MAJOR ELECTIVE-2: DRUG BIOLOGY**
TOTAL HOURS	**75**
HOURS/WEEK	**5**
CODE	**U15BC5MET01**
COURSE TYPE	**THEORY**
CREDITS	**5**
MARKS	**100**

General Objective:

The student learns the basic concepts of biology and chemistry to determine how drugs affectthe organism and the unique perspective in understanding cells, organ systems, and organisms function

Course Objectives

CO No.	Course Objectives
CO-1	Understand the evolution of drugs through time covering the principles of drug discovery in the areas of pharmacognosy and natural products; synthetic medicinal
	chemistry and the development of medicinal substances;
CO-2	Provide knowledge about the principle of action of drugs and toxic substances and the opportunity to apply these principles in a research setting
CO-3	Correlate between pharmacology of a disease and its mitigation or cure
CO-4	Interpret how biological systems fail to function, providing information on the etiology of disease.
CO-5	Apply the knowledge leading to a career in academic research or in the pharmaceutical industry

UNIT- I

History and development of medicinal plants, sources and classification of drugs. Routes of drugs administration, dosage forms. Drug distribution, pKa values, hydrogen bonding, protein binding, chelation, steric effect, surface activity. Mechanism of action of drugs, combined effect of drugs. Factors modifying drug action, tolerance and dependence. Pharmacogenetics.

UNIT- II

Drug metabolism – general pathways of drug metabolism (different types of reaction in phase I and phase II with examples), metabolism and excretion of drugs. Adverse drug reactions and treatment of poisioning. Drug interactions, factors affecting drug metabolism including stereo chemical aspects, significance of drug metabolism in medicinal chemistry.

UNIT- III

Autonomic nervous system, central nervous system, autocoids, chemotherapy of parasite infections, chemotherapy of microbial diseases, immunomodulators. Gene therapy. Therapeutic gases. Free radical biology and antioxidants, pharmacology of biophosphonates.

UNIT- IV

General toxicology: Basic principles of diagnosis. Mechanism of toxic effect, toxicokenectics – chemical carcinogens and teratogens, treatment of intoxication. Response of respiratory system, reproductive system, liver , kidney to toxic agents. Toxic effects of metals, solvents, environmental pollutants. Antidotes in the management of poisioning. Applied analytical toxicology and toxicovigilance.

UNIT- V

Basic constituents of plants (chemical classification). Isolation of active constituents from plant material. Percolation and maceration. Qualitative constituent characterization techniques. Utilization of HPTLC for the constituent analysis. Estimation of marker compounds on biological

fluid after crude plant material. Introduction and medicinal terminology – IT enabled services, need of medical transcription, equipments used. Medical terminology – word root, combining form, suffixes prefixes, formation and defining medical words.

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Understand key principles of pharmacognosy and natural products and their role in shaping the pharmaceutical industry, including traditional, complementary and alternative Medicines.	PSO 1	U,R

CO-2	Able to describe the modern and innovative discovery of biopharmaceuticals as it relates to today's healthcare and future trends in modern drug discovery globally.	PSO 2	An
CO-3	Develop an understanding of drug targets as a recognition site for pharmaceutical agents; how the chemical structure of a substance influences interaction with a drug target; and the identification of new drug targets for future drug discovery.	PSO 2	U,An
CO-4	Discuss the pharmacological management of infectious diseases including the mechanism of action of specific agents and their structure activity relationships.	PSO 3	U
CO-5	Under stand the role of synthetic chemistry in the development of pharmaceutical agents; and the modification of chemical structures to develop new drug molecules.	PSO 4	An

REFERENCE BOOKS

1. The pharmacology volumeI and II – Goodman and Gillman
2. Basic pharmacology –Foxter Cox
3. Principles of medicinal chemistry 4th edition by Willam.O.Foye, B.I. Waverks, LW&W., (1995)
4. Burgers medicinal chemistry and drug discovery- principles and practice- Manfred. E.Wolf
5. Oxford text book of clinical pharmacology and drug therapy, D.G Grahme Smithand J.K.Aronson
6. Pharmacology and pharmatherapeutics- R.S. Satoskr, S.D.Bhandhakarand
7. Essential of pharmacotherapeutics, Barav.F.S.K
8. Introduction to medicinal chemistry, Batrick.G.L
9. Lippincotts illustrated review pahamacology, Mary. J.Mcek, Richarts, Pamela.C.

(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

Third Year – Semester V

COURSE TITLE	**MAJOR ELECTIVE-2: BIOSTATISTICS**
TOTAL HOURS	**75**
HOURS/WEEK	**5**
CODE	**U15BC5MET02**
COURSE TYPE	**THEORY**
CREDITS	**5**
MARKS	**100**

General Objective

The student learns about illustrative and descriptive statistics and understands the use of the various statistical measures to be applied in biological sciences.

Course Objectives:

CO No.	Course Objectives
CO-1	Understand and apply the concept of various representations of data
CO-2	Understand and apply the measures of central tendency
CO-3	Understand and apply the types of correlations and regressions
CO-4	Understand and apply the knowledge of various significance tests
CO-5	Understand probability and analysis of variance and apply to their project work

UNIT: I **15 Hrs**

INTRODUCTION TO BIOSTATISTICS

Definition – Scope of Biostatistics, Variables in Biology. Collection, classification and tabulation of data. Graphical and diagrammatic representation- scale diagram – Histogram – frequency polygon – frequency curves.

(Extra reading/key words: mini survey)

UNIT: II **15 Hrs**

DESCRIPTIVE STATISTICS Measures of central tendency –Mean (Arithmetic, Harmonic and Geometric), Median and Mode. Measures of dispersion – Mean deviation, Quartile deviation and Standard deviation (Derivations not included).

(Extra reading/key words: case study on mean height of students in the department)

UNIT: III **15 Hrs**

CORRELATION AND REGRESSION

Simple correlations – correlation co-efficient. Regression – Simple linear regression.

(Extra reading/key words: big data analytics, sib-sib (intraclass) correlation, parent-child (interclass), regression analysis in business)

UNIT: IV **15 Hrs**

BIOSTATISTICAL TESTS

Basic idea of significance test – Hypothesis testing, level of significance. Tests based on student 't'test, 'Chi' square and goodness of fit. Theoretical distribution – Normal, Binomial and Poison distributions.

(Extra reading/key words: Decision Errors, Decision Rules)

UNIT: V **15 Hrs**

PROBABILITY

Probability: Principle- (Permutations and Combinations) and types. ANOVA, ANOCOVA and its applications (One way and two way classification). An introduction to SPSS.

(Extra reading/key words: statistical analysis system)

Note: Extra Reading/ Key Words are only for internal testing (Seminar / Assignments)

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Select, use and interpret results of descriptive statistical methods effectively	PSO 1	R, An
CO-2	Demonstrate an understanding of the central concepts of modern statistical theory and their probabilistic foundation;	PSO 2	U
CO-3	Select, use, and interpret results of, the principal methods of statistical inference and design	PSO 2	R, An

CO-4	Communicate the results of statistical analyses accurately and effectively	PSO 3	R
CO-5	Make appropriate use of statistical software. Read and learn new statistical procedures independently	PSO 4	An

TEXTBOOK:

1. S.Palanichamy & M. Manoharan, (1991) Statistical methods for Biologists. Palani paramount publications.

BOOKS FOR REFERENCE:

1. Gupta, C.D. (1973) An Introduction to statistical Methods. Vikas Publishing Pvt. Ltd., New Delhi.
2. Veer Bala Rastogi. Fundamentals of Biostatistics.
2. Ipsen,J & Feigl, P.(1970) Bancrofts Introduction of Biostatistics Haper and Row Publishers, New York, London.
3. Snedecor, G.W & William (1975) Statistical Methods Harvard University, Oxford & IBH publication Co., Calcutta Bombay.

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(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

Third Year – Semester V

COURSE TITLE	**NON MAJOR ELECTIVE PAPER I- FIRST AID MANAGEMENT**
TOTAL HOURS	**30**
HOURS/WEEK	**2**
CODE	**U15BC5NMT01**
COURSE TYPE	**THEORY**
CREDITS	**2**
MARKS	**100**

General objective:

The student learns about principles & objectives of first aid & acquires basic knowledge on the various first aid measures to be given during various emergency situations.

Course Objectives:

CO No.	Course Objectives
CO-1	Understand their role as an emergency first aider.
CO-2	Understand the use of risk assessments for health and safety purposes and apply it the daily life.
CO-3	Understand how to respond to accidents and sudden illnesses and analyse the different treatment methodologies.
CO-4	Understand the ways of minimizing risks to themselves and others
CO-5	Evaluate the various first aid strategies that can be applied at different occasions

UNIT: I **6Hrs**

PRINCIPLES OF FIRST AID MANAGEMENT

Principles and objectives of First Aid, casualty assessment. Priorities of First Aid. Patient management and care.

(Extra reading/key words: emergency services)

UNIT: II **6 Hrs**

MANAGEMENT OF ILLNESS

Management of common illness and Thermal illness. Risk assessment and risk reductions- Fainting, Anaphylaxis, Asthma, Epilepsy, Diabetes, Burns and Scalds.

(Extra reading/key words: physiological changes)

UNIT: III **6 Hrs**

INJURIES

Internal and external bleeding injuries to muscles, back, chest, abdomen, joints and bones, stroke and head injury and eye irrigation. Sudden illness-poisoning, Bites and Stings.

(Extra reading/key words: RBS, WBC)

UNIT: IV **6 Hrs**

FIRST AID IN EMERGENCIES

Accident reporting, breathing emergencies, Cardiac emergencies. Oxygen therapy – resuscitation, defibrillation – Heart attack. Common gastrointestinal sickness, Altitude sickness.

(Extra reading/key words: Dietary management)

UNIT: V **6 Hrs**

FIRST AID KITS

First Aid rooms and equipments, First aid kits, cleaning of wounds and dressing injury assessment.

(Extra reading/key words: methods of sterilization)

Note: Extra Reading/ Key Words are only for internal testing (Seminar / Assignments)

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Identify the most important action you can take in a life-threatening emergency. Identify the major structures of the respiratory, circulatory, nervous, and musculoskeletal systems.	PSO 1	U
CO-2	Explain why you should follow the emergency action steps/principles in any emergency. Demonstrate how to do a primary and secondary survey.	PSO 2	R
CO-3	Describe the purpose of and demonstrate rescue breathing for an adult.	PSO 2	R,U

CO-4	Describe and demonstrate first aid care for a conscious and an unconscious victim with an obstructed airway.	PSO 3	R,An
CO-5	Identify signals of a heart attack. Describe the purpose of and demonstrate CPR for an adult.	PSO 4	R,U

TEXT BOOK:

1. John A Eastman, (2007). First Aid to the Injured – Authorized manual of St. John's Ambulance, Red Cross Road, New Delhi.

BOOK OF REFERENCE:

1. Subramanian. R. (2006) First aid Home nursing, 1st edn, Bharat printers Trichy.

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(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2

DEPARTMENT OF BIOCHEMISTRY

SEMESTER V- NME 1: NON MAJOR ELECTIVE PAPER I

CLINICAL BIOCHEMISTRY AND MICROBIOLOGY

CREDITS: 4 **CODE: U15BC5NMT02**

HRS/WK: 4

COURSE TITLE	NME 1: NON MAJOR ELECTIVE PAPER I CLINICAL BIOCHEMISTRY AND MICROBIOLOGY
TOTAL HOURS	30
HOURS/WEEK	2
CODE	U15BC5NMT02
COURSE TYPE	THEORY
CREDITS	2
MARKS	100

General Objective:

The course will enable the students to demonstrate how basic biochemistry and analytical chemistry can be applied to medical diagnosis, treatment and management.

Course Objectives

CO No.	Course Objectives
CO-1	Remember the historical background for Clinical Biochemistry and understand the basic technology
CO-2	analyze the procedure for sample collection
CO-3	Understand and identify the main characteristics of diagnosis, Blood
CO-4	Apply the processes of scientific research to use in emergency services in clinical biochemistry.
CO-5	Evaluate the scientific explanations that show the Morphology and examination of Microorganism

General and instructional objectives:

The student learns about the basics of sampling, normal values for the different hematological tests and its significance.

UNIT:I

Introduction to laboratory equipment and basic laboratory operations: Use and care of common laboratory Glass wares and Instruments- Microscope, Colorimeter, Centrifuge, Incubator, Hot air oven, Autoclave. Practicals : Demonstration of glass wares and instruments

UNIT:II

GENERAL COMMENTS ON SAMPLE COLLECTION

Collection of Urine: Random, 24hrs, changes on keeping. Preservative of Urine. Collection of blood by fingertip and venipucture..Types of blood to be collected - whole blood, serum plasma, RBC.Routine analysis of urine(qualitative) colour, appearance and pH, specific graviy, Albumin, glucose, ketone bodies, blood, urinary deposits, bile salts, bile pigments and urobilinogen.Practicals: Demonstration – Abnormal chemical Constituents of Urine.

UNIT: III

INTRODUCTION TO HAEMATOLOGY

Components of blood and their functions, Routine Haematological Tests – Haemoglobin estimation and Anaemia, Blood Grouping, the ABO and Rhesus blood group system, making and staining of a blood film and identification of cellular elements in it. Differential leukocyte count.

Practicals: Hb, DLC, Blood Grouping.

UNIT: IV

CLINICAL BIOCHEMISTRY

Routine Biochemical Test- Blood glucose, protein, Urea, creatinine, Cholesterol (lipid profile), Calcium, Phosphorous and Enzymes (SGOT, SGPT) – their estimation and significance.

Practicals: – Glucose, Protein, Urea and Creatinine estimations. Demonstration.

UNIT:V

INTRODUCTION TO BACTERIOLOGY

Morphology and examination of Microorganism, Microorganism in stained preparation and culturing of microorganisms.Laboratory diagnosis – Typhoid, cholera, Meningitis, Tuberculosis Staphylococcal and streptococcal infection.Practicals: Gram's staining and culture method.

Note: Extra Reading/ Key Words are only for internal testing (Seminar / Assignments)

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Discuss technology performed in a clinical	PSO 1	U

	biochemistry laboratory		
CO-2	Compare the different sample collection methods	PSO 2	R
CO-3	Describe and identify the main characteristics of diagnosis, screening, and prognosis of disease.	PSO 2	U,R
CO-4	Critically evaluate the role of clinical biochemistry in diagnosis, monitoring and treatment.	PSO 3	R
CO-5	Applications of microbiology on health, medical diagnostics and pharmacy.	PSO 4	An

TEXT BOOK:

1. Kanai L. Mukherjee (1993) Medical laboratory Technology, Vol. I, I, III Tata Mc Graw-Hill Publishing Co. Ltd., New Delhi.

REFERNCES:

1.Monical Cheesbrough and John McArthr. A Laboratory manualforRural tropical hospitals. The English LanguageBooksociety.

2.Kanai L. Mukherjee (1993) Medical laboratory Technology, Vol. I, I, III TataMc Graw- Hill Publishing Co. Ltd., NewDelhi.

3.Ramakrishnan, Prasanna and Rajan (1994) Textbook of Medical Biochemistry orient Longman,Madras

4.Harold Varley alan H. Gowenlock and Mauring Bell (1991) Practical Clinical biochemistry Vol. I & II Fifty Edn., CBS Publishers 7 Distributors,NewDelhi.

Ambika Shanmugam, (1997) Fundamentals of Biochemistry for Medicalstudents, Chennai

(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

Third Year – Semester V

COURSE TITLE	**SBE 4: FOOD PRESERVATION TECHNOLOGY**
TOTAL HOURS	**30**
HOURS/WEEK	**2**
CODE	**U15BC5SBP04**
COURSE TYPE	**PRACTICAL**
CREDITS	**2**
MARKS	**100**

General Objective:

The student learns about the processes of commercial foods, milk and milk products and food additives and preserving foods from spoilage.

Course Objective:

CO No.	Course Objectives
CO-1	Analyze major food preservation techniques and their underlying principles.
CO-2	Understand the technologies available in India for food processing
CO-3	Evaluate the suitable methods of processing techniques for a chosen food.
CO-4	Understand the purpose and principles of food packaging.
CO-5	Evaluate the suitability of packaging material for a particular type of food. Analyze the operations involved in packaging material manufacture.

Preparation of

1. Jams, jellies and fruit preserves
2. Squashes, vegetables and fruit products
3. Pickles & Chutneys
4. Sauces & Ketchups
5. Ready mixes & Paneer Preparations
6. Bakery products (Cakes & Biscuits)

Classification of food and importance of food preservation. Principles and methods of food preservation.

Milk and Milk Products (Fl/ow chart for processing of milk powder, condensed milk and cheese).

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Apply the knowledge of preparing various foods	PSO 1	An
CO-2	Develop their interview skills	PSO 2	R
CO-3	Explain the relationship between food and diet	PSO 2	U,R
CO-4	Discuss the preparations and their applications	PSO 3	R,An
CO-5	Define solubility, percent concentration, molarity, mole fraction, and molality.	PSO 4	An

TEXT BOOKS:

1. Srilakshmi, B. (2001). Food Science, New Age International (P) limited Publishers, New Delhi.

2. Aishah Bujanj (2007). Principles of Food Preservation - Practical Manual for Diploma in Food Technology. Pusat Penerbitan University, University Technology, MARA.

BOOKS FOR REFERENCE:

1. Shafiur Rahman M. (2007). Hand Book of Food Preservation, CRC Press.
2. Shakuntala Manay, N. and Shadaksharasswamy, M., (1998), Foods –Facts and Principles New Age International (P) Limited, Publishers, New Delhi.
3. Shirley J.VanGrade and Margy Woodburn. (1999) Food Preservation and Safety- Principles and Practice Surabhi Publications, Jaipur.

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HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2

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

LIFE ORIENTED EDUCATION

ETHICS – III: FAMILY AND CAREER DEVELOPMENT

HRS / WK : 1 **CODE: U15VE6LVE03**

CREDIT : 1 **MARKS : 100**

OBJECTIVES:

- To help the students acquire skills, knowledge and talents to lead a meaningful life.
- To make the students learn skills of nurturing family and children.
- To make the students aware of emotional intelligence and choose their career.

UNIT – I: PERSONAL COMPETENCE

Emotional Intelligence for Professional growth, Management Vs Leadership-Management and Leadership Skills - Conflict Management - Tips for Professional growth

UNIT – II: MARRIAGE AND FAMILY

Family Vision - Family Values, Family relationship, Family Management, Sex in Marriage, Emotional Balance and Imbalance, Compatibility between Husband and Wife

UNIT – III: PARENTHOOD

Bringing up Children - Development stages (Eric Ericson model), Spirituality: Spirituality in Family - Prayer, God's Will , Role of Mother

UNIT – IV: PERSONALITY DEVELOPMENT

Self Analysis; interpersonal relation, introspection – Character formation towards positive personality- Values, self and college motto, punctuality, good moral, poverty, honesty, politeness, humanity, gentleness, friendship, fellowship and patriotism

UNIT – V: CAREER CHOICE

Career Choice according to Personality, Preparation for Competitive Exams, Sources of Knowledge, Memory Techniques, Mind Mapping

REFERENCES:

1. Tony B and Barry Buzan(2003), The mind map book, BBC world wide limited, London.
2. Susan Nash(2005), Turning team performance inside out, Jai CO. publishing House, New Delhi.
3. Fr. Ignacimuthu (1999) "Values for Life", Vaigarai Pathipagam.
4. Grose. D.N. (2000), "A text book on Value Education", Dominant Publishers.

HOLY CROSS COLLEGE(AUTONOMOUS) TRICHIRAPALLI-2.

B.A/B.SC/B.COM/ B.C.A – DEGREE COURSES
LIFE ORIENTED EDUCATION
BIBLE STUDIES – III: ESSENCE OF CHRISTIAN LIVING

HRS / WK : 1 **CODE: U15VE6LVBO3**

CREDIT : 1 **MARKS : 100**

OBJECTIVE:

1. To prepare the students to practice Christian principles in family, church and society as young women

UNIT – I: ESSENTIALS OF CHRISTIAN FAITH

1. Salvation – Deliverance from sin (Is 53),Assurance of salvation and New life (II Cor 5:17)
2. Sacraments – Baptism (Luke 3: 6-14), Lord's Supper (I Cor 10: 16,17; 11: 23-29)
3. Trinity– One in three and three in one. Illustrations from the Bible. (John 14: 16,17)
4. Heaven and Eternal life (John 14: 13, 3: 13-21)

UNIT – II: MARRIAGE AND FAMILY LIFE

1. Finding the God's Will - Issac (Gen 24)
2. Man and woman as Partners – Abraham and Sarah (Gen 16-18,22), Aquila and Priscilla (Acts 18: 1-3,26)
3. Evils to be avoided – Premarital Sex, Extramarital Sex, Homosexuality, Abortion(Heb 13: 4, Psalm 127 : 4)
4. Ideal Wife – Sarah (I Peter 3: 1-6), Ruth,(Eph 5)

UNIT – III: CHRISTIAN HOME

5. 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)
6. Caring for the Aged (I Sam 2: 31,32)

UNIT – IV: CHRISTIAN ETHICS

I Holiness – Joseph (Gen 39:9) Levi 11: 45, Ecc 12

- Obedience to God - Abraham (Gen 12) ; St.Paul (Acts 9)

A Freedom and Accountability

B Justice and Love

C Choices in Life – Making Decisions (Studies, job, life Partner)

D Model to follow – Who is your model? (John 15: 1-17)

E Social Evils – Dowry, Caste discrimination, Accumulation of wealth

UNIT – V: MISSIONARIES DOWN THE LANE

A William Carrie (Calcutta)

B Pandithar Rama Bai (Karnataka)

C Amy Carcheal (Dohnavur)

D Dr. Ida Scuddar (Vellore)

E Devasagayam (Nagercoil)

F St. John De Britto (Oriyur)

G Graham Staines & Family (Odisha)

H St. Mother Teresa (Calcutta)

REFERENCES:

1. Alban Douglass (1982) One Hundred Bible Lessons. Gospel Literature Service, Mumbai.
2. Derek Prince (1993) Foundations for Righteous Living. Derek Prince Ministries-South Pacific, New Zealand.
3. Derek Prince and Ruth Prince (1986) God is a Match maker. Derek Ministries, India.
4. Ron Rhodes(2005) Hand book on Cults. Amazon.com
5. Stanley.R. (1997) With God Again. Blessing Youth Mission, India.
6. Taylor.H. (1993) Tend My Sheep. SPCK, London.

(For Candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2

B.A./B.Sc/B.Com/BBA/B.C.A - DEGREE COURSES

LIFE ORIENTED EDUCATION

CATECHISM – III: LITURGY AND CHRISTIAN LIFE

HRS / WK : 1 **CODE:U15VE6LVC03**

CREDIT : 1 **MARKS : 100**

OBJECTIVES:

- To prepare the students to participate meaningfully in the liturgical celebration and experience GOD in their day today life.
- To enable the students to become living witnesses to Jesus Christ in their personal, family and social life.

UNIT – I: LITURGY

Personal prayer (Know oneself) – Vocal prayer – Community prayer – Meditation – Contemplation – Knowing the prayers : Our Father – Hail Mary – Holy Rosary – Mysteries of the Rosary- Litany of Mary – Family prayer-Popular devotion

UNIT – II: HOLY SACRIFICE OF THE MASS

Significance – Meaning and need for spiritual growth – Mass prayers – Part of the mass – Liturgical year, its division and its significance. – The Creed – Act of contrition – Discernment of spirits – Counseling – Spiritual direction.

UNIT – III: CHRISTIAN VOCATION AS DISCIPLE FOR THE KINGDOM OF GOD

Who am I as a Christian? – Christian dignity and others – The values of the Kingdom opposing to the values of the World – Christian social conscience – Christian in the reformation of the world – A call to be salt and light in today's context.

UNIT – IV: CHRISTIAN FAMILY

Holy Family- Characteristic of good family – Bible centered, Prayer centered, Christian centered–Responsibilities of parents and children in the family –Laws of the Church towards marriage-Pro life (Abortion, Euthanasia) – Lay Vocation – Lay Participation – Lay associates.

UNIT – V: CONSECRATED LIFE

"Come and follow me" – special disciples - Religious vocation – "I have called you to be mine"- Role of Nuns and Priest - called to be prophets and agents for God's Kingdom – nucleus of the church – Eschatological signs of the God's Kingdom.

REFERENCES:

1. Compendium – Catechism of the Catholic Church Published by Vaigarai Publishing House for the Catholic Church of India.

2. You are the light of the World, A course on Christian living for II year Religion published by Department of Foundation Courses, St.Joseph's College (Autonomous), Tiruchirappalli–

620 002.

3. Documents of Vatican II – St. Paul's Publications, Bombay 1966.

(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

Third Year – Semester VI

COURSE TITLE	**MAJOR CORE 11: GENETIC ENGINEERING**
TOTAL HOURS	**90**
HOURS/WEEK	**6**
CODE	**U15BC6MCT11**
COURSE TYPE	**THEORY**
CREDITS	**5**
MARKS	**100**

General Objective:

The student learns about the various techniques of genetic engineering.

Course Objectives:

CO No.	Course Objectives
CO-1	Understand the importance of plasmids and viruses to genetic engineering.
CO-2	Understand the principles of the techniques of selection and screening of clones.
CO-3	Analyze the methods of screening for clones that contain a desired gene fragment.
CO-4	Evaluate the various techniques used to characterize DNA.
CO-5	Analyze and evaluate the different applications of gene technology.

UNIT: I **18 Hrs**

TOOLS OF GENETIC ENGINEERING

Restriction enzymes: discovery, nomenclature, types and uses.

Linking of DNA- ligases, linkers, adaptors and Homopolymer tails.

Gene libraries: Genomic and cDNA libraries.

Cloning vectors: Plasmids (pBR322), Bacteriophage (λ, M13) and Cosmids. Ti plasmid, Retrovirus, phagemid, YACs.

(Extra reading/key words: DNA assembly technologies)

UNIT: II **18 Hrs**

GENE TRANSFER TECHNIQUES

Gene transfer techniques – calcium phosphate coprecipitation, transduction, protoplast fusion, electroporation, Microinjection and lipofection.

Selection and Screening: Insertional inactivation Immunological screening, DNA Hybridization. Northern, Southern, Western Blotting and PCR- Principle, technique and applications.

(Extra reading/key words: arterial gene transfer)

UNIT: III **18 Hrs**

PLANT TISSUE CULTURE

Biotechnology: Definition, Scope, Biotechnology as an interdisciplinary pursuit.Plant tissue culture methods-callus culture, micropropagation, protoplast culture. Cloning of disease resistant plants, cloning of *Bacillus thuringiensis,* Application of plant tissue culture. SCP and its applications.

(Extra reading/key words: multiplexed SCP)

UNIT: IV **18 Hrs**

ANIMAL CELL CULTURE

Animal cell culture – culture media, primary and continuous culture, cell lines and its applications. Stem cells and its applications.

Fish Biotechnology: Transgenic fish, IVF.

Transgenic live stock production and application, Knockout mice.

Rules in Biotechnology – Patent (IPR), copyright safety, bioethics and hazards.

(Extra reading/key words: Oxygen Transfer Oxygen Transfer Rate)

UNIT: V **18 Hrs**

APPLICATIONS OF BIOTECHNOLOGY

Recombinant hormones: concept, applications (Insulin and Growth Hormone)

Vaccines: Subunit vaccines, Recombinant vaccines, edible vaccines.

Monoclonal Antibodies: Methods of production (Hybridoma, vectors) and its application.

Nanotechnology – Introduction and its application.

(Extra reading/key words: recombinant DNA technology)

Note: Extra Reading/ Key Words are only for internal testing (Seminar / Assignments)

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Provide examples of current applications of biotechnology and advances in the different areas like medical, microbial, environmental, bioremediation, agricultural, plant, animal, and forensic.	PSO 1	U
CO-2	understand the concept of recombinant DNA technology or genetic engineering	PSO 2	U,R
CO-3	describe DNA fingerprinting, and restriction fragment length polymorphism (RFLP) analysis and their applications	PSO 2	R
CO-4	explain the concept and applications of monoclonal antibody technology	PSO 3	R,An
CO-5	Explain the general principles of generating transgenic plants, animals and microbes.	PSO 4	An

TEXT BOOKS:

1. Dubey, P.C. (2007) Text Book of Biotechnology, Chand and Co New Delhi.

BOOKS FOR REFERENCE:

1. Kumar, H.D. (1994) Mol. Bio., and Biotech. Vikas publishing House (P) Ltd., New Delhi.
2. Smith John, E. (1988) Biotech Edward Arnold London.
3. Trehan, K. (1990) Biotechnology, Wiley Eastern Ltd., New Delhi.
4. Old R.W and primrose, S.B (1989). Principles of Gene manipulation. Blackwell Scientific publications, Newyork.

(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

Third Year – Semester VI

COURSE TITLE	MAJOR CORE 12 -CLINICAL BIOCHEMISTRY
TOTAL HOURS	90
HOURS/WEEK	6
CODE	U15BC6MCT12
COURSE TYPE	THEORY
CREDITS	5
MARKS	100

General Objective:

The course will enable the students to demonstrate how basic biochemistry and analytical chemistry can be applied to medical diagnosis, treatment and management.

Course Objectives

CO No.	Course Objectives
CO-1	Remember the historical background for Clinical Biochemistry and understand the basic elements of core biochemistry and specialized test in biochemistry
CO-2	analyze the basic differences between carbohydrate, lipid, protein and nucleic acid Metabolism abnormalities.
CO-3	Understand and identify the main characteristics of diagnosis, screening, and prognosis of disease.
CO-4	Apply the processes of scientific research to use in emergency services in clinical biochemistry.
CO-5	Evaluate the scientific explanations that show the hormonal disorders during disease and analyze the functioning of the various organs and tissue through tissue function tests and also evaluate the role of biomarkers in disease diagnosis.

UNIT: I **18 Hrs**

DISORDERS OF CARBOHYDRATE METABOLISM:

Regulation of Blood Glucose, effect of hormones – Insulin, Glucagon & Catecholamines. Abnormal sugar levels - Hypo and Hyperglycemia, glycosuria. Diabetes mellitus-classification, metabolic changes, complications. Glucose Tolerance Test. Inborn errors of carbohydrate metabolism: Pentosuria, Fructosuria, Galactosemia, Glycogen storage disease.

(Extra reading/key words: hyperosmolar coma, novel drug targets for type II diabetes)

UNIT: II **18 Hrs**

DISORDERS OF AMINO ACIDS AND PROTEIN METABOLSIM

Plasma proteins in health and diseases, Characteristics of individual plasma proteins,their significance & variation in diseases (Dysproteinemias and paraproteinemias). Serum Urea and Creatinine level-interpretation. Porphyria, Proteins in normal urine and renal diseases – proteinuria. Inborn errors of amino acid metabolism: Phenylketonuria, Alkaptonuria, Tyrosinosis, Albinism, Maple – syrup syndrome and Hartnup syndrome.

(Extra reading/key words: metabolic diet app for IEM)

UNIT: III **18 Hrs**

DISORDERS OF LIPID METABOLISM

Disorders of lipid metabolism: Intestinal lipid disorders, Lipid transport disorders, metabolic disorders: atherosclerosis, fatty liver, obesity. Inborn errors in lipid metabolism: Tay sach's disease, Niemann Pick disease and Gaucher's disease. Serum cholesterol interpretation.

(Extra reading/key words: micro RNA in atherosclerosis)

UNIT: IV **18 Hrs**

DISORDERS OF NUCLEIC ACID METABOLISM: Disorders of Purine and pyrimidine metabolism – Gout – high serum levels of urate, orotic aciduria, Xanthinuria, ADA deficiency, Lesch Nyhan syndrome. **RENAL AND LIVER TRANSPORT DISORDER**: Renal glycosuria, cystinuria, Fanconi syndrome, Gilbert's disease and Dubin Johnson`s

syndrome.**TISSUE FUNCTION TEST**: Liver function test, Kidney function test, gastric function test. Quality control of laboratory test.

(Extra reading/key words: nucleic acid therapeutics for Alzheimer's disease)

UNIT: V **18 Hrs**

CLINICAL ENDOCRINOLOGY: Laboratory investigations associated with thyroid, parathyroid and adrenal medulla. **DIAGNOSTIC ENZYMOLOGY**: Use of enzymes as marker for clinical diagnosis – Alkaline phosphatase, Acid phosphatase, AST (SGOT), ALT, [SGPT], LDH. CK and amylase, acetyl choline esterase. **HAEMATOLOGY**: Haemoglobinopathies, Mechanism of blood coagulation and disturbances in blood clotting process.

(Extra reading/key words: bone marrow transplantation)

Note: Extra Reading/ Key Words are only for internal testing (Seminar / Assignments)

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Discuss the biochemistry and pathophysiology associated with tests performed in a clinical biochemistry laboratory	PSO 1	U
CO-2	Compare and contrast the basic differences between carbohydrate, lipid and protein metabolism abnormalities.	PSO 2	R
CO-3	Describe and identify the main characteristics of diagnosis, screening, and prognosis of disease.	PSO 2	U,R
CO-4	Critically evaluate the role of clinical biochemistry in diagnosis, monitoring and treatment.	PSO 3	R
CO-5	Applications of biochemistry on health, medical diagnostics and pharmacy.	PSO 4	An

TEXT BOOKS:

1. M.N. Chatterjea, Rana Shinde. Text Book of Medical Biochemistry 2002, Fifth Edn., Jaypee brothers, Medical publishers,Ltd., New Delhi.

BOOKS FOR REFERENCE:

1. Harold Varely Alan H. Gownlock and Maurine Bell. Practical Clinical Biochemistry Vol I& II, Fifth Edn., CBS publishers & Distributors, New Delhi.
2. Thomas M. Devlin. Text Book of Biochemistry with clinical correlation, 1993 Third Edn, A John wiley & sons. Inc publication.
3. Lehninger, Nelson, Cox Principles of Biochemistry, 1993 Second Edn., CBS Publishers & Distributors
4. Robert K. Murray, Peter A Mayes, Daryl K.Granner & Victor W, Rodwell, Harper's Biochemistry, 22nd Edn, Prentice Hall International Inc.,
5. Ramakrishnan S. and Rajiswamy. Text Book of Clinical (Medical) Biochemistry and Immunology 1995. T.R. Publications, Madras.

(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

Third Year- Semester VI

COURSE TITLE	**MAJOR CORE 13: PRACTICAL III CLINICAL AND IMMUNOCHEMICAL ANALYSIS**
TOTAL HOURS	**90**
HOURS/WEEK	**6**
CODE	**U15BC6MCP13**
COURSE TYPE	**PRACTICAL**
CREDITS	**5**
MARKS	**100**

General Objective:

The student will be able to concentrate on commonly used clinical techniques to develop competencies in the interpretation of results

Course Objectives:

CO No.	Course Objectives
CO-1	understand and apply the knowledge of the theory and practice of various clinical techniques like hematology, clinical biochemistry and immunology
CO-2	understand and apply biochemical investigations to develop a clinical diagnosis;
CO-3	clinically assess the laboratory indicators of physiologic conditions and diseases And acquire the necessary professional and research skills to promote lifelong learning and career development.
CO-4	understand how to assess blood test results and their involvement in the assessment of different pathologies
CO-5	integrate the knowledge gained on Biochemistry, Anatomy and Physiology, in order to understand the pathophysiology of disease processes and their correlation in the study of body functions

I. HEMATOLOGY

1. Colorimetric Estimation of Haemoglobin - Sahli's Acid Haematin Method.
2. Hemocytometery - Determination of total R.B.C Count and Total W.B.C.Count.
3. Making and staining of a Blood Film and identification of the cellular elements in it.
4. Differential Lecucocyte Count.
5. Absolute Eosinophil count.
6. Determination of Coagulation time and Bleeding Time.
7. ABO Blood Grouping and Rh typing.

II. CLINICAL BIOCHEMISTRY

8. Estimation of Blood glucose
9. Estimation of Blood Urea
10. Estimation of serum Creatinine
11. Estimation of serum Uric acid
12. Estimation of Phosphorous and Calcium in Serum.
13. Estimation of serum Cholesterol.
14. Estimation of serum Proteins & A: G ratio
15. Estimation of serum alkaline phosphatase.
16. Estimation of serum AST & ALT
17. Constituents of Normal Urine,
18. Test for Common abnormalities in Urine – Test for proteins, blood, bile,Reducing sugars and ketone bodies.
20. Electrophoresis of serum proteins
21. Immuno diffusion
22. Immuno electrophoresis.
23. Vidal test, CRP and pregnancy test

Course outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Critically evaluate the role of clinical biochemistry in diagnosis, monitoring and treatment.	PSO 1	U,R
CO-2	Applications of biochemistry on health, medical diagnostics and pharmacy.	PSO 2	R, An
CO-3	clinically assess the laboratory indicators of physiologic conditions and diseases	PSO 2	U.R
CO-4	know the biochemical and molecular tools needed to accomplish preventive, diagnostic, and therapeutic intervention on hereditary and acquired disorders	PSO 3	R
CO-5	Define solubility, percent concentration, molarity, mole fraction, and molality.	PSO 4	An

TEXT BOOK

1. Kanai L. Mukherjee (1993) Medical laboratory Technology, Vol. I, I, III Tata Graw- Hill Publishing Co. Ltd., New Delhi.

BOOKS FOR REFERENCE

1. Harold Varely Alan H. Gownlock and Maurine Bell. Practical Clinical
2. Biochemistry Vol I& II, Fifth Edn., CBS publishers & Distributors, New Delhi.

(Students admitted from the year 2018 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
PG DEPARTMENT OF BIOCHEMISTRY
B.Sc., BIOCHEMISTRY Third Year –Semester VI

COURSE TITLE	**MAJOR ELECTIVE 3: PLANT BIOCHEMISTRY**
TOTAL HOURS	**75**
HOURS/WEEK	**5**
CODE	**U15BC6MET01**
COURSE TYPE	**THEORY**
CREDITS	**5**
MARKS	**100**

General Objective

1. To understand the basic concepts of Traditional medicine
2. To study the basics of Phytochemistry and Bioethics

Course objectives:

CO No.	Course Objectives
CO1	Understand and analyze the biochemistry of plant structure
CO2	Evaluate the photosystem of plants
CO3	Describe the kinetics and characterization of hormones
CO4	Understand and apply the mechanism of Nitrogen fixation of plants in agriculture Fields
CO5	Explain the entry of pathogens and its induced diseases in plants

Unit I

Overview of plant structure, major tissues in plant, structure and components of a plant cell, plant cell membrane and constituents, transport systems across cell membrane, genome organization in plant (nucleus, plastids and mitochondrial). Solute transport and photo assimilate translocation: Uptake, transport and translocation of water, ions, solutes and macromolecules from soil, through cells, across membranes, through xylem and phloem.

Extra reading/Key words: DNA Structure and its role

Unit II

Transpiration, mechanisms of loading and unloading of photo assimilation. Respiration: Plant Glycolysis-cytosolic and Plastidic process; plant mitochondrial electron transport and regulation. Photosynthetic apparatus in plants, photosystems I and II, light harvesting antenna complex. Electron flow and phosphorylation; cyclic and noncyclic, oxygen evolution, Calvin cycle, C3, C4, and CAM cycle; Photorespiration, regulation of photosynthesis, RUBISCO

Extra reading/Key words: Calculation of ATP molecules

Unit III

Plant hormones: Biosynthesis, storage, breakdown and transport. Physiological effects and Mechanisms of action of auxins, gibberlins, cytokinins, ethylene, abscisic acid. Plant defense and secondary metabolites - Terpenes, phenols, flavonoids and nitrogenous compounds and their roles in plant physiology. Methods in phytochemicals: extraction, fractionation and characterization.

Extra reading/Key words: Isolation and identification methods of phytochemicals

Unit IV:

Nitrogen metabolism- Importance of nitrogen in biological systems, nitrogen cycle. Nitrogen fixation; symbiotic and non-symbiotic, nitrogenase complex, energetics and regulation. Formation of root nodules in legumes. Assimilation of nitrate and ammonium ion. Sulfur assimilation. Stress physiology: Responses of plants to biotic (pathogen and insects) and

abiotic (water, temperature and salt) stresses; mechanisms of resistance to biotic stress and tolerance to abiotic stress.

Extra reading/Key words: Food chain and food web of nitrogen

Unit V:

Host parasite interaction: Recognition and entry processes of different pathogens like bacteria, Viruses, alteration of host cell behavior by pathogens, virus-induced cell transformation, pathogen induced diseases in plants, cell-cell fusion in both normal and abnormal cells.

Extra reading/Key words: Disease resistance mechanism

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

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Students will be able to understand how Plants function at the level of the gene, genome, cell, tissue, Flower development.	PSO 1	U
CO-2	Students will be able to apply phytochemical extraction techniques in industries.	PSO 2	Ap
CO-3	Students will be able to identify the various diseases of plants and their causative agents.	PSO 3	An
CO-4	Students will be able to understand the nitrogen fixation of plants.	PSO 4	U
CO-5	Students will be able to understand the parasite interaction with the other host like plants, virus, etc.	PSO 5	U

REFERENCES:

1. Principles of Biochemistry; David L. Nelson and Michael M. Cox, 6th Edition,

2. W. H. Freeman (2013).

3. Biochemistry; Donald Voet, Judith G. Voet, 4th Edition, John Wiley and sons (2010). PM, Plant Biochemistry, Harborne JB (1997) Academic Press.

3. Introduction to Plant Biochemistry, Goodwin TW, Mercer EI (1983)

4. Plant Physiology; Taiz and Zeiger, 3rd Edition

5. Plant Biochemistry; Hans Walter Heidt, 3rd Edition, Elsevier Publishers

6. Biochemistry & Molecular biology of Plants: Buchanan BB, Gruissem W, Jones RL (2000) American Society of Plant Physiologists Rockville

7. Singhal G (1999) Concepts in Photobiology: photosynthesis and photomorphogenesis: Springer Science & Business Media.

(Students admitted from the year 2018 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2 PG
DEPARTMENT OF BIOCHEMISTRY
B.Sc., BIOCHEMISTRY Third Year–Semester VI

COURSE TITLE	**MAJOR ELECTIVE 3: BASICS OF BIOINFORMATICS**
TOTAL HOURS	**75**
HOURS/WEEK	**5**
CODE	**U15BC6MET02**
COURSE TYPE	**THEORY**
CREDITS	**5**
MARKS	**100**

General objectives:

The student learns about the different databases and its applications in bioinformatics

Course Objectives:

CO No.	Course Objectives
CO1	Apply the basic concepts of Bioinformatics and its significance in Biological data analysis.
CO2	Describe various types of date bases of protein information resources
CO3	Explain about the methods to characterize and manage the different types of Biological data.
CO4	Explain the structural databases and Structure file formats
CO5	Understand the basics of sequence alignment and analysis.

UNIT - I

Bioinformatics - an overview, definition and history. Bioinformatics Glossary. Evolution of Bioinformatics - Scope - Potentials of Bioinformatics Human Genome Project - Bioinformatics in India - Future of Bioinformatics.

UNIT - II

Protein information resources: Primary data base – PIR, MIPS and Swissprot, TrEMBL. Composite protein Sequence data bases – NRDB, OWL, MIPSX, Swissprot and TrEMBL. Secondary data bases – Prosite, PRINTS, BLOCKS, Profiles, Pfam, IDENTIFY. Composite pattern databases – SCOP – CATH.

UNIT - III

Genome information resources: EMBL, DDBJ, Genbank and its flat file dissection - Specialized genome databases –dbEST – Unigene – GSDB.

UNIT - IV

Structural databases – Introduction – PDB – MMDB – Structure file formats – Structural viewers and Structure similarity searching.

UNIT - V

Sequence Alignment – Pairwise alignment – Multiple sequence alignment – Softwares used in sequence alignment.

Course Outcomes:

student completing a major in Bioinformatics shall be able to apply:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Acquire basic knowledge and awareness of the basic principles and concepts of biology, computer science and mathematics	PSO 1	R
CO-2	Discuss on how to use an existing software effectively to extract information from large databases and to use this information in computer modeling	PSO 2	U
CO-3	Developing an understanding to Retrieve a protein sequence of interest for different organisms	PSO 3	An
CO-4	Developing an understanding to Generate a basic multiple sequence alignment using Clustal	PSO 4	U
CO-4	Developing an understanding to use sequence alignment methods by various softwares	PSO 5	U

REFERENCE BOOKS:-

1. Introduction to Bioinformatics - Attwood T.K. and Parry Smith D.J Published by Pearson Education Ltd., New Delhi (2004)

2. Arthur M. Lesk Introduction to Bioinformatics, Oxford University Press, New Delhi (2003)
3. A.Baxevanis and B.F. Ouellette, Wiley Bioinformatics - A

   practical guide to the analysis of genes and proteins. (ed) - Interscience, New York, 2001.

4. D.Higgins and W.Taylor (Eds), Bioinformatics- Sequence, Structure and databanks, Oxford University Press, New Delhi (2000).

5. S.R.Swindell, R.RMiller and G.S.A.Myers (Eds) Internet for the Molecular Biologist, Horizon Scientific Press, Wymondham,UK, (1996).

6. Andrea Cabibbo, Richard Grant and Manuela Helmer-Citterich (Eds), The Internet for Cell and Molecular Biologists (2^{nd} Ed) Horizon scientific Press, Norwich UK (2004)

(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

Third Year – Semester VI

COURSE TITLE	**MAJOR ELECTIVE 3: PHARMACEUTICAL CHEMISTRY & PHARMACOGNOSY**
TOTAL HOURS	**75**
HOURS/WEEK	**5**
CODE	**U15BC6MET03**
COURSE TYPE	**THEORY**
CREDITS	**5**
MARKS	**100**

General Objective:

The student learns methods of general extraction, classification, properties and importance of major phytoconstituents

Course Objectives:

CO No.	Course Objectives
CO-1	Understand the basic concept of drugs and their classifications, administration, distribution and bioavailability of drugs.
CO-2	Understand and evaluate the role of drug metabolism and its interactions with host enzymes.
CO-3	Analyze the combination of medications to treat cancer and mechanism of pharmacokinetic drug-drug interactions.
CO-4	Understand the basic concept of pharmacognosy and therapeutic significant of phyto-constituents.
CO-5	Understand the medicinal uses of drugs and their phytochemical investigations with respective examples.

UNIT: I **15 Hrs**

CLASSIFICATION OF DRUGS

Classification of drugs based on sources; traditional and homeopathy. Mode of administration, site of action, absorption of drugs. Drug distribution and elimination, role of kidney in elimination. Drug receptors and barriers, Bio availability.

(Extra reading/key words: *psychoactive drug****)***

UNIT: II **15 Hrs**

DRUG METABOLISM

Drug metabolism – chemical pathways of drug metabolism – phase I and Phase II reactions, role of cytochrome P_{450} Non microsomal reactions of drug metabolism, drug metabolizing enzymes.

(Extra reading/key words: In-silico approaches)

UNIT: III **15 Hrs**

ANTIBIOTICS

Chemotherapy: Biochemical mode of action of antibiotics – penicillin and Chloramphenicol, antiviral and antimalarial substances, Biochemical mechanism of drug resistance.

(Extra reading/key words: Complex Drug-Drug-Disease Interaction)

UNIT: IV **15 Hrs**

PHYTOCHEMICAL PHARAMACOGNOSY

Basic concepts of Pharmacognosy, extraction protocols for biologically important organic compounds, classification of drugs of natural origin – morphological, pharmacological and chemical classification. Phytoconstituents of therapeutic significance - carbohydrates, glycosides, tannins and phenolic compounds, lipids, proteins, volatile oils, resins and resin combinations, alkaloids and terpenes.

(Extra reading/key words: Traditional and Modern Pharmacognosy)

UNIT: V **15 Hrs**

PLANTS WITH MEDICINAL USES

Sources, characteristics and medicinal uses of drugs containing carbohydrates – Drugs containing glycosides – Digitalis. Drugs containing tannins – Tannic acid, Drugs containing lipids – castor oil, neem oil. Drugs containing volatile oils – Turpentine oil. Drugs containing

alkaloids – cinchona. Drugs containing flavonoids- Vinca.Plants with antimicrobial, antidiabetic, hepato-protective activity with two examples each.

(Extra reading/key words: Anti- viral, Anti- inflammatory and Anti-cancer activity of medicinal plants

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

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Demonstrate the importance of chemistry in the development and application of therapeutic drugs.	PSO 1	U
CO-2	Develop an understanding of the physico-chemical properties of drugs and state the physicochemical properties of drug molecules, pH, and solubility	PSO 2	R,An
CO-3	Assess the mechanism of drug action and its relevance in the treatment of different diseases.	PSO 2	R
CO-4	describe the extraction procedures for natural compounds and their therapeutic significance	PSO 3	R,An
CO-5	Assess the therapeutic role of phytoconstituents and their applications in drug development.	PSO 4	An

TEXT BOOKS:

1. Satoskar R.S. & Bhandarkar S.D., (1998) Pharmacology and pharmacotherapeutics Volume I & Volume II

BOOKS FOR REFERENCE:

1. Mohammed Ali, (1994).Text book of Pharmacognosy,CBS Publishersand Distributors, New Delhi.

2. Trease, G.E. and Evans, W.C (1997) - Pharmacognosy, 14th and 15th Edition, W.B. Saunders Company

3. Anil Kumar De (1996) Environment chemistry New Age International (p) Ltd., Publisher, New Delhi.

4. Kokate, C.K.; Purohit, A.P & Gokhale, S.B. (1997). Pharmacognosy, Nirali Prakasan, Pune.

5. Peter B. Kaufmann, *et al.* (1999): Natural Products from Plants, C.R.C. Press.

(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPALLI -2

DEPARTMENT OF BIOCHEMISTRY

SEMESTER VI

COURSE TITLE	**NME 2: NON-MAJOR ELECTIVE PAPER - II NUTRITION AND DIETETICS**
TOTAL HOURS	**30**
HOURS/WEEK	**2**
CODE	**U15BC6NMT01**
COURSE TYPE	**THEORY**
CREDITS	**2**
MARKS	**100**

General and instructional objectives:

The student learns about the constituents of food and the ideal diet for various stages of life and diet therapy.

CO No.	Course Objectives
CO-1	Understand and apply the concept of nutritional foods and status for good health
CO-2	Understand the categorization and assessment of nutritional foods status and national nutrition institutions roles.
CO-3	Understand the differential functions of nutritional food constituents and deficiency states.
CO-4	Analyze the minimum requirements of macro- and micro-nutrition and also mineral values.
CO-5	Understand and analyze the function of vitamin and their comparison of direct and indirect calculation in the energy requirements.

UNIT:I

NUTRITIONAL STATUS

Introduction to Nutrition – Food as a source of nutrient – Function of food, definition of nutrition. Interrelationship between nutrition and health – visible symptoms of good health.

CONSTITUENTS OF FOODS

Carbohydrates – Functions, sources and deficiency. Proteins – Functions, sources, essential aminoacids and deficiency.

UNIT:II

Fats – Functions, sources, essential fattyacids and deficiency. Fibres – Definition, sources, role of fibre in human nutrition, Minerals – Macronutrients – Calcium, Phosphorous, Sodium and Pottasium.

Micronutrients – Iron and Iodine – their sources, function requirements and deficiency.

UNIT:

vitamins

Definition and classification, fat soluble Vitamin C and B (Thiamine, Niacin, Riboflavin, Pyridoxine, Cyanacobalamin) – sources, functions, deficiency and requirement.

Hypervitaminosis - A & D.

UNIT: IV

NUTRITION IN HEALTH

Factors to be considered in formulating diets for different income groups. Nutritional and food requirements to meet the needs of Infant and pre-school children Pregnant and Lactating women.

UNIT: V

Concepts of diet therapy, growth and scope of dietetics. Therapeutic diets: Diet in Diabetes Mellitus.

Diseases of Liver – Hepatitis and Cirrhosis. Diseases of the renal system– Uremia & renal stones Diseases of Gastrointestinal Tract-PepticUlcer.

Diseases of the heart & Circulatory system- Atherosclerosis

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Demonstrate the knowledge and understanding of the fundamental concepts in food and nutrition.	PSO 1	U
CO-2	assess the nutritional status of individuals in various life-cycle stages	PSO 2	R

CO-3	Determine nutrition-related conditions and diseases by applying knowledge of metabolism and nutrient functions, food sources, and physiologic systems.	PSO 2	An
CO-4	Utilize the knowledge from the physical and biological sciences as a basis for understanding the role of food and nutrients in health and disease processes.	PSO 3	R
CO-5	Describe the differences and relationships between food, diet and nutrients and understand how food nourishes the body**.**	PSO 4	An

TEXT BOOKS:

1. Swaminathan, M., (1985) Hand Book of Food and Nutrition. The Bangalore Printing and publishing Co., Ltd., 2nd Edn.,

REFERENCE:

1. Swaminathan, M., (1985) Advanced Text Book on Food and Nutrition.TheBangalore Printing and Publishing Co., Ltd.,2nd Edn.,
2. Shunbhangini,A.Joshi, (1992) Nutrition and Dietetics, Tata McGram Hill PublishingCo., Ltd.,NewDelhi.
3. Sue Rodwell Williams, (1985) Nutrition and Diet Therapy,TheC.V.Mosby.

(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

Third Year – Semester VI

COURSE TITLE	**NON MAJOR ELECTIVE – II HOME MANAGEMENT**
TOTAL HOURS	**30**
HOURS/WEEK	**2**
CODE	**U15BC6NMT02**
COURSE TYPE	**THEORY**
CREDITS	**2**
MARKS	**100**

General Objective:

The student learns about composition and nutritive values of different food groups; types of spoilage and methods of preventing them and importance of time and energy management.

Course objectives:

CO No.	Course Objectives
CO-1	Understand the meaning of management and managerial effectiveness
CO-2	Analyze the various causes for food spoilage and apply that in food preservation
CO-3	Understand the basic principles of cooking and apply that in the different methods of cooking.
CO-4	Understand time pressures and the need for time management.
CO-5	Understand the concept of visual pleasure and apply it in flower arrangement

UNIT: I **6 Hrs**

FOOD SCIENCES:

ICMR recommended basic five food groups. General composition and nutritive value of cereals; pulses and nuts; milk and meat products; vegetables and fruits.

(Extra reading/key words: Diet plan)

UNIT: II **6 Hrs**

FOOD PRESERVATION:

Food spoilage – Definition, causes, types of spoilage and preventing methods; Preservation of fruits -sugar concentrates; jam and jelly. Pickling - Principle, types and spoilages encountered in pickles.

(Extra reading/key words: sterilization techniques)

UNIT: III **6 Hrs**

COOKING AND COOKING METHODS:

Cooking – preliminary preparations and objectives of cooking; methods of cooking; advantages and disadvantages of different cooking and cooking methods

HEALTH AND NUTRITION EDUCATION:

Introduction, nutrition and prevention of infection, safe drinking water, environmental sanitation. Immunization schedule.

(Extra reading/key words: traditional food)

UNIT: IV **6 Hrs**

HOUSING AND INTERIOR DECORATION:

Features to be considered in house construction - orientation grouping, roominess, lighting, ventilation, storage facilities, flexibility and safety.

Flower arrangement - types of arrangement, selection of vases, flowers and accessories.

Home furnishing – Selection, arrangement and care of furniture in different rooms, furnishing material, draperies and curtains, floor coverings and accessories.

(Extra reading/key words: interior decoration, wall paintings)

UNIT: V **6 Hrs**

FAMILY RESOURCE MANAGEMENT:

Resources - Classification of family resources.

Management process - Planning, controlling and evaluation.

Time and energy management – Importance of time and energy. Guidelines in planning time schedule. Fatigue – types and ways of overcoming fatigue.

(Extra reading/key words: plan a schedule)

Note: Extra Reading/ Key Words are only for internal testing (Seminar / Assignments)

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Understand the meaning and importance in Home Management and scope of Home management	PSO 1	U
CO-2	understand the food, nutrition, food preservation, health, safety in food, home and environment	PSO 2	U
CO-3	Discuss the significance and positive impacts of time, energy and money management	PSO 2	R
CO-4	Extrapolates the concepts of food science and food management to individuals and groups and to the institution.	PSO 3	R
CO-5	Understand Family resource, planning and controlling	PSO 4	An

TEXT BOOK:

1. Srilakshmi, B. (2001). Food Science, New Age International (P) limited Publishers, New Delhi.

BOOKS FOR REFERENCE:

1. Srilakshmi, B. (2001). Food Science, New Age International (P) limited publishers, New Delhi.
2. Shanthi Ghosh, (1997). Nutrition and Child Care - A Practical Guide. Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
3. Chinthapalli Vidya, (1996). A Text Book of Nutrition. Discovery Publishing House, New Delhi.
4. Deshpande, R.S. (1985). Build your own home. Poona United Book Corporation.
5. Man Home Management for Indian families, Kalyani Publishers, New Delhi.

(Students admitted from the year 2018 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2 PG
DEPARTMENT OF BIOCHEMISTRY

B.Sc., BIOCHEMISTRY Third Year–Semester VI

COURSE TITLE	**SKILL BASED ELECTIVE 3: TOOLS FOR BIOINFORMATICS**
TOTAL HOURS	**75**
HOURS/WEEK	**2**
CODE	**U15BC6SBP05**
COURSE TYPE	**THEORY**
CREDITS	**2**
MARKS	**100**

General and instructional objectives:

The student learns about the different databases and its applications in bioinformatics.

Course Objectives:

CO No.	Course Objectives
CO1	Apply the basic concepts of Bioinformatics and its significance in Biological data analysis.

CO2	Describe various types of date bases of protein information resources
CO3	Explain about the methods to characterize and manage the different types of Biological data.
CO4	Explain the structural databases and Structure file formats
CO5	Understand the basics of Map viewer.

1. Nucleotide Sequence database
   - Genbank
   - DDBJ
   - EMBL
2. Protein Sequence database
   - Swissprot
3. Protein Structure Database
   - PDB
4. Literature Database
   - Pubmed, OMIM
5. Visualization Tools
   - Rasmol
6. Metabolic Pathway Database
   - KEGG

7. Map Viewer

Course Outcomes:

A student completing a major in Bioinformatics shall be able to apply:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Acquire basic knowledge Bioinformatics	PSO 1	R
CO-2	Discuss on how to use an existing software effectively to extract information from large databases and to use this information in computer modeling	PSO 2	U
CO-3	Developing an understanding to Retrieve a protein sequence of interest for different organisms	PSO 3	An
CO-4	Developing an understanding to Generate a basic multiple sequence alignment using Clustal	PSO 4	U

(Students admitted from the year 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

PG DEPARTMENT OF BIOCHEMISTRY

Third Year – Semester VI

COURSE TITLE	SKILL BASED ELECTIVE: - 6 RESEARCH METHODOLOGY (THEORY CUM PROJECT COURSE)
TOTAL HOURS	30
HOURS/WEEK	2
CODE	U15DS6SBT06
COURSE TYPE	THEORY
CREDITS	2
MARKS	100

General Objective

Students get introduced to concept of research and carrying out research projects.

Course Objectives:

CO No.	Course Objectives
CO-1	Understand the scope and origin of research
CO-2	Analyze the various various data collection and its uses
CO-3	Understand the basic principles of research and documentation planning
CO-4	Understand time management
CO-5	Understand the concept of project work

Unit I **6 Hrs**

INTRODUCTION TO RESEARCH

Definition, type, nature and scope of research-Research design.

Unit II **6 Hrs**

DATA COLLECTION

Types-Primary and secondary data-Data processing-Hypothesis testing.

Unit III **6 Hrs**

PLAN AND EXECUTION

Methodology-Plan and execution-Analysis-Documentation.

Unit IV **6 Hrs**

FORMAT AND PRESENTATION OF PROJECT REPORT

Art of writing and structure of a Project Report-Viva-voce

Unit V **6 Hrs**

PROJECT

Project work

TEXT BOOK:

1. Kothari, C.R., Research Methodology. New Delhi:New Age International Publishers, 1998.Print.

BOOKS FOR REFERENCE:

1. Lal, B. (2002) Research Methodology, ABD Publishers. India

2. Rahim F.A. Thesis Writing: A manual for researchers. New Delhi: New Age International Publishers, 1988.Print.

3. Gopalan. Thesis Writing. Chennai: Vijay Nicole, 2005.Print.

4. Oliver, Paul, Writing your Thesis. New Delhi: Sage Publication, 2008. Print. M.L.A. Style sheet.

Note:

The students will be evaluated internally by a test for 50marks. The Project will be evaluated by an external evaluator and a viva-voce will be conducted for 50 marks.

The students can carry out their projects individually or in groups.