B.Sc. ZOOLOGY -With
SPECIALIZATION IN BIOTECHNOLOGY
(For students admitted from 2014- onwards)
COURSE PATTERN- CBCS

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
DEPARTMENT OF ZOOLOGY
CHOICE BASED CREDIT SYSTEM
UG COURSE PATTERN- B.Sc. ZOOLOGY (SPECIALIZATION IN BIOTECHNOLOGY)
(FOR STUDENTS ADMITTED FROM THE ACADEMIC YEAR 2014 onwards)

Semester	Part	Course	Title of Paper	Code	Hrs/Week	Credits	Marks
I	I	Language	Tamil paper I/ Hindi paper I / French paper 1	U12TL1TAM01 U14HN1HIN01 U13FR1FRE01	6	3	100
	II	English	English Paper 1	U10EL1GEN01	6	3	100
	III	Major Core -1	Animal Diversity1: Invertebrata	U13ZO1MCT01	7	5	100
	III	Allied-1(Optional)	Basics in Biotechnology	U12ZO1AOT01	4	4	100
	III	Allied-2 (Optional)	Environmental Management	U12ZO1AOT02	4	3	100
	IV	Environmental studies	Environmental studies	U14RE1EST01	2	2	100
	IV	Value Education	Ethics I/ Bible Studies I /Catechism I	U12VE2LVE01 U12VE2LVB01 U12VE2LVC01	1	-	-
				Total	**30**	**20**	**600**

Semester	Part	Course	Title of Paper	Code	Hrs/Week	Credit	Marks
II	I	Language	Tamil paper II/ Hindi paper II / French paper II	U12TL2TAM02 U14HN2HIN02 U13FR2FRE02	5	3	100
	II	English	English Paper II	U10EL2GEN02	6	3	100
	III	Major Core -2	Animal Diversity-2: Chordata	U13ZO2MCT02	5	5	100
	III	Major Core- 3	Practical-I (Animal Diversity I & II)	U12ZO2MCP03	5	4	100
	III	Allied-3 (Optional)	Basics in Bioinformatics	U12ZO2AOT03	4	3	100
	IV	Skill Based Elective-1	Soft Skill Development	U14RE2SBT01	2	2	100
	IV	Skill Based Elective-2	Rural Enrichment and Sustainable Development	U08RE2SBT02	2	2	100
	IV	Value Education	Ethics I/ Bible Studies I/ Catechism I	U12VE2LVE01 U12VE2LVB01 U12VE2LVC01	1	1	100
				Total	**30**	**23**	**800**

Semester	Part	Course	Title of Paper	Code	Hrs/ Week	Credit	Marks
III	I	Language	Tamil paper III/ Hindi paper III/ French paper III	U12TL3TAM03 U14HN3HIN03 U14FR3FRE03	6	3	100
	II	English	English Paper III	U10EL3GEN03	6	3	100
	III	Major Core -4	Cell & Molecular Biology	U12ZO3MCT04	5	5	100
	III	Major Core -5	Genetics	U12ZO3MCT05	5	5	100
	III	Allied-4 (Compulsory) for Botany students	Biology of Invertebrates and Chordates	U12ZO3ACT04	4	3	100
	IV	Skill Based Elective-3	Biological Skills for Physical Sciences-Basic/ Biological Skills for Physical Sciences- Advanced (Theory cum Lab) (For Physics Students)	U13BZ3SBT03/ U13ZO3SBT03	2	2	100
	IV	Gender Studies	Gender Studies	U12WS3GST01	1	1	100
	IV	Value Education	Ethics II/ Bible Studies II /Catechism II	U12VE4LVE02 U12VE4LVB02 U12VE2LVC02	1		
				Total	**30**	**22**	**700**

Semester	Part	Course	Title of Paper	Code	Hrs/ Week	Credit	Marks
IV	I	Language	Tamil paper IV/ Hindi paper IV/ French paper IV	U12TL4TAM04 U14HN4HIN04 U14FR4FRE04	5	3	100
	II	English	English Paper IV	U13EL4GEN04	6	3	100
	III	Major Core-6	Practical-II (Cell biology, Genetics Dev. Biology & Evolution)	U12ZO4MCP06	5	5	100
	III	Major Elective- 1	Dev. Biology & Evolution / Aquaculture	U12ZO4MET01/ U12ZO4MET02	5	5	100
	III	Allied-5 (Compulsory for Botany students)	Zoology and Human Welfare	U12ZO4ACT05	4	4	100
	III	Allied-6 (Compulsory for Botany students)	Allied Zoology Practical	U12ZO4ACP06	4	3	100
	IV	Value Education	Ethics II/ Bible Studies II /Catechism II	U12VE4LVE02 U12VE4LVB02 U12VE4LVC02	1	1	100
				Total	**30**	**24**	**700**

Semester	Part	Course	Title of Paper	Code	Hrs/ Week	Credit	Marks
V	III	Major Core-7	Biochemistry & Biostatistics	U12ZO5MCT07	5	4	100
	III	Major Core-8	Fundamentals of Biotechnology	U12ZO5MCT08	5	4	100
	III	Major Core-9	Biological techniques	U12ZO5MCT09	5	4	100
	III	Major Core 10	Practical-III Biochemistry, Microbiology, Biotechnology& Bioinformatics	U12ZO5MCP10	5	4	100
	III	Major Elective-2	Microbiology & Bioinformatics/ Fundamentals of Bioinformatics	U12ZO5MET03/ U12ZO5MET04	5	5	100
	IV	Non Major Elective-1	Ornamental Fish Culture	U12ZO5NMT01	2	2	100
	IV	Skill BasedElective-4 *	Biological Skills for chemical Sciences-Basic/ Biological Skills for chemical Sciences-Advanced (Theory cum Lab) (For Chemistry students)	U13BZ5SBT04/ U13ZO5SBT04	2	2	100
	IV	Value Education	Ethics / Bible Studies /Catechism	U13VE6LVE03 U12VE6LVB03 U12VE6LVC03	1	-	
				Total	**30**	**25**	**700**

Semester	Part	Course	Title of Paper	Code	Hrs/ Week	Credit	Marks
VI	III	Major Core-11	Animal Physiology	U12ZO6MCT11	6	5	100
	III	Major Core-12	Applied Biotechnology	U12ZO6MCT12	6	5	100
	III	Major Core-13	Practical-IV Animal Physiol., Environ. Biol. & Immunology	U12ZO6MCP13	6	5	100
	III	Major Elective-3	Immunology/ Environmental Science	U12ZO6MET05/ U12ZO6MET06	5	5	100
	IV	Non Major Elective-2	First Aid and Home Nursing	U12ZO6 NMT02	2	2	100
	IV	Skill Based Elective-5	Animal Cell Culture Techniques (Theory cum Lab)	U13ZO6SBT05	2	2	100
	IV	Skill Based Elective-6	Research Methodology	U13DS6SBT06	2	2	100
	IV	Value Education	Ethics / Bible Studies /Catechism	U13VE6LVE03 U12VE6LVB03 U12VE6LVC03	1		
	V	Extension Activities	RESCAPES-Impact study of Project	U08RE6ETF01		1	100
				Total	**30**	**27**	**800**
				Grand Total	**180**	**141**	**4300**

HOLY CROSS COLLEGE (Autonomous), Tiruchirappalli - 620 002

TAMIL DEPARTMENT

BA/ B.SC/ B.COM DEGREE

Part - I : Language: Tamil Paper - 1

Total Hours : 90 **Code : U12TL1TAM01**
Hrs : 6Hrs /Wk **Marks : 100**
Credit : 3

நோக்கங்கள்:

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

பயன்கள்:

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

பாடத்திட்டம்

அலகு:1 செய்யுள்

மொழி

கல்வி

வீரம்

அலகு:2 செய்யுள்

அறம்

வாழ்க்கை

அலகு:3

தமிழ் இலக்கிய வரலாறு

20-ஆம் நூற்றாண்டு (தற்காலம்)

தமிழாய்வுத்துறை வெளியீடு

அலகு:4

படைப்பிலக்கியம் - சிறுகதைத் தொகுப்பு

அலகு:5

பொதுப்பகுதி - கலைச்சொற்கள்

தமிழாய்வுத்துறை வெளியீடு

பாட நூல்கள்

செய்யுள்	தமிழாய்வுத்துறை வெளியீடு	-
தமிழ் இலக்கிய வரலாறு	தமிழாய்வுத்துறை வெளியீடு	
சிறுகதைத் தொகுப்பு	தமிழாய்வுத்துறை வெளியீடு	
கலைச்சொற்கள்	தமிழாய்வுத்துறை வெளியீடு	

(for the candidates admitted from June 2014 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-620002

DEPARTMENT OF HINDI

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

HINDI PAPER-I SHORT STORY, PROSE, GRAMMAR

SEMESTER – I

HRS/WEEK : 6 **CODE: U14HN1HIN01**

CREDITS : 3 **MARKS : 100**

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

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

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

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

UNIT- V : Anuvad Abhyas – II

Books Prescribed :

- Galpa Sanchayan - D.B.H.P. Sabha Publishers, Chennai-17
- Naveen Hindi Patamala – I - D.B.H.P. Sabha Publishers, Chennai-17
- Naveen Hindi Patamala – II - D.B.H.P. Sabha Publishers, Chennai-17
- Sugam Hindi Vyakaran - D.B.H.P. Sabha Publishers, Chennai-17
- Anuvad Abhyas – II - D.B.H.P. Sabha Publishers, Chennai-17

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 2

DEPARTMENT OF FRENCH

SEMESTER I

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

(For candidates admitted 2013 onwards)

HRS/WEEK : 6 **CODE : U13FR1FRE01**
CREDIT : 3 **MARKS : 100**

Unit 1 Parcours d'initiation ; Vous comprenez

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

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

Unit 2 Au travail!

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

Unit 3 On se détend!

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

Unit 4 Racontez-moi ! ; Bon voyage !

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

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

Unit 5 Bon appétit!

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

TEXT BOOKS :

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

(for candidates admitted from 2014 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2.

2014 - 2015

I B.A., B.Sc., B.Com., B.R.Sc., B.C.A., B.B.A., SEMESTERI

PART II - ENGLISH 1 - GENERAL ENGLISH PAPER I

NO.OF HRS/WK:6 **CODE:U10EL1GEN01**

NO.OF CREDITS: 3

OBJECTIVES

To develop in the students LSRW Skills at the foundation basic level

To focus on Oral Communication Skills through several Spoken English tasks given individually and in groups.

To encourage students to read and appreciate biographies/passages/fables/folk tales

To develop sub skills including comprehension, vocabulary, grammar, spelling, punctuation and reference skills.

UNIT I: Speak Better I Tasks 1 - 30

UNIT II: Speak Better II Generation of Alternatives Viewpoints

Challenging Assumptions Redesigning

Dominant Ideas and Crucial Factors

UNIT III : Read and Communicate I : a) Fables and Folk Tales The Crow and the Kavun

The Parakeet and the Clay Pot

UNIT IV: Read and Communicate I: b) Fables and Folk Tales How the Ministers Laid Eggs

How Andare Ate Curd at the Palace

UNIT V: Read and Communicate II : Biographies MahatmaGandhi

AbrahamLincoln

PRESCRIBED TEXT

Oranee Jansz : EXPLORATIONS A Course in reading, thinking and communication skills: Foundation Books. Print.

LIST OF GENERAL TOPICS:

1. Knowledge ispower
2. The Impact of EnglishLanguage
3. Science andTechnology
4. Where there is a will there isway
5. Honesty is the bestpolicy
6. Birds of the same feather, flocktogether

7. East or west home is thebest
8. Make hay while the sunshines
9. Your favouriteleader
10. Description of a significant experience in yourlife.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
B.Sc. ZOOLOGY (Specialization in Biotechnology)
(For the candidates admitted from 2013 onwards)
SEMESTER I
MAJOR CORE: 1- ANIMAL DIVERSITY 1: INVERTEBRATA

OBJECTIVE **Code: U13ZO1MCT01**
Credits: 5 **Hours/Week: 7**

Student learns the outline classification of invertebrates. Student classifies Phylum Protozoa, Porifera, Coelenterata, Platyhelminthes, Annelida, and Arthropoda, Mollusca, Echinodermata and Hemichordata upto order. Describes their organization with examples of biological importance. Student gets an insight into coral wealth of India and nematode parasites of man. Student identifies local fauna and local mosquito species.

UNIT I Protozoa to Coelenterata

Concepts, Methods and Significance of Taxonomy
Phylum: Protozoa, Type study : Paramecium
Phylum: Porifera, Type study : Sponge
Phylum: Coelenterata, Type study : Obelia
Coral Wealth of India

UNIT II Platyhelminthes to Annelida

Phylum: Platyhelminthes, Type study: Tape worm
Phylum: Aschelminthes,Type study: Ascaris
Nematode Parasites of Man – Enterobius, Ancylostoma, Wuchereria, Dracunculus.
Phylum: Annelida, Type study: Leech

UNIT III Arthropoda

Phylum: Arthropoda- Classification of Phylum upto Classes
Class- Insecta –Classification upto Orders, Type study: Cockroach

UNIT IV Mollusca and Echinodermata

Phylum: Mollusca, Type study :Pila
Phylum: Echinodermata, Type study: Starfish

UNIT V Hemichordata and Phylogeny of Invertebrata

Phylum: Hemichordata, Typestudy:Balanoglossus Phylogeny of Invertebrata, Levels of organization.

Note: General and Distinguishing characters of classes. An outline classification upto orders and study of the representative types. Applicable to all 5 units.

Text Book:

Ekambaranatha Ayyar.M and Ananthakrishnan.T.N.(1994). *Manual of Zoology* Vol.I.Part I &II S. Viswanathan Pvt. Ltd. Madras.

Reference Books:

1. Jordan,E.L.andVerma,P.S.(2009). *Invertebrate Zoology* S. 14Th Edition Chand &Co. New Delhi
2. Agarwal, V.K. (2000). *Invertebrate Zoology*. S. Chand &Co. NewDelhi
3. Agarwal, V.K. and Gupta U. (2004). *Animal Taxonomy*. S. Chand &Co. NewDelhi
4. Kotpal, R.L. (2001).*Modern Textbook of Zoology Invertebrates*. Rastogipublications,Meerut.
5. Mukerji, D (1977). *Textbook of Zoology* Vol I & II The New book stall,Calcutta.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
DEPARTMENT OF ZOOLOGY
(For candidates admitted from 2012 onwards)
SEMESTER I
ALLIED: 1 – BASICS IN BIOTECHNOLOGY (Optional)

Code: U12ZO1AOT01
Credits: 3
Hours /Week: 4

OBJECTIVE

Students learns about the scope of biotechnology, biotechnology as an interdisciplinary pursuit, classifies prokaryotes and eukaryotes, structure of DNA, RNA, and proteins, techniques of genetic engineering and its importance in medicine, waste water treatment, plant and animal tissueculture.

UNIT I - Basics and Scope of Biotechnology

Scope of biotechnology- biotechnology as an interdisciplinary pursuit- Outline structure of prokaryotic and eukaryotic cell. Brief account of structure, synthesis and functions of DNA, RNA andproteins.

UNIT II - Methods in Biotechnology

Restriction enzymes, vectors (plasmid and bacteriophage) - Recombinant DNA technology: Isolation of DNA, linking of DNA, gene transfer technique, selection and screening of recombinant clones - genomic and cDNAlibrary.

UNIT III - Medical biotechnology -

Production of recombinant insulin and HBV vaccine. Monoclonal antibodies and their uses. Stem cell research. Gene therapy - protocol - ADA as an example.

UNIT IV - Plant Biotechnology

Plant tissue culture and transgenic plants. Biopesticides and Biofertilizers. Production of penicillin and single cell protein(SCP).

UNIT V - Environmental and AnimalBiotechnology

Sewage treatment. Superbug and oil degradation.Biofuels, biosensors, biochip. Animal cloning, Transgenic fish and livestock ,biopharming.

TEXT BOOK:

Dubey, P.C. (1994). *Text book of biotechnology,* Chand and Co. New Delhi.

REFERENCE BOOKS:

1. Gupta, P.K. (2004). *Elements of Biotechnology*, Rastogi Publication,Meerut.
2. Irfan Ali Khan and Athiya Khanum (2004). *Fundamentals of Molecular biology, Genetic engineering and Biotechnology,* Ukaaz Publication,Hyderabad.
3. Old R.W. and Primrose. S.B. (1989). *Principles of Gene Manipulations*, Blackwell Scientific Publications.
4. Primrose. S.B. and R.M. Twyman (2006). *Principles of Gene Manipulation andGenomics* Blackwell Publishing, UK.
5. Satyanarayana (2006). *Biotechnology,* Books and Allied (P) Ltd.,Lolkata.
6. Smith John.E. (1988). *Biotechnology,* Edward Arnold,London.

7. Walker, J.M. and Gingold, E.D. (Eds) (1992). *Molecular Biology and Biotechnology,* Panima Educational Book Agency. NewDelhi.
8. Watson, J.D., Michael G., Tam Witkowski and Mark Zollew (1999). *RecombinantDNA*, Scientific American Books, New Delhi

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
DEPARTMENT OF ZOOLOGY
(For candidates admitted from 2012 onwards)
SEMESTER I
ALLIED: 2 - ENVIRONMENTAL MANAGEMENT (Optional)

Code:U12ZO1AOT02
Credits: 3
Hours/Week: 4

OBJECTIVE

The students learn about the global ecosystem, man‟s manipulation on environment, pollution, deforestation, sustainable environmental management, Ecotourism and biodiversity

UNIT I

Scope of environmental management

Global ecosystem and its components- Man‟s manipulation of environment and its impact on ecological balance Measures for sustainable environmental management-Abiotic factors- water; oxygen; carbon di oxide; temperature; light-photoperiodism; soil – types andprofile.

UNIT II

Community and Population

Ecological succession-concept, process, concept of climax community.
Animal Population: Concept, attributes-density, natality, mortality, growth form, fluctuations, equilibrium, self regulation.
World human population- industrialization, Urbanization and environmental Degradation, Biomagnification, Pest outbreak-IPM

UNITIII

Pollution

Radiation pollution episodes: Hiroshima-Nakasaki,Chernobyl.
Water Pollution : Effects, Minamata episode, Gulf war 1990, Bombay high oil slick 1993, Anaerobic and aerobic treatment of sewage water- sewage as resource-WHO standard for drinking water.
Air Pollution – acid rain, Stone leprosy and Tajmahal, Bhopal Tragedy smog, global warming, ozone depletion and ecological disturbance-emission standards and control measures.

UNIT IV

Biodivesity and Conservation

Deforestation – causes, impact and management.
Eco-tourism – India as a mega diversity nation – hot spots of biodiversity – threats to biodiversity – endangered species of India and conservation measures.

UNIT V

Disaster Management and Environmental Economics

Earth quakes, floods and cyclones- Causes, magnitude, predictionsandcontrol measures.
International Environmental Organization andConventions
Environmental Economics – Environmental Auditing. Environmental Acts of India.

TEXT BOOK:

Odum, E.P. (1971). *Fundamentals of Ecology.* W.B. Saunders Company, Phil. London.

REFERENCE BOOKS:

1. Agarwal, K.C. (2001). *Environmental Biology,* Nidi Publication Ltd. Bikaner.
2. Chairas, D.D. (1985). *Environmental Science.* The Benjamin Cummings Publishing company., Inc.
3. Clarke George, L. (1954). *Elements of Ecology*. Hohn Wiley and SONS,Inc.
4. Hodges, L. (1977). *Environmental Pollution,* II Edition. Holt, Rinehart and Winston, NewYork.
5. Nebel, B.J. and Wright, R.T.(1996). *Environmental Science*, Prentice Hall, NewJersey.
6. Sharma, B.K. and Kaur (1997). *Environmental Chemistry*. Goel Publishing House,Meerut.
7. Sharma, B.K. and Kaur, (1997). *An Introduction to Environmental Pollution*. Goel Publishing House,Meerut.
8. Sinhe, A.K. Boojh, R. and Vishwanathan, P. N. (1989). *Water Pollution Conservation and Management,* Gyansdaya Prakashan,Nainital.

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

Hrs – 2/Week **CODE: U14RE1EST01**
CREDITS : 2

Unit I–Awareness and Natural Resources

Awareness of Environmental issues and management strategies–need of the hour Renewable and non-renewable resources-uses, present status and management of forest, water, land and energy resources.

Unit II–Ecosystems and Biodiversity

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

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

Unit III–Environmental Pollution

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

Unit IV–Human population and Environment

Population growth at national and global level.

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

Environmental pollutions and diseases-malaria- chikungunya **Unit V–**

Environment and Social Issues

Rich poor wide–at national and global levels. Urbanization –slums

Changing value systems –AIDS

Family welfare programs

புனித சிலுவை தன்னாட்சிக் கல்லூரி, திருச்சிராப்பள்ளி – 620 002.

தமிழாய்வுத்துறை

இளங்கலை ∴ இளமறிவியல் ∴ இளம் வணிகவியல் பட்ட வகுப்பு

முதலாமாண்டு – இரண்டாம் பருவம் - 2014

தாள் - **II**

Total Hours : 75 **Code : U12TL2TAM02**

Hrs : 5Hrs /Wk **Marks : 100**

Credit : 3

நோக்கங்கள்:

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

பயன்கள்:

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

அலகு:1 செய்யுள்

இறைமை

அன்பு

நேர்மை

அலகு:2 செய்யுள்

தன்னம்பிக்கை

முயற்சி

அலகு:3

தமிழ் இலக்கிய வரலாறு - தமிழாய்வுத்துறை வெளியீடு

பல்லவர்காலம்

நாயக்கர்காலம்

அலகு:4

படைப்பிலக்கியம் - புதினம்

சு.தமிழ்ச்செல்வி - கீதாரி

அலகு:5

கடிதம் எழுதுதல்

பாட நூல்கள்

செய்யுள்	-	தமிழாய்வுத்துறை வெளியீடு
தமிழ் இலக்கிய வரலாறு	-	தமிழாய்வுத்துறை வெளியீடு
கீதாரி	-	சு.தமிழ்ச்செல்வி
குடித இலக்கியம்	-	பயிற்சி ஏடு.

(for the candidates admitted from June 2014 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-620002

DEPARTMENT OF HINDI

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

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

SEMESTER –II

HRS/WEEK: 5 **CREDITS: 3**

CODE: U14HN2HIN02 **MARKS: 100**

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

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

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

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

UNIT- V **:** Comprehension – Prose passages

Books Prescribed:

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

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 2

DEPARTMENT OF FRENCH

SYLLABUS

SEMESTER II

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

(For candidates admitted 2013 onwards)

HRS/WEEK : 5

CREDIT : 3 **CODE : U13FR2FRE02**

MARKS : 100

Unit 1 Quelle journée !

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

Unit 2 Qu'on est bien ici !

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

Unit 3 Souvenez-vous ?

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

Unit 4 On s'appelle ?

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

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

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

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

TEXT BOOKS :

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

(for candidates admitted from 2014 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2
2014 - 2015
I B.A., B.Sc., B.Com., B.R.Sc., B.C.A., B.B.A., SEMESTER II
PART II - ENGLISH 1I - GENERAL ENGLISH PAPER II

NO.OF HRS/WK:6 CODE:U10EL2GEN02
NO.OF CREDITS: 3

OBJECTIVES

Integrated skills of English with focus on reading, writing, speaking and listening.
Integrated sub skills that include comprehension, vocabulary, grammar, spelling, punctuation and reference skills.
Literary appreciation (incidental)

UNIT I

The Suitor and Papa: *Anton Chekov*

UNIT II

The Sniper :*Liam O'Flaherty*

UNIT III

A Handful of Dates :*Tayeb Salih*

UNIT IV

Two Gentlemen of Verona: *A.J. Cronin*

UNIT V

GRAMMAR - 1. Transformation of sentences – a) Direct – Indirect speech b) Voices
2. Question Tag 3. Tenses

COMPREHENSION – Prescribedtexts

COMPOSITION - 1. Personal letter
2. CreativeWriting
3. NarrativeWriting
4. ArticleWriting

GENERAL ESSAY: 5 TOPICS
1. My relationship with mymother
2. My favouritehobby
3. Look before youleap
4. All that glitters is notgold
5. Me, after tenyears…

BOOKS FOR REFERENCE

Renu, Anand and Geetha, Rajeevan, *Images Of Life An Anthology of Prose,* New Delhi: Cambridge University Press, 2006. Print.

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HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
I B.Sc. ZOOLOGY (Specialization in Biotechnology)
SEMESTER II
MAJOR CORE: 2 - ANIMAL DIVERSITY- 2: CHORDATA
(For candidates admitted from 2013 onwards)

Code : U13ZO2MCT02
Credits : 5
Hours/Week**: 7**

OBJECTIVE

Student learns the geological time scale, origin of chordates, and classification of vertebrates up to order giving their organization with examples of biological interest. They also identify a few locally available fishes of aqua cultural importance.

UNIT I

Origin of Chordates and classification of Prochordates

Geological time scale, Origin of chordates, Vertebrate relationships and basic structure.
Type study: Amphioxus
Prochordates- Classification, characters and relationship.

UNIT II

Pisces

General characters and outline classification upto orders with suitable examples of biological interest.
Type study: Shark
Identification and study of a few locally available fishes and fishes of aquaculture importance (Lab Cum theory).

UNIT III

Amphibia and Reptilia

General characters and outline classification upto orders with suitable examples of biological interest.
Type study: Frog and Calotes
Identification and study of a few Poisonous and non-poisonous snakes.

UNIT IV

Aves

General characters and outline classification upto orders with suitable examples of biological interest.
Type study: Pigeon
Archaeopteryx, Significance of Arachaeopteryx, Flightless birds.

UNIT V

Mammalia

General characters and outline classification upto orders with suitable examples of biological interest.
Prototheria, Metatheria and Eutheria
Type study: Rabbit

TEXT BOOK:

Ekambaranatha Ayyar, M. and Anantha Kriashnan, T. N.(1994). *A Manual of Zoology* Vol II Part I & II. (Chordata). S.ViswanathanPvt.Ltd.

REFERENCE BOOKS:

1. Jordan,E.L.andVerma,P.S.(2008). *Chordate Zoology* S. 14Th Edition Chand &Co.New Delhi
2. Harvey Pough, F., Christine M. Janis and John B. Heiser, (2003). *Vertebrate life* 6th Edition. Pearson Education
3. Kotpal, R.L. (2001).*Modern Textbook of Zoology Chordates*. Rastogi publications,Meerut.
4. Arnold, G. Kluge, (1971). *Chordate structure and function*. 2nd Edition.Macmillan.
5. Miller, A.S. and John P. Harvley, (1996). *Zoology*. 2nd Edition. Wm. C.BrownPublishers.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
I B.Sc. ZOOLOGY (Specialization in Biotechnology)
(For candidates admitted from 2012 onwards)
SEMESTER II
MAJOR CORE 3: PRACTICAL I -
ANIMAL DIVERSITY I & II

Code: U12ZO2MCP03
Credit: 4
Hours/Weeks: 5

1. Cockroach – Digestive system, Nervous system and Reproductivesystem.
2. Earthworm- Nervous system, Reproductive system and Mounting of Bodysetae.
3. Frog- Digestive system, Circulatory system (Arterial and Venous system), Urinogenitalsystem, Nervous system – Brain V, VII, IX and X cranial nerves and I spinal nerve using virtual class study.
4. Spotters: Animal Diversity I andII
   Identification of prepared slides and specimens of Biological importance.

A Record of the work done is to be submitted at the time of examination

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2

(For the candidates admitted from 2012onwards)

DEPARTMENT OF ZOOLOGY

SEMESTER –II

ALLIED: 3 – BASICS IN BIOINFORMATICS (Optional)

Code: U12ZO2AOT03
Credits: 3
Hours/Week**: 4**

OBJECTIVE

Students understands the biomolecular structures, web browsing, structural data base (Protein and nucleic acids), molecular modeling database, Protein information sources, genomic information sources, sequence alignment, phylogeneticanalysis.

UNIT I

Basics and Scope

Bioinformatics- Definition, Scope. Biomolecular Structure (Primary, secondary, tertiary and quaternary) – Proteins and Nucleic acids

UNIT II

Data bases

Web Browsing – Structural Data bases- Introduction, primary data base, protein data bank (PDB) - Nucleic acid structural data base (NDB) - Secondary or derived data base- Molecular modeling data base (MMDB).

UNIT III

Proteomics

Protein information resources (PIR) - Martinsried Institute for protein sequences (MIPS) Swiss-Prot - Translated EMBL (TrEMBL) - Composite pattern Database- Structural classification of proteins (SCOP), ORF Prediction.

UNIT IV

Genomics

Genome Information Resource – European Molecular Biology Laboratories (EMBL) - DNA Data Bank Japan (DDBJ) - Gen Bank.

UNIT V

Sequence Alignment and Phylogenetic Analysis

Sequence Alignment- Multiple sequence alignment – Software used in sequence alignment.
Phylogenetic analysis.

TEXT BOOK:

Arthur, M.L. 2007. *Introduction to Genomics*. Oxford Uni . Press, USA.

REFERENCE BOOKS

1. Irfan Ali Khan and Atiya Khanum. (2003). *Fundamentals of Bioinformatics*. Ukaaz Publications Hyderabad, AP,India.
2. Murthy, C. S. V. (2003). *Bioinformatics.* Himalaya Publishing House. Mumbai, Delhi, Nagpur. Bangalore, Hyderabad,India.

3. Subramanian, C. (2004). *A textbook of Bioinformatics***.** Dominant Publishers and Distributors. New Delhi,India.
4. Lovric, J. 2011. *Introducing Proteomics: From concepts to sample separation,mass spectrometry and data analysis* .Wiley.
5. Jonathan , P. 2009. *Bioinformatics and Functional genomics,* 2nd edition.Sinauer Associates,Inc.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI
B. A/ B. SC/ B. COM/ B. R. SC/ B. C. A/ B. B. A- SEMESTER- II
SKILL – BASED ELECTIVE I: SOFT SKILL DEVELOPMENT

Code: U14RE2SBT01
Hours/Week: 2
Credits: 2

OBJECTIVE:

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

UNIT I
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.

UNIT II
Interpersonal skills
Trust-trustworthiness-interpersonal communication –art of listening, reading and writing –art of writing,e-mails and e-mail etiquettes –building relationship-networking.

UNIT III
Corporate skills
Vision, mission and goals: Concepts, vision setting, goal setting- goals for roles. Group goal –concept of synergy – team building – group skills.

UNIT IV
Management skills
Developing Body Language – Practicing etiquette and mannerism –Stress Management –
Time Management: Important and urgent activities- time management to move towards life vision.

UNIT: V
Employability Skills
Writing Resume / CV –interview skills – Group Discussion –Mock Interview – Mock GD –Career Planning.

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI
B.A./B.Sc./ B Com./ BCA
Semester II
SKILL-BASED ELECTIVE II: RURAL ENRICHMENTAND SUSTAINABLE DEVELOPMENT

Code: U08RE2SBT02
Credit: 2
Hrs/ Week: 2

Unit I

Green revolution and industrialization-caused climatic changes and mismanagement of natural resources: effects of over exploitation of land and water, Monoculture practices, use of hybrid and genetically modified (GM) seeds, dumping of chemical fertilizers and pesticides - reduced economic returns from agriculture – resultant social issues- poverty-farmer suicide.

Unit II

Sustainable Development: Concept – environmental, social and economic aspects of sustainable development- Sustainable development as solution to address rural issues- successful case studies from India.

Unit III

Elements in sustainable development I: Water shed management- rain water harvesting, de-silting, bunds construction, check dams, managing rain water drainage canals
Alternate agricultural models –agro-forestry.

Unit IV

Elements in sustainable development II: Addressing agricultural issues – biofertilizer- Azolla culture, vermicomposting, biopesticides- panchakavya, muligai puchiviratti, amrithakarasal
Addressing health and sanitation issues – health, nutrition, vaccination.

Unit V

Survey of natural resources and resource mapping in villages, Village Level Participatory Approach (VLPA) – Role of SHGs and NGOs.
Introduction to disaster Management (fire and flood).

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2

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

LIFE ORIENTED EDUCATION

ETHICS – I: RELIGION AND VALUE SYSTEMS

HRS / Wk :1 **CODE: U12VE2LVE01**

CREDITS : 1 **MARKS : 100**

OBJECTIVES:

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

UNIT – I: RELIGION

Concept of God- Faith, Meaning, Definition, Nature, Characteristics. Basic values of different religions-Globalization.

UNIT – II: DIFFERENT RELIGIONS

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

UNIT – III: UNITY OF RELIGION

Unity of Vision and Purpose- Respect for Other's Faith, Inter Religious Co-operation, Religious Pluralism as a fact and Religious Pluralism as a value.

UNIT – IV: FUNDAMENTALISM, COMMUNALISM AND SECULARISM

Meaning and impact of Fundamentalism-Communalism-Violence and terrorism – Tolerance – Secularism - Individualism.

UNIT – V: VALUE SYSTEMS

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

REFERENCES:

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

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

HRS / WK : 1 **CODE: U12VE2LVB01**
CREDIT : 1
MARKS : 100

OBJECTIVE:

- Developing the passion for the Word of God – Jesus and inculcating the thirst of Missionaries being a disciple of Christ.

UNIT - I: BIBLE – THE WORD OF GOD

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

UNIT – II: MINISTRY OF JESUS

- Miracles (Mark 2:1-12,Luke 4:38-41,6:6-11,7:1-17,8:26-56,John 2:1-12)
- Parables (Luke 6:46-49,8:4-15,10:25-37,15:1-32)
- Preaching
  - Sermon on the mount (Mat 5-7)
  - Lord's Prayer (Luke 11: 1-13)
  - Kingdom of God (Mat 13: 24-50)
- Prayer life of Jesus (Luke 5:12-16,John 11:41-45,17:1-26,Mark 14:32-42)
- Rich and Poor (Luke 16: 19-31,21:1-4)
- Women Liberation (John 4:1-30,8:1-4)
- Women in the New Testament
- Mary(Mother of Jesus)-(Luke 1:27-35, John 2:1-12, 19:35, Acts 1:13-14)
- Martha & Maria (Luke 10: 38- 42, John 11: 1-46)

UNIT – III: CHURCH – BIRTH AND GROWTH

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

UNIT – IV: DISCIPLES AND APOSTLES

- Betrayal and the change in the life of St. Peter (Luke 22:1-7,Acts 2:1-41,12:1-17)
- St.Andrew (Mat 4:18-20,John 1:35-42,6:1-14)
- St.Stephen (Acts 6,7)
- St.Paul (Acts 8,9,14,17,26 and 28)

UNIT – V: MISSIONARIES

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

REFERENCES:

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

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

HRS / WK :1 **CODE :U12VE2LVC01**
MARKS : 100 **CREDIT : 1**
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

Genesis - God revealed himself in creation -God who preserves creation through covenants (Pentateuch) -Our response to God's covenant -Reason for its success and failure -The relationship of God with Israel -Image of God in Old Testament-God and me

UNIT - II: GOD OF THE PROPHETS

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

UNIT - III: GOD OF WISDOM

God experience through wisdom Literature, its origin and growth

UNIT - IV: SYNOPTIC GOSPELS

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

UNIT - V: LUKE'S GOSPEL

Study of Luke's Gospel in detail – specialty of the gospel – main emphasis of the message – meaning and blessing of suffering and paschal joy in one's life.

Passion – Paschal mystery

REFERENCES:

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

புனித சிலுவை தன்னாட்சிக் கல்லூரி, திருச்சிராப்பள்ளி – 620 002. தமிழாய்வுத்துறை

இளம் வணிகவியல் ∴ இளங்கலை ∴ இளம் அறிவியல் பட்ட வகுப்பு இரண்டாம் ஆண்டு - மூன்றாம் பருவம் - 2014 தாள் - III

Total Hours : 90 **Code : U12TL3TAM03**
Hrs : 6Hrs /Wk **Marks : 100**
Credit : 3

நோக்கங்கள்:

4. வாழ்வின் கூறுகளாகியஅறம், பொருள், இன்பம், வீடுபேறு ஆகியவற்றின் வழிமுறைகளை எடுத்துரைத்தல்.
5. ஊடகங்களின் ஆழமான நுண்ணறிவை வெளிப்படுத்துதல்.

பயன்கள்:

1. காப்பியங்களை பயில்வதன் மூலமாக மாணவர்கள் அறக்கருத்துக்களை உணர்ந்து கொள்ளுதல்.
2. தமிழ் மொழியை செம்மொழியாக அறிவித்துள்ள இக்காலக்கட்டத்தில் தமிழ் இலக்கியத்தின் பயனை மாணவர்கள் முழுமையாக அறிந்துக் கொள்ளுதல்.
3. ஊடகங்கள் வெளிப்படுத்தும் நன்மை, தீமை ஆகியவற்றைப் பகுத்தறியக் கூடிய பக்குவத்தை அடைதல்.

அலகு:1 செய்யுள்

இயற்கை

நாட்டுப்பற்று

உழைப்பு

அலகு:2 செய்யுள்

மானம்

பெண்ணுரிமை

அலகு:3

தமிழ் இலக்கிய வரலாறு

சோழர் காலம்

அலகு:4

நாடகம்

தண்ணீர் தண்ணீர் - கோமல் சுவாமிநாதன்

அலகு:5

கோயிற்கலை - திட்டக்கட்டுரை, வினாடி வினா

பாட நூல்கள்

1. செய்யுள் நூல் - தமிழ்த்துறை வெளியீடு
2. தமிழ் இலக்கிய வரலாறு - தமிழ்த்துறை வெளியீடு
3. நாடகம் - தண்ணீர் தண்ணீர் - கோமல் சுவாமிநாதன்
4. கோயிற்கலை - தமிழ்த்துறை வெளியீடு

(for the candidates admitted from June 2014 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-620002

DEPARTMENT OF HINDI

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

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

SEMESTER – III

HRS/WEEK : 6 **CODE: U14HN3HIN03**

CREDITS : 3 **MARKS : 100**

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

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

UNIT- III : Bakthi Kaal

UNIT- IV : Poetics

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

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

Books Prescribed :

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

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 2

DEPARTMENT OF FRENCH

SEMESTER III

PART I - LANGUAGE - FRENCH PAPER III [LANGUAGE & CIVILISATION

(ÉCHO A2 2e édition)]

(For candidates admitted 2013 onwards)

HRS/WEEK : 6
CREDIT : 3

CODE : U14FR3FRE03
MARKS : 100

Unit 1 Vivement demain !

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

Unit 2 Tu as du boulot ?

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

Unit 3 Qu'en pensez-vous?

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

Unit 4 C'est tout un programme !

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

Unit 5 On se retrouve

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

TEXT BOOKS :

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

(for candidates admitted from 2013 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2.

2014 - 2015

II B.A., B.Sc., B.Com., B.R.Sc., B.C.A., B.B.A., SEMESTER III PART II - ENGLISH III - GENERAL ENGLISH PAPER III

NO.OF HRS/WK:6 CODE:U10EL3GEN03

NO.OF CREDITS: 3

OBJECTIVES

To reinforce the LSRW skills of students.

To enhance their study skills and literary skills through a selection of prose extracts. To develop soft skills such as presentation and group discussion skills.

To strengthen sub skills including vocabulary, grammar, comprehension, argumentative and imaginative writing

UNIT I

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

UNIT II

The Avenger :*Anton Chekov*

UNIT III

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

UNIT IV

The Second Crucifixion: *Larry Collins and Dominique Lapierre*

UNIT V

General Essay – 5 topics given

Idioms and Phrases - 20 Idioms and phrases given

BOOKS FOR REFERENCE

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

List of Idioms and Phrases:

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

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

GENERAL ESSAY TOPICS

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

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HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 2
B.Sc. ZOOLOGY (Specialization in Biotechnology)
For Students Admitted from 2012 onwards)
SEMESTER III
MAJOR CORE: 4- CELL AND MOLECULAR BIOLOGY

Code: U12ZO3MCT04
Credits: 5
Hours/Week**: 5**

OBJECTIVE
Student learns the ultra structural details and functions of cellular organelles such as cell membrane, lysosomes, mitochondria, ribosome, endoplasmic reticulum, golgi complex, centrosome, nucleus and chromosomes. They also learn the cell division – mitosis and meiosis. Student also learns the structure and replications of DNA, transcription, post transcriptional modification, structure and functions of RNAs, translation and post translational modification.

UNIT I
Plasma Membrane: Ultrastructure -Unit membrane and Fluid mosaic models; Modifications; Permeability Functions- Passive, Facilitated, Active, Exo and Endocytosis; Introduction to signal transduction.
Mitochondria: Ultra structure – chemistry and functions.
Lysosome: Polymorphic forms, Cytochemistry – Functions.

UNIT II
Ribosomes: Structure – Composition and Assembly - Functions.
Endoplasmic Reticulum: Ultra structure - Types – Protein trafficking- Other functions.
Golgi Complex: Ultra structure - Role in cell secretion.
Centrosome : Ultra structure and Functions.

UNIT III
Chromosomes: Organization - Chemistry- Functions.
Giant Chromosomes – Polytene and Lampbrush – Organization and functions.
Nucleus: Ultrastructural Organization – Functions.
Cell division: **Mitosis -** Stages- Spindle mechanics- mitotic inhibitors, **Meiosis** – Stages – Significance.

UNIT IV
DNA Structure and Replication: DNA – double helix – Watson and Crick model, DNA replication and semi-conservative method. Central dogma of molecular biology.
Transcription: Eukaryotic transcription, RNA polymerase-types, transcription factors, reverse transcription, transcription regulators.
Post-transcriptional modification: Processing of mRNA-capping, polyadenylation , splicing –introns and exons.

UNIT V
Structure and functions - mRNA, tRNA and rRNA.
Translation: Genetic code and its characteristics, Protein synthesis– initiation, elongation, termination in eukaryotes.
Post-translational modifications: Polypeptide to functional proteins (Glycosylation and, Phosphorylation).

TEXT BOOK:

1. Verma P.S. & Agarwal V.K. (1998). *Cell Biology*, S.Chand and Company Ltd, NewDelhi.
2. Agarwal**,** V.K., (2000). *Molecular Biology,* S. Chand and Company Ltd., NewDelhi

REFERENCE BOOKS:

1. De Robertis E.D.P. & De Robertis E.M.F. (1995). *Cell and Molecular Biology*, 8th Edition, Saunders College,PA.
2. Sheeler P. & Bianchi D.E. (1987). *Cell and Molecular Biology*, III Edition, John Wiley &Sons.
3. Alberts B., Bray D., Lewis J., Raff M., Roberts K. & Watson J. (1994). *Molecular Biology of the Cell* , 3rd Edn, Garland Publishing Inc, New York &London
4. Alberts B. Bray, D., Lewis,J., Riff, M.,Robert, K., and Watson, J.D. (1994). *Molecular Biology of the Cell*. Garland Publishing Inc., NewYork.
5. Darnell, J., Lodish,H., and Baltimore, D. (1986). *Molecular Cell Biology*. Scientific American Book Inc.,USA.
6. Freifelder, D (1990). *Molecular Biology*, Narosa Publishing House, NewDelhi.
7. Sheeler, P. and Bianchi. D.E. (1987). *Cell and Molecular Biology*, John Wiley andsons.

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPALLI-2
B.Sc. ZOOLOGY (With Specialization in Biotechnology)
(For the candidates admitted from 2012 onwards)
SEMESTER III
MAJOR CORE: 5- GENETICS

CODE: U12ZO3MCT05
Credits: 5
Hours/Week**: 5**

OBJECTIVE:

This course exposes the students to various concepts in Genetics *viz.* Mendelism, Multiple alleles, Linkage, Crossing over, Sex linkage, Polygenes and Cytoplasmic inheritance. The student studies some aspects of Human genetics like Genetic counseling, Syndromes and certain Genetic disorders. The student learns the mechanism of Sex determination, Mutation, Bacterial recombination, Control of gene expression and cancer genetics.

UNIT I

Mendelian traits in human-Pedigree charts
Multiple alleles: Blood group inheritance-ABO, Rh-applications.
Linkage: Morgan‟s experiment.
Crossing over: Kinds, theories& cytological basis.
Gene map: Determination of map distance and gene order.
Polygenic inheritance – Skin colour in man.

UNIT II

Sex determination in animals.
Sex determination in man-sex determining genes - Lyon hypothesis.
Non-disjunction – types – gynandromorphism - origin.
Sex linked inheritance : X linked genes in man - colour blindness and haemophilia-
Y linked genes.
Sex limited genes and sex influenced genes.
Cytoplasmic inheritance: Kappa particles in *Paramecium* and shell coiling in *Limnaea*.

UNIT III

Introduction to gene function-Metabolic disorders associated with phenylalanine metabolism.
Thalassemia and Sickle cell anemia.
Genetic counselling: Prenatal diagnosis: Ultrasound scanning-amniocentesis-chorionic villus sampling - AFP test-management of genetic disorders.

UNIT IV

Mutation: Types, major molecular mechanisms; mutagens-radiation and chemical.
Mutation detection-ClB method.
Variation in chromosomes: Structural-deletion, duplication, inversion and translocation.
Numerical-aneuploidy-types, syndromes in man - Down, Turner and Klinefelter-polyploidy-types.
Population genetics: Hardy-Weinberg law and equilibrium and calculation of gene frequency for recessive alleles.

UNIT V

Recombination in bacteria: Transfer of genetic material-conjugation-F+,F- and Hfr strains, transformation, transduction andsexduction.

Operon model for transcriptional regulation in prokaryotes-lac operon in *E.coli* - promoter, operator, regulator, repressor, inducible and repressible operon.
Cancer genetics - oncogenes -activation of proto-oncogenes-anti oncogenes.

TEXT BOOK:

Verma,P.S. and Agarwal, V.K. (1988). *Genetics*. S.Chand & Company Ltd, New Delhi.

REFERENCE BOOKS:

1.Bhatnagar, Kothari & Mehta (1986). *Essentials of human Genetics*, Orient Longman Ltd.
2.Gardner (1984). *Human genetics*. Jones and Bartlet Publishers, Boston.
3.Griffiths,A.J.F.(1993). *An introduction to genetic analysis.* Freeman company, NewYork.
4.Ricki, L (1994). *Human genetics*. WLB Publishers.
5.Ursula Goodenough (1985).*Genetics,* Holt Reinhart and Winstan, NewYork.
6.Alice Marcus (2009). *Genetics*, MJP Publishers,Chennai.

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-2

(For the candidates admitted from 2012onwards)

SEMESTER III

ALLIED ZOOLOGY: 4 (Compulsory for Botany students)

BIOLOGY OF INVERTEBRATES AND CHORDATES

Code: U12ZO3ACT04
Credits: 4
Hours/Week: 4

OBJECTIVE

Students learn about the level of organization and general characters of various phyla of Invertebrates with examples. They also learn the general features of Pisces, Amphibia, Reptilia, Aves and Mammalia with examples.

BIOLOGY OF INVERTEBRATES

UNIT 1

General characters and levels of organization.

Protozoa: Acellular organization- distinguishing features, detailed study of the structure and life history of*Plasmodium.*

Coelenterata: Tissue grade of organization-Organization and life history of *Aurelia.*

UNIT II

Organ system level of organization.

Detailed study of the structure and life history of representative types of the following phyla.

Platyhelminthes: *Fasciola hepatica.*

Annelida-*Hirudinaria.*

UNIT III

Arthropoda-*Penaeus.*

Mollusca-*Pila.*

Echinodermata-*Asterias.*

BIOLOGY OF CHORDATES

UNIT IV

Salient features of prochordates.

Vertebrata : General features and type study of the following (excluding skeletal system).

Reptilia – Calotes.

UNIT V

Aves – Pigeon.

Mammalia – Rabbit.

TEXT BOOK:

Ekambaranatha Iyer, M. & Ananthakrishnan, T.N. (1990). *Outlines of Zoology* (Viswanathan Publishers) Vol. I & II.

REFERENCE BOOKS:

1. Kotpal, R.L. (1997). *Modern Text Book of Zoology Invertebrata.* Rastogi Company, Meerut (U.P.),India.
2. Kotpal, R.L. (1997). *Modern Text Book of Zoology -Vertebrata.* Rastogi Company, Meerut, India.

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2
DEPARTMENT OF ZOOLOGY
(for candidates admitted 2012 onwards)
SEMESTER III
SBE – 3 BIOLOGICAL SKILLS FOR PHYSICAL SCIENCES - BASIC
(THEORY CUM LAB FOR PHYSICS STUDENTS)

CODE: U13BZ3SBT03
HOURS:2
CREDITS:2

Course Objectives: Students learn the basics of biological systems, molecular biology & biotechnology.

Unit I
Biological system: Organization of Biological system: Cells-tissue-organ-cell organelles-plant stem and blood astissues.
Lab exercise: Observation of stem. Observation of chromosomes in onion root tip.

Unit II
Molecular biology: Organization of gene exon – intron - functional genes-organization of operon: promoter, operator, regulator, enhancer, repressor.
Lab exercise: Hypothetical model to show gene expression.

Unit III
Recombinant DNA technology: DNA as universal molecule – construction of rDNA – vector – cloning methods – examples for transgenic plants and animals.
Lab exercise: Isolation of DNA.

Unit IV
Plant tissue culture: Methods – callus culture, protoplast and somatic hybridization, ovule and pollen culture.
Lab exercise: Culture medium for multiple shooting.

Unit V
Animal cell culture: Requirement for animal cell culture, primary cell culture, stem cell – type, application
Lab exercise: Cell viability.

REFERENCE BOOKS:

1. DeRobertis D.P. (2001) Cell and Molecular Biology, 8thedition, Lippincott Williams and Williams.
2. Dubey R.C. (2010) A textbook of Biotechnology, 1st edition, S. Chand & company Ltd, New Delhi.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2 DEPARTMENT OF ZOOLOGY- SEMESTER III
(For candidates admitted from 2012 onwards)
SBE 3 – BIOLOGICAL SKILLS FOR PHYSICAL SCIENCES - ADVANCED
(Theory cum Lab for Physics Students)

Code: U13ZO3SBT04
Credits: 2
Hours/Week: 2
Objective: The student understands the principles of biological system, molecular biology, and computational tools including computer aided drug design.

UNIT I

Molecular Biology: Biomolecules – Proteins: Primary, secondary, tertiary and quaternary structure. DNA: Structure (Watson and Crick model)
Lab exercise: Estimation of protein, Isolation and separation of DNA.

Unit II

Recombinant-DNA technology – DNA as universal molecule- construction of rDNA- vector-cloning methods- examples for transgenic plants and animals

Unit III

Structure elucidation of protein and Bioactive compounds: Crystal studies, IR, NMR, MASS, X-ray diffraction and X-Ray crystallography and 2-D Electrophoresis.

UNIT IV

Bioinformatics: Introduction to data bases and retrieval of information. Introduction to Genomics- sequence alignment, gene finding.
Introduction to Proteomics- protein prediction, and visualization using various tools. Applications of Bioinformatics

UNIT V

Molecular dynamic simulation of movement of atoms about rotatable bonds. Hidden Markov models
-Neural Networks . Computational approaches involved in structure prediction : GOR, Chou-Fasman.

REFERENCE BOOKS:

1 De Robertis, E.D.P. and De Robertis, E.M.F.(1995). Cell and Molecular Biology. Saunders College, PA.
2. Attwood, T.K. and D.J. Parry-Smith, (2001). Introduction to Bioinformatics, Pearson Education (Singapore Pvt. Ltd., Delhi,India.)
3. Murray,R.K.,Granner,D.K.,Mayes,P.A.,Rodwell,V.W.(2000).Harper‟s Biochemistry,

Prentice Hall InternationalInc.
4. Arthur M. Lesk (2003). Introduction to Bioinformatics, Oxford University Press.
5. Mani K. and Vijayaraj N.(2003).Bioinformatics for Beginners, Kalaikathir Achchagam, TamilNadu.
6. Palanichamy,S.&Manoharan,M.(1991).Statisticalmethodsforbiol ogists.Palani, Paramount Publications, Palani, TamilNadu.
7. Power,C.B. Cell Biology, Himalaya Publishing House, Mumbai,India.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
B.A. /B.Sc. / B.Com. / B.R.Sc. / B.C.A./B.B.A DEGREE COURSE
II YEAR: SEMESTER - III
(From 2012 onwards)

GENDER STUDIES

Hours: 1Hr/wk **CODE: U12WS3GST01**
CREDITS: 1

Objectives
To make boys and girls aware of each other's strength and weakness
To develop sensitivity towards both genders in order to lead an ethically enriched life
To promote attitudinal change towards a gender balanced ambience and women empowerment

Unit I Concepts of Gender :

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

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

Unit –III Areas of Gender Discrimination :
Family – Sex Ratio – Literacy – Health – Governance – Religion Work Vs Employment – Market – Media – Politics – Law – Domestic Violence – Sexual Harassment – State Politics and Planning

Unit – IV Women Development and Gender Empowerment :
Initiatives – International Women's Decade – International Women's Year – National Policy for Empowerment of Women – Women Empowerment Year 2001 – Mainstreaming Global Policies.

Unit – V Women's Movements and Safeguarding Mechanism:
In India National / State Commission for Women (NCW) – All Women Police Station – Family Court – Domestic Violence Act – Prevention of Sexual Harassment at Work Place Supreme Court Guidelines – Maternity Benefit Act – PNDT Act – Hindu Succession Act 2005 – Eve Teasing Prevention Act – Self Help Groups – 73rd Amendment for PRIs.

BOOK FOR STUDY

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

புனித சிலுவை தன்னாட்சிக் கல்லூரி, திருச்சிராப்பள்ளி – 620002.

தமிழாய்வுத்துறை

இளம் வணிகவியல் ∴ இளங்கலை ∴ இளம் அறிவியல்

பட்ட வகுப்பு இரண்டாம் ஆண்டு – நான்காம் பருவம் - 2014

தாள் - IV

Total Hours : 75 **Code : U12TL4TAM04**

Hrs : 5Hrs /Wk **Credit: 3**

Marks : 100

நோக்கங்கள்:

1. மாணவர்களுக்குத் தமிழர்தம் வாழ்வியல் விழுமியங்களை உணர்த்துதல்.
2. அறநெறிகள் வாழ்க்கைக்கு வழிகாட்டும் விதத்தினை எடுத்துரைத்தல்
3. சிகரம் தொட்ட படைப்பாளிகளின் சிந்தனைகளை வெளிப்படுத்துல்
4. மொழித்திறன் வளர்த்தல்.

பயன்கள்:

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

அலகு:1 செய்யுள்

கடமை

காலந்தவறாமை

ஒற்றுமை உணர்வு

அலகு:2 செய்யுள்

நட்பு

குடும்பமும் விருந்தோம்பலும்

அலகு:3

தமிழ் இலக்கிய வரலாறு

சங்ககாலம் - சங்கம் மருவியகாலம்

எட்டுத்தொகை, பத்துப்பாட்டு, பதினெண்கீழ்க்கணக்கு நூல்கள்

அலகு:4

உரைநடை

சங்க இலக்கியம் (பெண்பாற் புலவர்கள்)

கட்டுரைத் தொகுப்பு

அலகு:5

பொது – மொழிபெயர்ப்பு

பாட நூல்கள்

1. செய்யுள் நூல் - தமிழாய்வுத்துறை வெளியீடு
2. தமிழ் இலக்கிய வரலாறு - தமிழாய்வுத்துறை வெளியீடு
3. சங்க இலக்கியம் கட்டுரைத் தொகுப்பு - தமிழாய்வுத்துறை வெளியீடு
4. மொழிபெயர்ப்பு - தமிழாய்வுத்துறை வெளியீடு

(for the candidates admitted from June 2014 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-620002

DEPARTMENT OF HINDI

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

HINDI PAPER-IV FUNCTIONAL HINDI & TRANSLATION

SEMESTER – IV

HRS/WEEK : 5 **CREDITS : 3**

CODE: U14HN4HIN04 **MARKS : 100**

UNIT – I Functional Hindi

UNIT- II Adhunic Kaal

UNIT- III General Essays

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

UNIT- IV Letter Writing

UNIT- V Anuvad Abhyas - III

Books Prescribed :

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

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 2

DEPARTMENT OF FRENCH

SEMESTER IV

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

(For candidates admitted 2013 onwards)

HRS/WEEK : 5 **CODE : U14FR4FRE04**
CREDIT : 3 **MARKS : 100**

Unit 1 C'est la fête !
Les pronoms objets directs et indirects – parler d'une fête – exprimer des goûts et des préférences – fêtes sans frontières – plats des fêtes – les jours fériés – les saisons – le calendrier – les fêtes traditionnelles, importées, francophones.

Unit 2 Vous plaisantez !

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

Unit 3 On s'entend bien !

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

Unit 4 À vos risqué et périls !

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

Unit 5 La vie est dure

Les pronoms possessifs, les adjectifs, les pronoms indéfinis – parler de ses activités quotidiennes, exprimer la confiance ou la méfiance – les taches ménagères – la France insatisfaite - sans travail – la chanteuse Diam's – le film 'Le Couperet de Costa-Gavras'.

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

(for candidates admitted from 2013 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2.

2014 - 2015

II B.A., B.Sc., B.Com., B.R.Sc., B.C.A., B.B.A., SEMESTER I PART II - ENGLISH IV - GENERAL ENGLISH PAPER IV

NO.OF HRS/WK:6 CODE:U13EL4GEN04

NO.OF CREDITS: 3

OBJECTIVES

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

To develop skills required for referential and independent learning.

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

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

UNIT I: READ AND COMMUNICATE: HISTORICAL SKETCHES

The Renaissance

India under the British Raj

UNIT II: READ AND COMMUNICATE : MODERN FABLES

Nonchi Nona and Kotiya

the Cat The Competition

UNIT III: READ AND COMMUNICATE : MODERN FABLES

The Nightingale and the

Rose The Butterfly that

Stamped

UNIT IV -READ AND COMMUNICATE : BIOGRAPHIES AND MODERN FABLES

Napoleon

Bonaparte The

Hiding Place

UNIT V

GRAMMAR -

Tenses

COMPREHENSION -

General

COMPOSITION - 1. Note making

2. Dialogue
3. Creative Writing
4. Narrative Writing
5. Imaginative

Writing GENERAL ESSAY – 5TOPICS

1. Should capital punishment be abolished?
2. Is a corruption- free India a dream?

3. The nuclear family and its consequent changes in society.
4. The threat of terrorism.
5. If man becomes immortal…

THINK BETTER - READ AND COMMUNICATE: MODERN FABLES

1 – 10 for Internal Testing

BOOKS FOR REFERENCE

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

*****

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

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

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
II B. SC. ZOOLOGY (With Specialization in Biotechnology)
(For the candidates admitted from 2012 onwards)
SEMESTER IV
MAJOR CORE 6 – PRACTICAL – II
(Cell Biology, Genetics, Developmental Biology and Evolution)

Code: U12ZO4MCP06
Credits: 5
Hours/Week: 5

OBJECTIVE
Student learns the skills of performing experiments, analyzing the results and discussing the observations pertaining to courses studied.

Cell Biology

Preparation of buccal cells.
Preparation of polytene chromosomes in salivary gland of Chironomous larva/ Drosophila larva.
Study of mitotic stage in onion root tip.
Study of meiosis in Grasshopper testis.

Genetics

Blood group inheritance – A, B, O and Rh.
Pedigree analysis.
Syndromes and their karyotypes.
Drosophila mutants.

Developmental biology

Preparation and observation Sperm suspension.
Observation of slides pertaining to development of frog and chick.
Placenta in mammals.

Evolution

Variation – Homologous and Analogus organs, Mimicry.

Bioinformatics

Nucleotide sequence analysis – Genbank.
Protein sequence analysis – Swissprot.
Phylogenetic analysis – ClustalW and ClustalX.

A record of the work done is to be submitted at the time of examination.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPALLI-2
B.Sc. ZOOLOGY (With Specialization in Biotechnology)
(For the candidates admitted from 2012 onwards)
SEMESTER IV
MAJOR ELECTIVE 1 - DEVELOPMENTAL BIOLOGY AND EVOLUTION

Code: U12ZO4MET01
Credits: 5
Hours/Week**: 5**

OBJECTIVE
This course is designed to study the concepts of fertilization, parthenogenesis, cleavage, gastrulation, organogenesis, extra embryonic membranes, nuclear transplantation and organizers

UNIT I
Fertilization: Physico-chemical aspects of fertilization and its significance.
Parthenogenesis: Natural and artificial – significance.
C**leavage:** Types (Holoblastic & meroblastic) and patterns of cleavage (radial, spiral, bilateral, rotational, determinate and indeterminate cleavage) – role of yolk in cleavage, cleavage in frog, chick and mammals.

UNIT II
Gastrulation: Fate map, morphogenetic movements – Gastrulation in frog, chick and mammals.
Organogenesis - Ectodermal derivatives – Development of brain and eye of frog
Mesodermal derivatives – Heart and Kidney of mammals

UNIT III
Extra embryonic membranes in chick.
Placentation in mammals – Types and functions.
Nuclear transplantation in Amphibia.
Organiser – Spemann‟s embryonic induction and chain of induction.

UNIT IV
Emergence of Evolutionary thoughts: Lamarck; Darwin-concepts of variation, adaptation, struggle, fitness and natural selection, spontaneous mutation, the evolutionary synthesis.
Origin of life: Evolution of prokaryote, origin of eukaryotic cells.
Stages of primate evolution including Homo sapiens

UNIT V
Molecular Evolution: Concepts of neutral evolution, molecular divergence and molecular clocks: molecular tools in phylogeny(Clustal W and Clustal X), protein and nucleotide sequence analysis – classification and identification(Genbank & SWISS PROT).

Developmental Biology
TEXT BOOK:
Arumugam, N. (1988). *A Text Book of Embryology*. Saras Publication, Nagercoil.

REFERENCE BOOKS:

1. Balinsky, B.I. (1970). *An Introduction to Embryology*. Saunders Press, Phil. 3rdEdn.
2. Berril, N.C. (1971). *Developmental Biology*, McGraw Hill, NewYork.
3. Berril, R. (1979). *Developmental Processes in Higher Vertebrates.* LogosPress.
4. Bodmer,(1978). *Modern Embryology.* HR &W. NewYork.
5. Nelson.O.E. (1953). *Comparative Embryology of the Vertebrates*.McGraw Hill,NewYork.
6. Scott, F & Gilbert F.S (2013). *Developmental Biology (10th Ed).* Sinauer associates Inc. Publishers. SunderlandMassachusetts.
7. Subramoniam, T.(2002). *Developmental Biology*, Narosa Publishing House, New Delhi

EVOLUTION

REFERENCE BOOKS:

1. EarnstMayr(1966).*AnimalspeciesandEvolution.*TheBelknapPressofHarvardUniversity Press, Cambridge, Massachusetts.
2. Theodosius Dobzhansky (1967). *Evolutionary Biology*. Appleton- Century – Crofts, Division of Meredith Publishing Company, NewYork.
3. Theodore H. Eaton Jr. (1970*). Evolution*. Thomas Nelson and Sons Ltd,Trinidad.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
B.Sc. ZOOLOGY (With Specialization in Biotechnology)
(For candidates admitted from 2012 onwards)
SEMESTER IV
MAJOR ELECTIVE: 2 - AQUACULTURE

Code: U12ZO4MET02
Credits: 5
Hours/Week**: 5**

OBJECTIVE
The students learn in detail about the methods of culturing economically viable species of fish. Prawn farming, oyster and clam farming are also introduced along with fish farming. Common fish diseases and methods of their control are also learnt.

Unit I
Need and scope of aquaculture, Fresh water, brackish water and near shore resources of India for aquaculture: Qualities of fresh water and brackish water aquaculture - Environmental problems caused by aquaculture.

Unit II
Different aquaculture practices – Selection of sites for aquaculture practices – Engineering aspects of fish pond construction. Preparation of fish ponds – Fertilization – Formulation and preparation of fish feeds – culture of live foodorganisms.

Unit III
Culturable species of fin fish and shell fish and their characteristics. Composite fish culture – Murrel and Tilapia. Prawn farming – oyster and clam farming.

Unit IV
Culture of cat fish, Integrated farming of fish with agriculture crops (i.e paddy cum fish culture and live stock – (Chick, duck, and pig) – Sewage fed fish culture.

Unit V
Common fish diseases and methods of control. Induced breeding and fish seed production. Prawn seed production through eye stalk ablation. Economic returns – starting investments. Bank Facility, Marketing, byproducts.

TEXT BOOK:
Santhanam,R. Sukumaran,N. and Natarajan, P. (1990). *A manual of fresh water aquaculture.* Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.

REFERENCE BOOKS:
1. Bardach, J.E., (1972). *Aquaculture* John Wiley and sons. NewYork.
2. Jhingaran,V.G. (1983). *"Fish and fisheries of India".* Hindustan Publishing Corporation, New Delhi.
3. Shukla,G.S. and Upadhyay, V.B. (1997). *Economic Zoology*, Rakesh Rastogi,Meerut.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 2

(For the candidates admitted from 2012 onwards)

SEMESTER IV

ALLIED ZOOLOGY 5 – ZOOLOGY AND HUMAN WELFARE

(Compulsory for Botany students)

Code:U12ZO4ACT05
Credits: 4
Hours /Week: 4

OBJECTIVE

Students learn about the culture of commercially important animals. Agricultural importance of some animals and methods of control are also learnt. They also study the bacterial, viral, protozoan and helminth diseases of man. They understand the basic structure and functions of immune system.

UNIT I

Culture methods of commercially important animals

Apiculture, Prawn culture and Fish culture.

UNIT II

Viral and bacterial diseases

A study of viral and bacterial diseases of man - Causative organism - modes of transmission, symptoms and preventive measures of the following

Viral diseases - Polio, rabies, mumps, influenza, measles, Japanese encephalitis, hepatitis group of virus - water borne (A and E), Blood borne- (B, C and D), AIDS.

Bacterial diseases–Dysentery, cholera, tuberculosis, tetanus, diphtheria, typhoid, STD and Leptospirosis

UNIT III

Protozoan diseases – Amoebiasis and malaria.

Helminthiasis - Taeniasis, ascariasis, ancylostomiasis and elephantiasis

Immune system – Organs, cells, antigens, antibodies, immune response;

Vaccination schedule for children in India.

UNIT IV

Insects of agricultural importance:

Any two pests of paddy, sugarcane, coconut, vegetables (Brinjal, lady‟s finger, tomato) and stored products – their life cycle and control.

UNIT V

Genetics

Blood group inheritance A, B, AB, O & Rh.

Sex-determination and sex linked inheritance in man - haemophilia and colour blindness.

Inborn errors of metabolism – phenylketonuria,

Chromosomal abnormalities –Syndromes in man- Down‟s, Klinefelter, Turner‟s & Cri-du-chat.

Genetic counseling – amniocentesis.

REFERENCE BOOKS:

1. Ekambaranatha Ayyar. M. and Ananthakrishnan. T. N. (1988). *Outlines ofZoology* (for B.Sc. Ancillary).
2. Gardener and Peter Snubtard.D. (1984). *Principles of Genetics,* John Wiley &Sons.
3. Jhingaran,V.G.(1983). *Fish and Fisheries of India* .Hindustan Publishing

Corporation, New Delhi.
4. John.B.Walter (1982). *An introduction to the Principles of diseases*.W.B.Saunders Company.
5. Paul.A.Ketchuns (1984). *Microbiology*. John Wiley and Sons, NewYork.
6. Ramakrishnan Ayyar (1940). *Handbook of Economic Entomology for South India*, Government Press.Madras.
7. Kuby, J. (2007). *Immunology*. (Sixth edition) W.H.Freeman and company, NewYork.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 2

(For the candidates admitted from 2012 onwards)

SEMESTER IV

ALLIED ZOOLOGY 6 - PRACTICAL

(Compulsory for Botany students)

Code: U13ZO4ACP06
Credits: 3
Hours/Week: 4

Anatomy of cockroach/ Earthworm- Digestive system and Nervous system
Prawn - Appendages
Temporary mounting of Pediculus/mosquito.
Frog– Digestive system and reproductive system – Virtual class
Measurement of blood pressure.
Blood group identification.
Qualitative tests for free sugar and albumin in urine.
Study of Mendelian traits
Pedigree analysis (Autosomal dominant, recessive and Sex linked)
Syndromes – Down, Turner & Klinefelter
Spotters – Animals of Biological/Economicinterest

Protozoa - Entamoeba
Coelenterata - Aurelia, Corals
Platyhelminthes -Taenia
Annelida -Leech
Arthropoda - Prawn and any two insect pests of crops
Mollusca -Pila
Echinodermata - Starfish
Prochordata -Amphioxus
Chordata - Naja naja, Pigeon,Mammal

Animal products of economic importance - honey, cocoon, and silk thread.
Ornamental fishes (any 3)
Edible fishes (any 3)
Slides of Endoparasites (any5)
Meiosis in Grasshopper Testis
Buccal Smear – Barr body
Bacteria - Gram Staining, Antibiotic Sensitivity.

A record of the work done is to be submitted at the time of examination.

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

HRS / Wk : 1 CODE: U12VE4LVE02
CREDIT : 1
MARKS : 100

OBJECTIVES:

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

UNIT – I: GENDER ISSUES

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

UNIT – II: WOMEN AND MEDIA

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

UNIT – III: SOCIAL ISSUES RELATED TO WOMEN

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

UNIT – IV: WAYS OF EMPOWERING WOMEN

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

UNIT – V: CYBER CRIME AGAINST WOMEN

Harassment and Spoofing via e-mail, Cyber Stalking, Cyber Pornography, Morphing - Cyber Laws, social network, face book, and twitter

REFERENCES:

1. Dr.M.Arumairaj et al., 1999, "Marching towards the Millenium ahead".
2. Thomas Anjugandam, 1999, "Grow Free Live Free" Salesian Publicaiton.
3. H.C 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,"

HOLY CROSS COLLEGE(AUTONOMOUS) TRICHIRAPALLI-2.
B.A/B.Sc./B.Com/B.R.Sc/B.C.A – DEGREE COURSES

LIFE ORIENTED EDUCATION

BIBLE STUDIES – II: OLD TESTAMENT

HRS / WK :1 **CREDIT : 1**
CODE: U12VE4LVB02
MARKS : 100

OBJECTIVE:

- Understanding the desires of God through Prophetic revelation and becoming sensitive to the heart beat of God.

UNIT – I: PURPOSE OF LIFE

Creation of man – fall of man (Gen 1-4)

Plan of redemption through the life of :

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

UNIT – II: JUDGES AND KINGS

- **JUDGES:** Deborah (Judges 4); Samson (Judges 6-8); Gideon (Judges 13-16)
- **KINGS:** David (I Sam 17-31, II Sam 1-12); Solomon (I Kings 1-11, Proverbs 1-5,31)

UNIT – III: WOMEN IN THE BIBLE

- Women in the Old Testament
- Eve (Gen 3)
- Ruth (Ruth 1-4)
- Hannah (I Sam 1:1-28)
- Esther (Esther 1-6)

UNIT – IV: MINOR PROPHETS

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

UNIT – V: MAJOR PROPHETS

- Brief Life History and teachings of
- Elijah(I Kings 17-19)
- Elisha(II Kings 4-6)
- Isaiah (Is 1,6,11,36-38,40-42,44,50,53,61)
- Jeremiah (Jer 1-3,7-12,18-19,23)
- Daniel (Daniel 1-6)

REFERENCES:

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

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

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

OBJECTIVES:

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

UNIT - I: MISSION OF THE CHURCH

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

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

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

UNIT – III: THE FUNCTIONARY CHURCH AND I

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

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

UNIT – IV: SACRAMENTS AND SACRAMENTAL

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

UNIT – V: MARY AND SAINTS

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

REFERENCES :

- "Vatican II Revised" Archbishop Angelo Fernandes Published by X.Diax de Rio S.J. Gujarat Sahitya Prakash, P.O.Box. 70, Gujarat, 388001, India.
- "The Sacraments The Word of God at the Mercy of the Body" Claretian Publications, Malleswaram, Bangalore 560055.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
B. SC. ZOOLOGY (With Specialization in Biotechnology)
(For the candidates admitted from 2012 onwards)
SEMESTER V
MAJOR CORE: 7 – BIOCHEMISTRY AND BIOSTATISTICS
Code: U12ZO5MCT07
Credits : 4
Hours /Week :5

BIOCHEMISTRY

OBJECTIVE: Students learn the structure, classification and metabolism of specified biomolecules like carbohydrates, proteins and lipids. Students learn the structure of nucleotide and understand the occurrence of biologically important nucleotides. Students learn the nomenclature, classification of enzymes, mechanisms and factors affecting enzyme action.

UNIT I
Structure and classification
Carbohydrates – Structure and classification – monosaccharides, disaccharides, oligosaccharides and polysaccharides
Proteins – Structure – primary, secondary, tertiary & quaternary and classification
Lipids- Structure and classification

UNIT II
Metabolism
Carbohydrate – Glycolysis, Citric acid cycle, Glycogenesis, Glycogenolysis and Gluconeogenesis
Lipid- Biosynthesis of long chain fatty acids, Oxidation of fatty acids – β oxidation
Protein- Transamination, decarboxylation, oxidative and non- oxidative deamination and Urea cycle
UNIT III
Nucleotide and Enzymes
Nitrogenous bases, nucleosides, nucleotides – Biologically important nucleotides
Enzymes – Nomenclature, classification, Mechanism of enzyme action – Fischer‟s lock and key model and Koshland‟s induced fit model, Michaelis – Menten hypothesis, Factors affecting enzyme action

BIOSTATISTICS

OBJECTIVE: Students learns the importance of statistical applications in biology. Student learns collection, classification, tabulation and presentation of data. The student learns the tools to describe the data. The student also learns the application of statistical tests to infer on the given data.

UNIT IV
Descriptive Statistics
Definition and scope – Variables in biology – Data collection – Classification – Tabulation,
Diagrammatic representation – Bar, Pie and Histogram.
Measures of central tendency – Mean (Arithmetic)- Median – Mode
Measures of dispersion – Standard deviation, Standard error, Co-efficient of variance.

UNIT V
Inferential Statistics
Test of significance – hypothesis testing – Type 1 error – Type II error, Level of significance.
Student t test – comparison of mean of two samples.
Chi-square (X^2) test – Test for goodness of fit.

Correlation – Graphic and Mathematical method (Karl Pearson‟s correlation coefficient)
Regression – simple linear regression.

BIOCHEMISTRY

TEXT BOOK:

Satyanarayanan, U (2004). *Essentials of Biochemistry,* Uppala Author – Publisher Interlinks, Vijayawada.

REFERENCE BOOKS:

1. Jain, J.L., Sunjay Jain and Nitin Jain (2007). *Fundamentals of Biochemistry*, S. Chand & Company Ltd., NewDelhi.
2. Murray, R.K., Granner, D. K., Mayes, P.A., Rodwell, V.W (2000). *Harper'sBiochemistry,* Prentice Hall International Inc.,
3. Stryer, L (1988). *Biochemistry*. W.H. Freeman and Company, New York.

Veerakumari, L (2004). *Biochemistry,* MJP Publishers,Chennai.

BIOSTATISTICS

TEXT BOOK:

Palanichamy, S. & Manoharan,M. (1991). *Statistical methods for biologists.* Palani, Paramount Publications, Palani, Tamil Nadu.

REFERENCE BOOKS:

1. Bailey, N.T.J. (1959). *Statistical Method in Biology.* The English Language book society and English University PressLtd.
2. Snedecor, G.W. and William, G. (1975). *Statistical Methods.* HarvardUniversity, Oxford & IBH Publication Co., Calcutta. Bombay, NewDelhi.
3. Sokal, R. and James, F.R. (1973). *Introduction to Bio-statistics*, W.H. Freeman& Company, Toppan company, Ltd., Tokyo,Japan.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPALLI-2
B.Sc. ZOOLOGY (With Specialization in Biotechnology)
(For the candidates admitted from 2012 onwards)
SEMESTER V
MAJOR CORE: 8 -FUNDAMENTALS OF BIOTECHNOLOGY

Code: U12ZO5MCT08
Credits: 4
Hours/Week**: 5**

OBJECTIVE

Students understand the methods in genetic engineering such as isolation of genes, gene transfer, selection and screening, plant, animal and stem cell culture. Students learn the principles of blotting techniques and DNA sequencing.

UNIT I

Definition and scope of biotechnology
Introduction and techniques in genetic engineering**:** Isolation of DNA – shot gun technique, cDNA, artificial gene.
Vectors: plasmid- Col E1, pBR322; bacteriophage- M13 and λ phage, cosmid, phagmid, YAC, BAC, animal and plant viruses, shuttle vector, cloning and expression vectors.
Restriction enzymes - discovery, nomenculature, types and uses;
Linking of DNA - DNA ligase, linkers and homopolymer tail.

UNIT II

Host: *E. coli, Bacillus***,** yeast and mammalian cells
Gene transfer techniques: Bacterial transformation, calcium phosphate co-transformation, transduction, protoplast fusion, electroporation andmicroinjection.
Selection and screening; Insertional inactivation, Immunological screening, DNA hybridization, reporter gene. Concept of fusion protein.
Genomic and cDNA library.

UNIT III

Principles of blotting techniques: Immuno blot, Southern, Northern and Western, dot blot; PCR – Principle and applications.
DNA sequencing: Sanger method and automated sequencing.
Humangenomeproject- Salient features of humangenome.
DNA microarray: Principle andapplications.

UNIT IV

Gene knock out technique and its significance.
DNA Finger printing: principle and applications.
Safety in Biotechnology.
Intellectual property rights and patenting.

UNIT V

Plant tissue culture: Methods- callus culture, protoplast, somatic hybridization, ovule and pollen culture, culture media.

Animal cell culture: Primary and secondary culture, continuous cell lines, culture media and applications.
Stem cell culture and its applications.

TEXT BOOK:

Dubey, P.C. (1994). *Text Book of Biotechnology,* Chand and Co., New Delhi.

REFERENCE BOOKS:

1. Gupta, P.K. (2004). *Elements of Biotechnology,* Rastogi Publication,Meerut
2. Irfan Ali Khan and Athiya Khanum (2004). *Fundamentals of Molecular biology,* Genetic engineering and Biotechnology, Ukaaz Publication,Hyderabad
3. Old R.W. and Primrose. S.B. (1989). *Principles of Gene Manipulation,* Blackwell Scientific Publications.
4. Primrose. S.B. and R.M. Twyman (2006). *Principles of Gene Manipulation and Genomics* Blackwell Publishing,UK.
5. Satyanarayana (2006). *Biotechnology,* Books and Allied (P) Ltd.,Kolkata.
6. Smith John.E. (1988). *Biotechnology,* Edward Arnold,London.
7. Walker, J.M. and Gingold, E.D. (Eds) (1992). *Molecular Biology and Biotechnology,* Panima Educational Book Agency. NewDelhi.
8. Watson, J.D., Michael G., Tam Witkowski and Mark Zollew (1999). *Recombinant DNA,* Scientific American Books, NewDelhi

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
B. Sc. ZOOLOGY (With Specialization inBiotechnology)
(For the candidates admitted from 2012onwards)
SEMESTER V
MAJOR CORE 9 - BIOLOGICAL TECHNIQUES

Code: U12ZO5MCT09
Credits: 4
Hours /Week: 5

OBJECTIVE
The student learns the principles of Light –theories-interaction with matter, Electromagnetic spectrum-properties, principles and application of electron microscopes, spectrophotometers, Radioactivity-radioactive elements, decay, half life, measurement and effects. Osmosis, Diffusion and Donnan membrane equilibrium.

UNIT I
Units of measurement and Preparation of solutions: Percentage, Normality, Molarity, ppm, buffers, stock and working solution; Viable cell count and serial dilution.
Microtechnique – Fixatives and principles of fixation; Tissue preparation, block making and sectioning. Stains and principles of staining; Haematoxylin and Eosin staining method for histologyand mounting.

UNIT II
Microscopy - Principle and applications of Light microscope, Phase contrast, Confocal scanning light microscopy, Fluorescence and Electron (TEM, SEM and STEM) microscopy, X-ray crystallography,
pH meter- principle and applications.

UNIT III
Spectrophotometry
Electromagnetic spectrum and its properties.
Principle and applications of Colorimeter; Spectrophotometer; Flow cytometer and
Nuclear magnetic resonance.
Radioactivity- Detection and measurement of radioactivity: autoradiography; Geiger Muller and Scintillation counter.

UNIT IV
Centrifugation –concepts of relative centrifugal force and sedimentation coefficient.
Principle and applications of Preparative Centrifuge –Differential and Gradient centrifugation;
Analytical centrifuges- Ultra centrifuge.
Chromatography - Principle and applications of Paper, Thin layer, Column, HPLC, Gas-liquid, Ion-exchange, Affinity and Gel permeation, GC-MS, MALDI-TOF.
UNIT V
Electrophoresis – Principle and applications of Paper, Polyacrylamide gel electrophoresis - PAGE and SDS – PAGE, Agarose gel electrophoresis (AGE) Immunoelectrophoresis.
Introduction to Nanobiology.

TEXT BOOK:
Upadhyay, A., Upadhayay, K. and Nirmalendu, N. (2002). *Biophysical Chemistry.* Himalayan Publishing House, Mumbai.

REFERENCE BOOKS:

1. Anbalagan, K (1999). *An introduction to electrophoresis*. The electrophoresis institute, Biotech,Yercaud.
2. Casey, E. J., (1962). *Biophysics - ConceptsandMechanisms.* East West Press Pvt., Ltd., New Delhi.
3. Daniel, M., (1989*). Basic Biophysics for Biologist*. Agro Botanical Publishers, Bihaner,India.
4. Narayanan, P., (2000). *Essentials of Biophysics.* New Age International (P) Ltd.Publishers.
5. PlummerT. D., (1978). *An introduction toPracticalBiochemistry*. Tata McGraw Hill Publishing Company Limited, NewDelhi.
6. Skoog, A. D. and James, J. L. (1992). *Principles of Instrumental Analysis.* Saunders Golden SunberstSeries.
7. Vasanthan, P. and Gautham, N. (2002). Biophysics. Narosa Publishing House, NewDelhi.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPALLI-2
B.Sc. ZOOLOGY (With Specialization in Biotechnology)
(For the candidates admitted from 2012 onwards)
SEMESTER V
MAJOR CORE 10 - PRACTICAL – III
(Biochemistry, Microbiology, Biotechnology & Bioinformatics)

Code: U12ZO5MCP10
Credits : 4
Hours /Week**: 5**

Biochemistry

Quantitative estimation of proteins in a biological sample
Quantitative estimation of carbohydrates in a biological sample
Quantitative estimation of cholesterol in a biological sample
Analysis of human urine for sugar and albumin
Estimation of haemoglobin content in human blood

Microbiology

Microscopic observations of bacterial types and Gram staining
Culturing and observation of bacterial colonies
Observation of Antibiotic sensitivity test
Observation of fermentation in grapes
Milk quality test-methylene blue reductase test
Water potability test-MPN test

Biotechnology

Isolation of Genomic DNA (IndividualWork)
Agarose gel electrophoresis to show DNA (Individualwork)
Blotting techniques –Southern, and Western (Group Work)
Immobilization of enzymes (IndividualWork)

Bioinformatics

Pairwise sequence alignment – BLAST and FASTA
ORF prediction

A record of the laboratory work should be maintained and submitted at the time of external practical examination.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPALLI-2
B.Sc. ZOOLOGY (With Specialization in Biotechnology)
(For the candidates admitted from 2012 onwards)
SEMESTER V
MAJOR ELECTIVE 2- MICROBIOLOGY AND BIOINFORMATICS

Code: U12ZO5MET03
Credits : 5
Hours /Week**: 5**

OBJECTIVES:
Microbiology: Student classifies microorganisms and learns the structure of bacteria, actiniomycetes and virus, also learns the bacterial culture methods, soil, water, dairy, industrial and pathogenic microbes**. Bioinformatics:** The student learns the structure and function relationship of genes and proteins. Uses computers to retrieve, sort, store and analyze the sequence information about genes and genomes from the databases and trace the phylogenetic relationship between the organisms.

MICROBIOLOGY
UNIT I
Microbes and Bacterial culture methods
Whittaker‟s classification of microorganisms and scope of microbiology.
Structure of Bacteria, Actinomycetes and Viruses – T4 phage and HIV.
Nutritional requirements, types of culture media; culture and growth characteristics.
Methods in microbial culture – sterilization, inoculation and incubation; preparation of pure culture and maintenance.

UNIT II
Environmental and Industrial microbiology
Common air and soil microbes.
Food microbiology: Microbial food spoilage, food poisoning, physic-chemical methods in food preservation.
Water microbiology: Common pathogenic microbes in water.
Basic design of fermentor, industrial fermentation of ethanol, penicillin and enzymes.
Dairy microbiology: Pasteurization, fermented milk products (Curd and Cheese).

UNIT III
Medical microbiology
Study of common bacterial and viral diseases in man: causative organisms, mode of transmission, pathogenicity, symptoms and preventive measures.
Diseases of Gastro-enteric system: Cholera, Typhoid and Viral hepatitis. Respiratory system: Influenza, Pneumonia and Tuberculosis. Nervous system: Meningitis, Leprosy, Tetanus, Polio, Rabies and Herpes. Genital system: Gonorrhea, Syphilis and Candidiasis. Rheumatic fever and AIDS.

UNIT IV
Proteomics and Genomics
History, Scope and application of Bioinformatics. Accessing bioinformatics resources from databases: Sequence databases –. Nucleotide sequence databases – NCBI, PubMed, EMBL, Genbank, DDBJ. Protein sequence databases – SWISS-PROT, TrEMBL and PIR.

Structure of DNA, RNA, ORF, Genetic code. Structure and organization of genomes- Prokaryotes (*E.coli*), Eukaryotes (Yeast and Human).

UNIT V

Protein structure, sequence analysis and phylogenetic tree

Proteinstructurepredictionandhomologymodeling.Pairwisealignmentand itssignificance.Multiple sequence alignment and its application. Phylogenetic tree: clustering and cladistic methods. Computer assisted drug design- outline of methods and toolsemployed.

TEXT BOOK:

Microbiology

Mani, A., Narayanan, L.M., Selvaraj, A.M., amd Arumugam, N (1996). *Microbiology,* Saras Publication, Kanyakumari.

REFERENCE BOOKS:

1. Anathanarayanan, R and Jeyaram Panikar, C.K (1990). *Text book of Microbiology*, OrientLongman.
2. Deb, W.C (1982). *Microbes and Diseases of Man. Text book of Microbiology* (including parasitology) CBS publishers and Distributors, NewDelhi.
3. Kalaichelven, P.T (2005). *Microbiology and Biotechnology – A LaboratoryManual*, MJP Publishers, Chennai.
4. Ketchuns, P.A (1984). *Microbiology*, John Wiky and Sons, NewYork.
5. Pelzer, M.J AND Reid, R.D (1965). *Microbiology*, McGraw Hill Book Company,New Delhi.
6. Sharma, P (1995). *Microbiology*, Rastogi and Company, MEERUT,India.
7. Sullila, S.B and Shantharm, S (1998). *General Microbiology*, Oxford and IBH Publishing Co. Pvt. Ltd, NewDelhi.

TEXTBOOK:

Bioinformatics

Arthur M. Lesk (2003). *Introduction to Bioinformatics*, Oxford Univerity Press.

REFERENCE BOOKS:

1. Irfan A, Khan and Atiya A Khanum (2003). *Recent Advances in Bioinformatics*, Ukaaz publishers,Hyderabad.
2. Mani K and Vijayaraj N(2003). *Bioinformatics for Beginners*, KalaikathirAchagam, Tamilnadu.
3. Murthy C.S.V (2003). *Bioinformatics*, Himalaya Publishing House,Mumbai.
4. Westhead, D.R., Parish, J.H., and Twyman, R.M (2003)- *Instant notes- Bioinformatics*, Viva Books Private Limited, NewDelhi.
5. Subramanian C (2004). *A Textbook of Bioinformatics.* Dominant Publishers and Distributors – NewDelhi.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
B. SC. ZOOLOGY (With Specialization in Biotechnology)
SEMESTER-VI
MAJOR ELECTIVE: 5 –FUNDAMENTALS OF BIOINFORMATICS
Code: U12ZO5MET04
Credits : 5
Hours /Week :5

OBJECTIVE

The student is introduced to an overview of bioinformatics, its scope and applications. To learn to search for data bases and use tools to retrieve, sort and store information from the internet. To analyse the structure of genes and genomes, to translate sequence information into protein. To understand proteomics- Protein structure prediction and modeling. To understand phylogenetic relationship and construction of phylogenetic trees. To introduce the basics of computer assisted drug designing.

Unit I

Introduction to Bioinformatics:

History, Scope and Application of Bioinformatics, – List of databases and few tools with their web addresses: NCBI, GenBank,DDBJ, EMBL,SWISS PROT, PDB, BLAST,FASTA,RASMOL, CLUSTAL W, PIR, ExPASY.

Exercise : Retrieval of DNA and protein sequences to display in FASTA format.

Unit II

Genomics:

Structure of DNA, RNA, ORF, Genetic code. Structure and organization of Genomes – Prokaryotes (E.coli), Eukaryotes (Yeast) and Human.

Exercise:– Use of ORF finder and translation of nucleotide sequences to protein sequences using translate

UnitIII

Proteomics : Protein structure outline – Primary, Secondary, Tertiary, Quaternary; Protein identity based on composition; Physical property based on sequence, Protein structure prediction and modelling.

Exercise: Primary structure prediction using ProtParam and Secondary structure prediction using GOR IV; PDB viewer – using RASMOL.

Unit IV

P**rotein Sequence Analysis:**

Pairwise alignment and its significance; Multiple sequence alignment (MSA) and its application for database sequences.

Exercise: Comparison of protein sequences of interest using BLAST, Multiple Protein sequence alignment using CLUSTAL W.

Unit V

Phylogenetic Trees:

Clustering and Cladistic methods. Computer assisted drug design outline of methods and tools employed . Pharmacogenomics.

Exercise: Constructing of phylogentic trees using CLUSTAL W and Use of Biomarker in CADD.

Text book:

Arthur M. Lesk (2003) Introduction to Bioinformatics, Oxford University Press.

References:

1. Irfan A. Khan and Atiya A Khanum. (2003) Recent Advances in Bioinformatics, Ukaaz publishers,Hyderabad.
2. Mani K. and Vijayaraj N.(2003) Bioinformatics for Beginners, Kalaikathir Achchagam, Tamil nadu.
3. Murthy C.S.V. (2003) Bioinformatics, Himalaya Publishing House .Mumbai.
4. Subramanian C. (2004). A Textbook of Bioinformatics. Dominant Publishers and Distributors – New Delhi.
5. Westhead,D.R.,Parish,J.H., and Twyman.R.M. (2003)- Instant notes –Bioinformatics, Viva Books Private Limited, NewDelhi.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2

(For candidates admitted from 2012 onwards

DEPARTMENT OF ZOOLOGY

FOR B.A/ B.Sc/ B.Com/ B.C.A/B.R.Sc/BBA Degree Course

SEMESTER V

NON-MAJOR ELECTIVE: 1 - ORNAMENTAL FISH CULTURE

Code : U12ZO5NMT01
Credits: 2
Hours/Week**: 2**

OBJECTIVE

Student learns the importance of ornamental fish culture, maintaining an aquarium, knowing the common ornamental fishes and to workout cost benefit analysis and to explore the self employment opportunities.

UNIT I

Importance of ornamental fish culture.

Design and setting up of fish tank: Construction, and maintenance of home aquarium.

Aquarium plants and their uses.

UNIT II

Popular tropical fresh water ornamental fishes and their characteristics:

Live bearers- guppy, molly, platy and swordtail - any two.

Egg layers- fighter, gourami, angelfish, red tailed shark and gold fish. – any two

A compatible group of fishes for home aquarium.

UNIT III

Food and feeding: artificial feeds- making pellet food – quantity and time of feeding.

UNIT IV

Diseases and treatment methods in brief: Ectoparasite- anchor worm and argulus, white spot, fin rot, mouth fungus, dropsy and velvet disease.

Breeding of aquarium fishes for commercial purpose

UNIT V

Maintenance of Aquarium in the lab (Lab work)

Note: The students maintain an aquarium in the lab and document the observations.

TEXT BOOK:

Ramanathan, (2000). *Tropical freshwater ornamental fish culture*, Department of fisheries farm management, Veterinary and animal sciences university, Tamil Nadu.

REFERENCE BOOKS:

1. Dey,V.K., (1995). *Hand book of aqua forming*. MPEDAIndia.
2. Jameson, J.D., Srinivasan.A and Venkataramanujam. (1995). *Ornamental fish culture technology,* TANUVAS publicationChennai.
3. Jameson, J.D., andSanthanam,R., (1996). *Manual of ornamental fishes and farming technologies*. Peejay,Thoothukkudi.

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2
DEPARTMENT OF ZOOLOGY
(for candidates admitted from 2012 onwards)
SEMESTER V
SBE– 4: BIOLOGICAL SKILLS FOR CHEMICAL SCIENCES-BASIC
(THEORY CUM LAB - FOR CHEMISTRY STUDENTS)

CODE: U13BZ5SBT04
Hours: 2/Week
Credits: 2

OBJECTIVE: Students learn the basics of biological systems, molecular biology and biotechnology.

Unit I
Biological system: Organization of Biological system: Cells-tissue-organ-cell organelles-plant stem and blood astissues.
Lab exercise: Observation of stem. Observation of chromosomes in onion root tip.

Unit II
Molecular biology: Organization of gene exon – intron - functional genes-organization of operon: promoter, operator, regulator, enhancer, repressor.
Lab exercise: Hypothetical model to show gene expression.

Unit III
Recombinant DNA technology: DNA as universal molecule – construction of rDNA – vector – cloning methods – examples for transgenic plants and animals.
Lab exercise: Isolation of DNA.

Unit IV
Plant tissue culture: Methods – callus culture, protoplast and somatic hybridization, ovule and pollen culture.
Lab exercise: Culture medium for multiple shooting.
Unit V
Animal cell culture: Requirement for animal cell culture, primary cell culture, stem cell – type, applications. Pharmaceutical aids derived from plants and animals.
Lab exercise: Cell viability.
REFERENCE BOOKS:

1. DeRobertis D.P. (2001). Cell and Molecular Biology, 8thedition, Lippincott Williams and Williams.
2. Dubey R.C.(2010). A textbook of Biotechnology, 1stedition, S. chand & company Ltd, New Delhi.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
DEPARTMENT OF ZOOLOGY
(For candidates admitted from 2012 onwards)
SEMESTER V
SBE- 4: BIOLOGICAL SKILLS FOR CHEMICAL SCIENCES-ADVANCED
(Theory cum Lab. - For Chemistry Students)

Code: U13ZO5SBT04
Credits: 2
Hours/Week**: 2**

OBJECTIVE: The student understands the principles of a biological system, molecular biology, and computational tools including computer aided drug design.

UNIT I

Molecular Biology: Organization of gene exon- intron- functional genes- organization of operon: promoter, operator, regulator, enhancer, repressor

Unit II

Recombinant-DNA technology – DNA as universal molecule- construction of r DNA- vector-cloning methods- examples for transgenic plants and animals.

UNIT III

Role of computers in chemical research; Structure representation; Chemical Databases – Design, Storage & Retrieval methods, 2D and 3D structures, reaction databases, similarity searches; Modelling of small molecules; Chemoinformatics tools for drug discovery

UNIT IV

Bioinformatics: Introduction to data bases and retrieval of information.
Introduction to Genomics- sequence alignment, gene finding.
Introduction to Proteomics- protein prediction, and visualization using various tools.
Applications of Bioinformatics

UNIT V

Structure representation: Chemsketch, ISIS Draw; Chemical database: Pubchem, chem bank, Drug Bank, Chem finder, Organic Syntheses, Chem mine; Reaction database: Chemogenesis, Web reactions database, Organic Synthesis(ORGSYN) database, and synthetic Pages database. Tools for chemo informatics: Chem spotlight, Molinspiration

REFERENCEBOOKS:

1. DeRobertis,E.D.P.andDeRobertis,E.M.F.(1995).CellandMolecularBiology.SaundersCollege, PA.
2.Attwood, T.K. Parry-Smith, D.J. (2001). Introduction to Bioinformatics, Pearson Education (Singapore Pvt. Ltd., Delhi,India.
3. Murray,R.K.,Granner,D.K.,Mayes,P.A.,Rodwell,V.W.(2000).Harper‟sBiochemistry, Prentice Hall InternationalInc.
4. Arthur M. Lesk (2003) Introduction to Bioinformatics, Oxford UniversityPress.
5. Mani K. and Vijayaraj N.(2003) Bioinformatics for Beginners, Kalaikathir Achchagam, TamilNadu.
6.Palanichamy,S.&Manoharan,M.(1991)Statisticalmethodsforbiologists.Palani, Paramount Publications, Palani, TamilNadu.
7. Power,C.B. Cell Biology, Himalaya Publishing House, Mumbai,India.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPALLI-2
B.Sc. ZOOLOGY (With Specialization in Biotechnology)
(For the candidates admitted from 2012 onwards)
SEMESTER VI
MAJOR CORE 11 – ANIMAL PHYSIOLOGY

Code: U12ZO6MCT11
Credits: 5
Hours/Week: 6

OBJECTIVE
The student learns the principle of homeostasis in animals. They also learn the process of digestion and absorption of food, circulation, respiration and excretion. They understand the mechanism of muscle contraction, neural conduction and functioning of receptors. They also learn the structure and functioning of reproductive organs and endocrine glands.

UNIT I
Introduction to Animal Physiology, scope of physiology
Principles of Homeostasis:
Osmo- ionic regulation in crustaceans and fishes.
Thermoregulations in poikilotherms and homeotherms.
Digestion: Digestion of food and absorption (in mouth, stomach, duodenum and intestine).

UNIT II
Circulation: Composition of blood, blood-clotting mechanisms, heartbeat – origin, conduction; cardiac cycle, bloodpressure.
Respiration: Respiratory pigments; structure of haemoglobin; transport of respiratory gases-O_2 dissociation curve, CO_2 transport; Haemoglobin as abuffer.
Excretion: Biosynthesis of nitrogenous waste products – ammonia, urea, uric acid; physiology of urine formation, acid -base balance.

UNIT III
Muscle Contraction: Structure and molecular organization of skeletal muscle; mechanism and chemistry of muscle contraction; Cori cycle, energetics of musclecontraction.
Neural conduction: Resting potential, conduction of nerve impulse, synaptic transmission, neuromuscular junction,reflexes.
Receptor Mechanisms: Photoreception – structure of retina – visual pigments, photochemistry; **Chemoreception** – gustatory, olfactory;
Mechanoreception – Pacinian corpuscle; **Phonoreception.**

UNIT IV
Endocrine glands I: Hypothalamus, Pituitary, thyroid, parathyroid, pancreas and thymus.
Endocrine glands II: Adrenal cortex and medulla, ovary and testis- structure, hormones and their functions.
Animal Behaviour: Kinesis, taxis, instinctive behaviour, learned behaviour. Biological clock-circadian, lunar and circannual rhythms.

UNIT V
Reproduction: Anatomy of reproductive organs in Human; Menstrual cycle and contraception.
Hormonal Control of implantation, gestation, parturition; Infertility.

Reproductive technologies – Artificial insemination, surrogate motherhood, IVF, GIFT, ZIFT and ICSI ; Oocyte banking and donation.

TEXT BOOK:

Mariakuttikan, A. and Arumugam, N. (2007). *Animal Physiology*, Saras Publication, Tamil nadu.

REFERENCE BOOKS:

1. Hoar, S.W. (1987). *General and Comparative Physiology*. PrenticeHall.
2. Knut Schmidt Nielson, (1985). *Animal Physiology. Adaptation and Environment*, Cambridge, UniversityPress.
3. Murray, R.K., Mayes, P.A. Granner, D.K. and Rodwell, V.W.(1990).*Harpers' Biochemistry*, Tweny Second edition, Prentice Hall InternationInc.
4. Parameswaran, R., Ananthakrishnan, T.N., Anantha Subramanian, K.S (1998) *Outlines of Animal Physiology*, S. Visuwanathan Pvt. Ltd,Chennai.
5. Philips, P. and Murray Mooyoung, (1989). *Animal Biotechnology*, Pergamm Press,Oxford.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
B. SC. ZOOLOGY (With Specialization in Biotechnology
(For the candidates admitted from 2012 onwards)
SEMESTER VI
MAJOR CORE12- APPLIED BIOTECHNOLOGY

CODE:U12ZO6MCT12
CREDITS : 5
Hours/Week **: 6**

OBJECTIVE

This paper deals with the applications of biotechnological principles for the improvement of industrial production, medical products for treatment and prevention of diseases, for waste disposal, environmental clean up, agricultural technologies and fish and livestock farming.

UNIT I

Plant Biotechnology

Applications of plant tissue culture; Transgenic plants – Agro bacterium-mediated transformation, Principles in the production of golden rice, flavr savr tomato, insect-resistant and disease-resistant plants; Concept of biofuel.

UNIT II

Animal Biotechnology

Ploidy induction in fish; Transgenic fishes- principles and applications transgenic live stock-production and applications.
GMO- regulations - risk assessment; Bioethics- ELSI

UNIT III

Microbial Biotechnology

Microbial enzymes- advantages, Immobilization of enzymes, Enzyme engineering
Concept of bio-pesticides and bio-fertilizers
Single cell protein- production and applications

UNIT IV

Medical Biotechnology

Production of humulin, recombinant vaccines- subunit, DNA-based, live vaccine, edible vaccine; recombinant growth hormone.
Applications of monoclonal antibodies.
Gene therapy for genetic diseases. Principle and protocol for ADA deficiency- future prospects.

UNIT V

Environmental Biotechnology

Biotechnology of sewage treatment and effluent treatment for tannery, textile and paper;
Concept of bio-monitoring, biofilters, biosensors, bioscrubbers.
Bioremediation of heavy metal and oil - super bug;
Concept of biopolymers.

TEXT BOOK

Dubey,P.C.(2006). *Text Book of Biotechnology*, Chand and Company, NewDelhi

REFERENCE BOOKS:

1. Babiuk, L.A., J.P.Philips and M.M.Young (1989). *Animal Biotechnology*,Pergaman ess, Oxford.
2. Balasubramanian *(*1996). *Concepts in Biotechnology*. Universities Press,Hyderabad.
3. Chrispeels. M.J. and Sadava, D.E (1994) *Plants, Genes and Agriculture* . Jones and Bartelett Publishers,Boston.
4. Gupta, P.K. (2004). *Elements of Biotechnology*, Rastogi Publication,Meerut.
5. Old R.W. and Primrose. S.B.(1989). *Principles of Gene Manipulation*,Blackwell Scientific Publications.
6. Primrose, S.B. and R.M. Twyman (2006). *Principles of Gene Manipulation and Genomics*, Blackwell Publishing,UK.
7. Sathyanarayana, U. (2006). *Biotechnology*, Books and Allied (P) Ltd Kolkota,India
8. Watson, J.D., M.Gilman, J.Witkowski and M. Zoller (1999). *Recombinant DNA*.Scientific American Books. W.H. Freeman and Company, NewYork.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
B. SC. ZOOLOGY (With Specialization in Biotechnology)
(For the candidates admitted from 2012 onwards)
SEMESTER VI
MAJOR CORE 13 – PRACTICAL IV - ANIMAL PHYSIOLOGY, ENVIRONMENTAL BIOLOGY AND IMMUNOLOGY

Code : U12ZO6MCP13
Credits : 5
Hours /Week: 6

ANIMAL PHYSIOLOGY

1. Oxygen consumption in an aquatic animal –fish
2. Determination of Q_{10}infish
3. Analysis of excretory products in animals of different habitats (ammonia,urea and uric acid)
4. Analysis of ECGrecording
5. Differential count of WBC
6. Total count ofRBC
7. Total count ofWBC
8. Measurement of human bloodpressure
9. Analysis of Sodium, Potassium and Calcium (Minerals) using FlamePhotometer.

ENVIRONMENTAL BIOLOGY

1. Construction of ecological pyramid to study the structural and functional relationshipof different tropiclevels.
2. Analysis of the fauna and their adaptations to the respective habitat - rocky shore,sandy shore, muddy shore and deepsea.
3. Analysis of marineplankton.
4. Analysis of water samples for pH, O_2, salinity, carbonates andbicarbonates.
5. Estimation of primary productivity of apond.
6. Animal associations (symbiosis, mutualism, commensalism andparasitism).

IMMUNOLOGY

1. Organs of immunesystem
2. Histology of spleen, lymph node andthymus
3. Haemagglutination test (Individualwork)
4. Immunodiffusion (Individualwork)

A record of the laboratory work should be maintained and submitted at the time of external practical examination.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
B. SC. ZOOLOGY (With Specialization in Biotechnology)
(For the candidates admitted from 2012onwards)
SEMESTER VI
MAJOR ELECTIVE: 3 –IMMUNOLOGY

Code :U12ZO6MET05
Credits : 5
Hours /Week :5

OBJECTIVE
Student learns about the types of immunity, organization of immune system, antigens, vaccines, immunoglobulins, humoral and cell mediated immune responses, Complement activation, Major histocompatible complexes, Organ transplantation, altered state of immunity and selected immunological techniques.

UNIT I
Scope of Immunology - Types of Immunity
Lymphoid system - Organs – Structure and Functions.
Lymphoid Cells – Types – Haematopoietic stem cells – Significance -Origin and differentiation of lymphocytes.

UNIT II
Antigens : Structure – Properties. **Vaccine** – Types , Vaccination Schedule.
Immunoglobulins: Structure, types, distribution and biological functions.

UNIT III
Immune response: Humoral response-antigen processing and presentation, clonal proliferation, cell-cell interaction, antibody secretion; Primary and secondary immune response.
Cell mediated immune response- Mechanism and target cell lysis.
Complements – Classical and Alternative pathways, role in immunity.

UNIT IV
Introduction to HLA – HLA complex-Structure and Function of molecules.
Organ transplantation- types of graft, mechanism of allograft rejection.
Immunosuppression (Basic concepts).**Autoimmune Diseases** –Concept and types (Graves‟s disease and Rheumatoid arthritis).

UNIT V
Hypersensitivity –Types with example.
Immunological Techniques in Clinical Diagnosis – Widal test – Pregnancy test – ELISA
Introduction to Immunotherapy.

TEXT BOOK:
Nandhini, S. (1994). *Immunology- Introductory Text Book*. New Age Int. (P) Ltd. Publication, New Delhi

REFERENCE BOOKS:
1. Kuby, J. (2007) *Immunology*. (Sixth edition) W.H.Freeman and company, NewYork.
2. Roitt, I. (1987) *Essential Immunology*. P.G. Publishing PVT. Ltd., New Delhi.
3. Sell,S.(1987) *Basic Immunology*. Elsevier Science PublishingCompany.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
B. SC. ZOOLOGY (With Specialization in Biotechnology)
(For the candidates admitted from 2013 onwards)
SEMESTER VI
MAJOR ELECTIVE: 3 – ENVIRONMENTAL SCIENCE

Code :U13ZO6MET06
Credits : 5
Hours /Week :5

UNIT I

Physical Environment and Habitat

Definition and Scope of Environmental Science – **Environment:** Physical environment – Light, temperature, soil and water. Basic concepts of limiting factors - Leibig‟s law of minimum and Shelford's law of tolerance. **Habitat: Fresh water habitat** - lentic and lotic habitat. **Marine habitat**- Pelagic, benthic and deep sea. **Estuarine habitat** - characteristics and adaptations. **Terrestrial habitat**- characteristics. **Biomes** - Forest and desert biomes.

UNIT II

Population and Community

Population - Characteristics of population, regulation of population- density dependent and density independent factors, age structure of populations. **Biotic community -** Community structure and characteristics, Ecotone and edge effect, ecological niche. **Biotic environment -** Inter specific interactions - symbiosis, commensalisms and antagonism.

UNIT III

Environmental Pollution

Water pollution – Eutrophication, Minamata episode, Post gulf war (1990) effect, Bombay high oil slick (1993), WHO standard for drinking water. **Air pollution –** Global warming, stone leprosy and Tajmahal, Bhopal tragedy, Emission standard and control measures. **Radiation pollution episodes** - Hiroshima and Nagasaki, Chernobyl, Fukushima. **Pesticide pollution -** Biomagnification, biological control, biopesticides, integrated pest management.

UNIT IV

Environmental Disaster and Fragile Ecosystems

Environmental Disaster: Definition, **Earth Quake -** Kashmir Earth quake 2005, **Tsunami-**Case study India - 2004, **Cyclones and Anticyclones, Floods, Drought. Natural disaster management. Fragile Ecosystem:** Coral reef ecosystem, Mangroves, Wetlands, Mountain environment.

UNIT V

Environmental Institutions, International Co-operation and Law

International Union for Conservation of Nature and Natural Resources (IUCN), World Wildlife Fund (WWF), US Environmental Protection Agency (EPA), **Indian Environmental Institutions –** Ministry of Environment, Forest and Wildlife (Government of India). Central Pollution Control Board (CPCB). **Environmental Laws/Acts –** Indian Forest Act, Forest Conservation Act, Wildlife Act, Air Act, Water Act. **Environmental Movement in India –** Chipko Movement, Silent Valley Movement

TEXT BOOK:

1. Veer Bala Rastogy and Jayaraj, M. S. Animal Ecology and Distribution of Animals, Kendar Nath Ram Nath, Meerut, Delhi.

REFERENCE BOOKS:

1. Odum, E.P. and Barrett, G.W. Fundamental of Ecology. 5th Ed., Cengage Learning India. New Delhi,2005.
2. Peter, J.R., Stephan, L.W., Paule, H., Ceche, S. and Bevlerly, M. Ecology. Cengage learning India. New Delhi,2008.
3. Wright, R.T. Environmental Science. 10th Ed., Pearson Education. New Delhi,2008.
4. Rana, S.V. S. Essentials of Ecology and Environmental Science, Third Ed. Prentice –Hall of India Pvt. Ltd. New Delhi 2007.
5. Smith, T.M. and Smith, R.L. Elements of Ecology. 6th Ed., Pearson Education. New Delhi,2008.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
DEPARTMENT OF ZOOLOGY
FOR B.A/ B.Sc/ B.Com/ B.C.A/B.R.Sc/BBA Degree Course
(For the candidates admitted from 2012onwards)
SEMESTER VI
NON- MAJOR ELECTIVE: 2 - FIRST AID AND HOME NURSING

Code: U12ZO6NMT02
Credits: 2
Hours /Week: 2

OBJECTIVE

This course is designed to give insight into Principles of First –aid, essential First –aid. Home Nursing, Trauma First –aid and Advanced First –aid. The student gets aware and learns to act at the time of emergency. They also learn basic home nursing and how to act practically during illness, trauma and Adult first–aid.

UNIT I

Introduction to First – Aid

Principles of First- Aid - An outline of human Anatomy, Carrying Posture at emergency - First - aid Kit; Emergencycanters.

UNIT II

Trauma First – Aid.

Bleeding (External and Internal); Electric shock – Facial injuries (Ear injuries, Eye injuries, Tooth injuries); Head injuries ; Spinal injuries; Chest injuries; Abdominal injuries; Epilepsy/Convulsions – Cuts, Incisions and Abrasions .

UNIT III

Advanced First - Aid.

Sprains and fractures-Bandages and slings

Expired Air Resuscitation (EAR) – Cardiopulmonary Resuscitation (CPR) - Oxygen administration – Analgesic administration; road traffic accidents; fire accidents; Burns and scalds, Common minor sports injuries; backinjuries

UNIT IV

Introduction to Home Nursing.

Principles of Home Nursing –Room maintenance, temperature taking, Care of the hair and skin, administration of medicines, bed making, bed pan, hot water bottle, ice cap and inhalation.

UNIT V

Childhood and adult illnesses care. Vomitting, diarrhoea and dehydration; anaphylaxis - asthma – common cold, cough and fever; hyperventilation; fainting, stroke (Paralysis); diabetes; Blood pressure; Heart attack; Choking; Poisoning: Food, Drug Overdose; Drowning ; Snake and Insect stings.

REFERENCE BOOKS:

1. Bhave,V. N., Deodhar, N.S., Bhave, S.V. and Sathe R. V. (1983). *You and Your Health,* Vol.I, National Book Trust,India.
2. Muthu, Era. Su. (2004). First - Aid, Sura Books (Pvt) Ltd, Chennai, Bangalore & Kolkata.
   Subramanian, R. (2005). First – aid and Home – Nursing, SindmayamPublishing,Tirunelveli.
3. St.John Ambulance. (2009). First Aid to the injured,Third Edition,5th issue.

4.Harold, S and Hubert, O.S. Your health and You, Vol I & II. The Stanborough Press Ltd, Alma Park, Grantham, LincolnshireEngland.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
DEPARTMENT OF ZOOLOGY - SEMESTER VI
SKILL BASED ELECTIVE: 5- ANIMAL CELL CULTURE TECHNIQUES (THEORY CUMLAB)
(For Zoology students)

Code: U13ZO6SBT07
Credits: 2
Hours/Week**: 2**

COURSE OBJECTIVE: The student learns the basic requirements for cell culture, maintenance of Primary and Secondary cell culture and their applications.

UNIT I

Requirements for Animal Cell culture – Laboratory media, glass ware

1. Exercise: Preparation of media- Balanced salt solution andsterilization

UNIT II

Preparation of Primary cell culture

2. Exercise: Cell viability and cyto-toxicityassays.

UNIT III

Maintenance of Secondary Culture, Application of Cell culture

3. Exercise: Subculturing

UNIT IV

4. Stem cell – types and its applications. Stem cell bank. Ethical legal socialissues.

UNIT V

5. Signal transduction pathways: receptor- types & cellular responses in normal and diseased condition.

REFERENCES BOOKS:

1. Babiuk , L .A ., John . P.Phillips and Murray Moo-young (1989). Animal **B**iotechnology Pergamm press,Oxford.
2. Freshney. R.I. (2000). Culture of Animal cells: Manual of Basic technique, 4th edition.John WileyPublications.
3. Stewart Sell (2003). (Ed) Stem Cells Handbook, Humana Press,NY.
4. Gor Dard and Lucessen, E. (1993). *In vitro* Culture of AnimalCells. Butterworth – HeinemannPublications.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
(For candidates admitted from 2012onwards)
DEPARTMENT OF ZOOLOGY
SEMESTER VI
SKILL BASED ELECTIVE: 6 –INTRODUCTION TO RESEARCH METHODOLOGY
(Theory cum Project)

Code: U13ZO6SBT06
Credits: 2
Hours/Week**: 2**

OBJECTIVE
Students get introduced to concept of research and to carry out research projects.

Unit I
Introduction to research: Concept of research – types of research – introduction to research literature base – collection of research information from different sources; maintenance of information.

Unit II
Research focusing: identifying research area – drawing objectives/ hypothesis – designing the work – data collection – analysis.

Unit III
Preparation of dissertation: Structure of dissertation – editing – bibliography.

Unit IV
Project work

REFERENCE BOOKS:

1. Blaxter, L., Hughes, C. aned Tight (1999). *How to research*? Viva Book privateLimited
2. Kothari, C.R. (2004). Research Methodology- *Methods and Techniques*, New AgeInternational Publishers,India
3. Lal, B.(2002). Research Methodology, ABD Publishers.India

Note:
The students will be evaluated internally by a test for 50 marks. The Project will be evaluated by an external evaluator and a viva- voce will be conducted for 50 marks.

The students can carry out their projects individually or in groups.

HOLY CROSS COLLEGE(AUTONOMOUS), TIRUCHIRAPPALLI-2

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

LIFE ORIENTED EDUCATION

ETHICS – III: FAMILY AND CAREER DEVELOPMENT

HRS / Wk : 1 **CREDIT : 1**

CODE: U13VE6LVE03 **MARKS : 100**

OBJECTIVES:

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

UNIT – I: PERSONAL COMPETENCE

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

UNIT - II: MARRIAGE AND FAMILY

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

UNIT – III: MOTHERHOOD

Bringing up Children - Development stages (Eric Ericson model), Spirituality: Spirituality in Family - Prayer, God's Will, and 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.R.Sc./B.C.A – DEGREE COURSES

LIFE ORIENTED EDUCATION

BIBLE STUDIES – III: ESSENCE OF CHRISTIAN FAITH

HRS/WK:1 **CODE: U12VE6LVB03**

CREDIT : 1 **MARKS : 100**

OBJECTIVE:

- Prepare to practice Christian principles in family, church and society as a young women.

UNIT - I: ESSENTIALS OF CHRISTIAN FAITH

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

UNIT – II: MARIAGE AND FAMILY LIFE

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

UNIT – III: CHRISTIAN HOME

- Parental Responsibilities and bringing up children – Abraham (Gen 22),
- Caring for the Aged (I Sam 2: 31,32)
- Entertainments (I Cor 10: 23)

UNIT – IV: CHRISTIAN ETHICS

- Holiness – Joseph (Gen 39:9)Levi 11: 45, Ecc 12
- Obedience to God - Abraham (Gen 12) ; St.Paul (Acts 9)
- Freedom and Accountability
- Justice and Love
- Choices in Life – Making Decisions(Studies, job, life Partner)

- Model to follow – Who is your model? (John 15: 1-17)
- Social Evils – Dowry, Caste discrimination, Accumulation of wealth
- Freedom of Options, Time Management, Work Ethics (I Peter 2: 11-25)

UNIT – V: ROLE IN CHURCH AND SOCIETY

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

REFERENCES:

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

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

HRS / WK: 1 **CODE: U12VE6LVC03**
CREDIT: 1 **MARKS: 100**

OBJECTIVES:

To prepare the students to participate meaningfully in the liturgical celebration and experience GOD in their day today life.

To become a living witness to Jesus Christ in their personal, family and social life.

UNIT - I: LITURGY

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

UNIT – II: HOLY SACRIFICE OF THE MASS

Significance – meaning and need for spiritual growth – mass prayers – part of the mass – liturgical year, its division and its significance. –Creed – Act of contrition – Discernment of spirits – Counseling – Spiritual direction.

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

Who am I as a Christian? – Christian dignity and others – The values of the Kingdom opposing to the values of the World – Christian social conscience – Christian in the reformation of the world – a call to be salt and light in today's context-Come follow me-I have chosen you-Servant hood-Baptism-Common priesthood-Discipleship-Lay vocation-Lay participation-Lay associates.

UNIT – IV: CHRISTIAN FAMILY

Holy family- characteristic of good family – role of families in the church and society-Responsibilities of parents, and children in the family – church – laws towards marriage-Prolife (Abortion, Euthanasia).

UNIT – V: CONSECRATED LIFE

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

REFERENCES:

1. Compendium – Catechism for the Catholic Church Published by Vaigarai Publishing House for the Catholic Church of India.
2. You are the light of the World, A course on Christian living for II year Religion published by Department of Foundation Courses, St.Joseph's College (Autonomous), Tiruchirappalli– 620 002