DEPARTMENT OF PHYSICS

UG SYLLABUS

B.Sc. Physics

(SHIFT –I)

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002 DEPARTMENT OF PHYSICS – CBCS - UG COURSE PATTERN – B.Sc. Physics (For the candidates admitted from the year 2015 onwards)

Sem	Part	Course	Title of the Course	Code	Hrs/ wk	credits	Marks
I	I	Language -1	Tamil paper I/ Hindi Paper I/ French Paper I	U15TL1TAM01/ U15HN1HIN01/ U15FR1FRE01	6	3	100
	II	English-1	English paper -I	U15EL1GEN01	6	3	100
	III	Major core-1	General Physics	U15PH1MCT01	7	5	100
	III	Allied Physics –I (for Chemistry)	Basic Physics -1	U15PH1ACT01	4	4	100
	III	Allied Physics – II (for Chemistry)	Basic Physics Practicals - I	U15PH1ACP02	4	3	100
	IV	Environmental studies	Environmental studies	U15RE1EST01	2	2	100
	IV	Value Education	Ethics/Bible studies/Catechism	U15VE2LVE01/ U15VE2LVB01/ U15VE2LVC01	1	--	--
II	I	Language-2	Tamil paper II/ Hindi Paper II/ French Paper II	U15TL2TAM02/ U15HN2HIN02/ U15FR2FRE02	5	3	100
	II	English – 2	English paper -II	U15EL2GEN02	6	3	100
	III	Major core-2	Electricity & Electromagnetism	U15PH2MCT02	6	6	100
	III	Major core -3	Main Practical I: General Physics practicals	U15PH2MCP03	4	3	100
	III	Allied Physics – III(for Chemistry)	BasicPhysics–2	U15PH2ACT03	4	3	100
	IV	Skill Based Elective -1	Soft skill development	U15RE1SBT01	2	2	100
	IV	Skill Based Elective -2	Rural Enrichment and Sustainability Development	U15RE2SBT01	2	2	100
	IV	Value Education	Ethics/Bible studies/Catechism	U15VE2LVE01/ U15VE2LVB01/ U15VE2LVC01	1	1	100

III	I	Language – 3	Tamil paper III/ Hindi paper III/ French Paper III	U15TL3TAM03/ U15HN3HIN03/ UI5FR3FRE03	6	3	100
	II	English – 3	English paper -III	U15EL3GEN03	6	3	100
	III	Major core -4	Electronics	U15PH3MCT04	5	5	100
	III	Major core -5	Main Practical II: Optics and electricity practicals	U15PH3MCP05	5	5	100
	III	Allied Physics Optional Paper - 1	Properties of matter, Heat and Modern Physics	U15PH3AOT01	4	3	100
	IV	Skill Based	Physics for Life	U15PH3SBP03	2	2	100
		Elective-3	sciences- Zoology				
		Gender Studies	Gender Studies	U15WS3GST01	1	1	100
	IV	Value Education	Ethics/Bible studies/Catechism	U15VE4LVE02/ U15VE4LVB02/ U15VE4LVC02	1	-	-

Sem	Part		Subject	Code	Hrs	Credit	Marks
IV	I	Language – 4	Tamil paper IV/ Hindi paper IV/ French paper IV	U15TL4TAM04 U15HN4HIN04/ U15FR4FRE04	5	3	100
	II	English – 4	English paper -IV	U15EL4GEN04	6	3	100
	III	Major core-6	Optics & Spectroscopy	U15PH4MCT06	5	5	100
	III	Major Elective-I	Digital Electronics/ Energy Physics	U15PH4MET01/ U15PH4MET02	5	5	100
	III	Allied Physics Optional Paper - 2	Optics, Electricity and Electronics	U15PH4AOT02	4	4	100
	III	Allied Physics Optional Paper - 3	Basic Physicspracticals- II	U15PH4AOP03	4	3	100
	IV	Value Education	Ethics/Biblestudies/ Catechism	U15VE4LVE02/ U15VE4LVB02/ U15VE4LVC02	1	1	100
V	III	Major core-7	Atomic and Molecular physics	U15PH5MCT07	5	4	100
	III	Major core – 8	Classical and Quantum Mechanics	U15PH5MCT08	5	4	100
	III	Major core – 9	Electromagnetics and Mathematical physics	U15PH5MCT10	5	4	100
	III	Major core – 10	Main Practical III: Electronics practicals	U15PH5MCP12	5	4	100
	III	Major Elective-2	Circuit and Network Theory/ Microprocessor INTEL 8085	U15PH5MET01 U15PH5MET02	5	5	100
	IV	Non Major Elective – 1	Basics of Computer Electronics	U15PH5NMT01	2	2	100
	IV	Skill Based Elective - 4	Physics For Life Sciences	U15PH5SBP04	2	2	100
	IV	Value Education	Ethics/Biblestudies/Catechism	U15VE6LVE03/ U15VE6LVB03/ U15VE6LVC03	1	--	
	III	Major			6	5	100

VI		Core – 11	Solid State Physics	U15PH6MCT13			
	III	Major core -12	Nuclear, Particle and Astrophysics	U15PH6MCT14	6	5	100
	III	Major core – 13	Main Practical IV A: Digital and Microprocessor practicals	U15PH6MCP16	6	5	100
	III	Major Elective-3	Communication Physics/ Applied Electronics	U15PH6MET04/ U15PH6MET05	5	5	100
	IV	Non Major Elective - 2	Basics of Modern Communication Systems	U15PH6NMT02	2	2	100
	IV	Skill Based Elective - 5	Trouble Shooting and Maintenance of Electronic Equipments	U15PH6SBT05	2	2	100
	IV	Skill Based Elective – 6	Research Methodology	U15DS6SBT06	2	2	100
	IV	Value Education	Value Education Ethics/Bible studies/Catechism	U15VE6LVE03/ U15VE6LVB03/ U15VE6LVC03	1	--	
	V	Extension activity	RESCAPES Impact Study of project	U15RE6ETF01	-	1	100
Grand Total					**180**	**141**	**4300**

List of Allied courses offered by our department to other disciplines

Sem	Part	Course	Title of the Course	Code	Hrs /wk	cre dits	Marks
I	III	Allied Physics – I (for Chemistry)	Basic Physics -1	U15PH1ACT01	4	4	100
I	III	Allied Physics – II (for Chemistry)	Basic Physics Practicals - I	U15PH1ACP02	4	3	100
II	III	Allied Physics – III(for Chemistry)	Basic Physics–2	U15PH2ACT03	4	3	100
III	III	Allied Physics Optional Paper - 1	Properties of matter, Heat and Modern Physics	U15PH3AOT01	4	3	100
IV	III	Allied Physics Optional Paper - 2	Basic Physics practicals- II	U15PH4AOP02	4	3	100
IV	III	Allied Physics Optional Paper - 3	Optics, Electricity and Electronics	U15PH4AOT03	4	4	100

List of Non Major Elective courses offered by our department to other disciplines

Sem	Part	Course	Title of the Course	Code	Hrs/ wk	cre dits	Marks
V	IV	Non Major Elective – 1	Basics of Computer Electronics	U15PH5NMT01	2	2	100
VI	IV	Non Major Elective -2	Basics of Modern Communication Systems	U15PH6NMT02	2	2	100

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 : U15TL1TAM01**

Hrs : 6Hrs /Wk **Marks : 100**

Credit : 3

நோக்கங்கள்:

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

பயன்கள்:

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

பாடத்திட்டம்

அலகு:1 செய்யுள்

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

அலகு:2 செய்யுள்

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

அலகு:3

தமிழ் இலக்கிய வரலாறு

20-ஆம் நூற்றாண்டு (தற்காலம்)

தமிழாய்வுத்துறை வெளியீடு

அலகு:4

படைப்பிலக்கியம் - சிறுகதைத் தொகுப்பு

அலகு:5

பொதுப்பகுதி - கலைச்சொற்கள்

தமிழாய்வுத்துறை வெளியீடு

பாட நூல்கள்

செய்யுள் - தமிழாய்வுத்துறை வெளியீடு

தமிழ் இலக்கிய வரலாறு - தமிழாய்வுத்துறை வெளியீடு

சிறுகதைத் தொகுப்பு - தமிழாய்வுத்துறை வெளியீடு

கலைச்சொற்கள் - தமிழாய்வுத்துறை வெளியீடு

(for the candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-620002

DEPARTMENT OF HINDI

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

HINDI PAPER-I SHORT STORY, PROSE, GRAMMAR

SEMESTER – I

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

CREDITS : 3 **MARKS : 100**

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

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

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

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

UNIT- V : Anuvad Abhyas – II

Books Prescribed :

- 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.
SEMESTER I
PART I – LANGUAGE - FRENCH PAPER I [GRAMMAR & CIVILISATION (ÉCHO A1 2e édition)]
(For candidates admitted 2013 onwards)

HRS/WEEK : 6 **CODE : U15FR1FRE01**
CREDIT : 3 **MARKS : 100**

Unit 1 Parcours d'initiation ; Vous comprenez

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

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

Unit 2 Au travail!

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

Unit 3 On se détend!

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

Unit 4 Racontez-moi ! ; Bon voyage !

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

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

Unit 5 Bon appétit!

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

TEXT BOOKS :

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

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

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

OBJECTIVES

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

UNIT I - I, ME, MYSELF

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

TEXTS

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

UNIT II - MY FAMILY AND FRIENDS

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

TEXTS

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

UNIT III - THE WORLD AROUND ME

Listening To identify specific information
Speaking –Discussing and expressing opinions
Reading To infer meaning

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

TEXTS

Listening	-	*Snake* by D.H. Lawrence (poem)
Speaking	-	*Floating Fantasy* by Vinu Abraham (Prose)
Reading	-	*Discovery* (ed.) (play)
Writing	-	*A Handful of Dates* by Tayeb Salih (Short story)

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

TEXTS

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

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

TEXTS

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

Prescribed Book:
English for Communication –PoGo publication Trichy

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
B.Sc. (PHYSICS) SEMESTER – I
MAJOR CORE – 1: GENERAL PHYSICS

HOURS/WEEK: 7 **CODE: U15PH1MCT01**
CREDITS: 5 **MARKS:100**

Course Objective: To study the basic principles of, Properties of matter, Mechanics, Theory of Relativity and Heat and Thermodynamics.

UNIT I: PROPERTIES OF MATTER

Torsion – couple per unit twist for solid and hollow cylinders – Work done in twisting a wire – Torsion pendulum – static torsion method – bending of beams – bending moment – cantilever – non-uniform bending – Theory – experiment using Microscope - Uniform bending theory – experiment using telescope – I Shape of girders.

Viscosity- coefficient of viscosity—streamline flow of turbulent flow- critical velocity - Poiseuille's formulafor the flow of liquid through a capillary tube- corrections to Poiseuille's formula- Poiseuille's method for determining co-efficient of viscosity of a liquid

Surface tension on kinetic theory – excess pressure inside a curved liquid surface- experimental determination of surface tension-jaegers' method - surface tension -Bernoulli theorem

UNIT II: MECHANICS

HARMONIC OSCILLATORS

Periodic and simple harmonic motions – Energy of a harmonic oscillator – Average values of kinetic and potential energies of a harmonic oscillator – Damped harmonic oscillator – power dissipation – Q factor – Forced harmonic oscillator – power absorption – Q factor – Condition for resonance.

UNIT III: RELATIVITY

Inertial frames of reference – Galilean transformation – Galilean invariance – Michelson Morley experiment – Einstein's special theory of relativity – Lorentz's transformation equations – relativity of time – relativity of space – relativity of mass – Addition of velocities – Mass energy equivalence and its physical significance – Atomic mass unit.

UNIT IV: THERMODYNAMICS

Statement of laws of thermodynamics –Carnot's ideal heat engine – Derivation of its efficiency in terms of temperatures – Internal combustion engine – Otto & Diesel Engines – Kelvin's absolute scale of temperature – Entropy – Changes in Entropy in reversible and

irreversible processes – T-S Diagram – Maxwell's thermodynamic relations – T - ds relations – Clausius and Claypeyron latent heat equations using Maxwell's relations.

UNIT V: TRANSMISSION OF HEAT

Thermal conductivity – Rectilinear flow of heat – experimental methods to determine the coefficient of thermal conductivity – Forbes's method and Lee's disc method – Kirchoff's law, Stefan's law and Newton's law of radiation – Black body radiation – Energy distribution in the black body spectrum .

Low Temperature Physics: Production of low temperature-Joule-Thompson effect-J-T effect for a Vanderwaal's gas-liquification of helium.

BOOKS FOR STUDY:

1. Murugesan R, Properties of matter. S. Chand & Co. (1998) (Units I, II & III)

2. Brijlal & Subramaniam, Heat and Thermodynamics- S. Chand & Co. New Edition (1998) (Units IV & V)

BOOKS FOR REFERENCE:

1. Mathur D.S., Mechanics S. Chand & Co., (1997)

2. Rajam J.B., (Revised by Arora. G.I.,) A Text book of Heat & Thermodynamics,

   S. Chand & Co., (1983).

3. D.Jeyaraman,Dr. K. Ilangovan and S. Visvanathan,Thermal Physics & Statistical Mechanics, (2009).

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
SEMESTER I
ALLIED PHYSICS - I: BASIC PHYSICS - 1

HOURS/WEEK: 4 **CODE: U15PH1ACT01**
CREDITS: 4 **MARKS:100**

Course Objective: To understand the basics of Properties of matter, Mechanics, sound, Thermal physics and Optics.

UNIT I: PROPERTIES OF MATTER

Elasticity - Elastic constants - Bending of beams - Young's modulus by non - uniform bending - Torsion in a wire - Rigidity modulus - Static torsion.

Viscosity - Coefficient of viscosity - Poisuelle's formula - Comparison of viscosities by burette method - Surface tension - Molecular theory of surface tension - Surface tension by drop weight method.

UNIT II: MECHANICS

Simple Harmonic Motion - Angular velocity - Angular acceleration - Uniform circular motion -Acceleration of a particle in a circle - centrifugal force - Centrifuge - Banking of curves: Motion of a bicycle around a circle.

Newton's universal law of gravitation - gravitational field - gravitational potential energy - gravitational potential and field due to uniform solid sphere.

UNIT III: SOUND

Characteristics of sound waves - Amplitude, pitch and frequency and loudness - Acoustics of buildings - Reverberation - Reverberation time - Sabine's formula - Condition for good acoustics - Ultrasonics – Introduction - Uses of ultrasonics.

UNIT IV: THERMAL PHYSICS

Postulates of kinetic theory of gases - Critical constants - J-K effect - Porus plug experiment -Theory of porus plug experiment – Regenerative cooling.

Newton's law of cooling - Specific heat of a liquid - specific heats of a gas C_P,C_V - Meyer's Relation.

UNIT V: OPTICS

Refraction - Refraction through prism- Refractive index – dispersive power of prism- Interference - Condition for Interference – Newton's rings - Air wedge - Diffraction - Theory of grating - normal incidence – comparison between prism spectra and grating spectra.

BOOKS FOR STUDY:

1. Murugesan R Allied Physics, New Delhi, S. Chand & Co. Ltd (2005).
2. Brijlal and Subramaniam, Text Book of Optics, S. Chand & Co, New Delhi (1998).
3. Brijlal and Subramaniam & Jivan Seshan, Mechanics and Electrodynamics, Eurasia publishing house (pvt) Ltd,Ram nagar, New Delhi(2005).
4. Brijlal, Subramaniam & P.S.Hemne, Heat, Thermodynamics and statistical physics, S. Chand & company Ltd. New Delhi (2007).
5. M.Narayanamurti and N.Nagaratnam, Heat, The National Publishing Co., Madras (1987).

BOOKS FOR REFERENCE:

1. Mathur D.S, Mechanics. S.Chand & Co. Ltd, (2007).
2. P.K. Chakrabharti, Theory and experiment on thermal physics, New central book agency Pvt Ltd (2006).
3. P.K. Chakrabharti,Geometrical and Physical optics ,New central book agency Pvt Ltd, (2005).
4. David Halliday, Robert Resnik, Kenneta S. Krane, The Physics, John Willey and sons, Singapore (2005).
5. Murugeshan R and Kiruthiga Sivaprasath, Properties of matter and Acoustics (2^{nd} ed.), S. Chand & company Ltd. New Delhi (2012)
6. Rajam J.B.and Arora C.L. A Text Book of Heat and Thermodynamics, S.Chand & Co, New Delhi (1983).

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
SEMESTER I
ALLIED PHYSICS - II: BASIC PHYSICS PRACTICALS – I

HOURS/WEEK: 4 **CODE: U15PH1ACP02**
CREDITS: 3 **MARKS: 100**

Course Objective: To understand the basics of Properties of matter, Optics, Electricity and Electronics by doing related experiments in Properties of Matter, Optics, Electricity and Electronics.

Any Fourteen experiments only

1. Determination of Young's modulus of the material of a bar using Cantilever (Pin and Microscope).
2. Determination of Young's modulus of the material of a bar by Non-uniform bending using (Pin and Microscope).
3. Determination of Rigidity modulus of the material of a wire using Torsion Pendulum.
4. Determination of Rigidity modulus of the material of a rod - Static Torsion.
5. Comparison of viscosities of two liquids using burette.
6. Determination of Surface Tension by Drop Weight method.
7. Determination of thickness of the wire using Air wedge.
8. Determination of Radius of Curvature of a lens - Newton's Rings.
9. Determination of refractive index of the material of prism using Spectrometer
10. Determination of refractive index of a liquid using hollow prism.
11. Determination of wavelengths of prominent lines of mercury spectrum using grating.
12. Determination of specific heat capacity of a liquid by Newton's law of cooling method.
13. Study of Junction Diode characteristics.
14. Study of Zener Diode characteristics.
15. Construction of Bridge Rectifier.
16. Construction of Regulated Power Supply using Zener Diode
17. Study of AND, OR Logic gates using discrete components.
18. Study of NAND as Universal logic gate.
19. Study of NOR as universal logic gate.
20. Verification of Demorgan's Theorems.

(For candidates admitted from 2015 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
B.A /B.Sc./B.Com/B.R.SC/B.C.A/B.B.A DEGREE EXAMINATION
SEMESTER I
ENVIRONMENTAL STUDIES

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

Unit I–Awareness and Natural Resources

Awareness of Environmental issues and management strategies–need of the hour

Renewable and non-renewable resources-uses, present status and management of forest, water, land and energy resources.

Unit II–Ecosystems and Biodiversity

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

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

Unit III–Environmental Pollution

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

Unit IV–Human population and Environment

Population growth at national and global level.

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

Environmental pollutions and diseases-malaria- chikungunya

Unit V–Environment and Social Issues

Rich–poor wide–at national and global levels

Urbanization –slums

Changing value systems -AIDS

Family welfare programs

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

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI -2
B.A/B.Sc./B.Com/B.R.Sc/B.C.A-DEGEE COURSES
LIFE ORIENTED EDUCATION
CATECHISM – I: GOD OF LIFE

HRS / Wk: 1

CODE: U15VE2LVC01
CREDIT: 1
MARKS: 100

OBJECTIVES:

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

UNIT – I: CREATION AND COVENANT

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

UNIT – II: GOD OF THE PROPHETS

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

UNIT – III: GOD OF WISDOM

God experience through wisdom Literature, its origin and growth

UNIT – IV: SYNOPTIC GOSPELS

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

UNIT – V: LUKE'S GOSPEL

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

REFERENCES:

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

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

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

OBJECTIVES:

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

UNIT – I: RELIGION

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

UNIT – II: DIFFERENT RELIGIONS

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

UNIT – III: UNITY OF RELIGION

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

UNIT – IV: FUNDAMENTALISM, COMMUNALISM AND SECULARISM

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

UNIT – V: VALUE SYSTEMS

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

REFERENCES:

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

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

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

OBJECTIVE:

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

UNIT – I: BIBLE – THE WORD OF GOD

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

UNIT – II: MINISTRY OF JESUS

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

UNIT – III: CHURCH – BIRTH AND GROWTH

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

UNIT – IV: DISCIPLES AND APOSTLES

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

UNIT – V: MISSIONARIES AND EVANGELISTS

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

REFERENCES:

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

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

TAMIL DEPARTMENT

BA/ B.SC/ B.COM DEGREE

Part - I : Language: Tamil Paper - II

Total Hours : 75 **Code : U15TL2TAM02**

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

Credit : 3

நோக்கங்கள்:

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

பயன்கள்:

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

பாடத்திட்டம்

அலகு:1 செய்யுள்

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

அலகு:2 செய்யுள்

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

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

அலகு:3

தமிழ் இலக்கிய வரலாறு - தமிழாய்வுத்துறை வெளியீடு
பல்லவர்காலம்
நாயக்கர்காலம்

அலகு:4

படைப்பிலக்கியம் - புதினம்
கல்கி - பார்த்திபன் கனவு

அலகு:5

கடிதம் எழுதுதல்

பாட நூல்கள்

செய்யுள் - தமிழாய்வுத்துறை வெளியீடு
தமிழ் இலக்கிய வரலாறு - தமிழாய்வுத்துறை வெளியீடு
கல்கி - பார்த்திபன் கனவு
கடித இலக்கியம் - பயிற்சி ஏடு.

(for the candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-620002

DEPARTMENT OF HINDI

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

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

SEMESTER –II

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

CREDITS : 3 **MARKS : 100**

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

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

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

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

UNIT- V : Comprehension – Prose passages

Books Prescribed :

- 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.

SEMESTER

II

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

(For candidates admitted 2013 onwards)

HRS/WEEK : 5 **CODE : U15FR2FRE02**

CREDIT : 3 **MARKS : 100**

Unit 1 Quelle journée !

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

Unit 2 Qu'on est bien ici !

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

Unit 3 Souvenez-vous ?

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

Unit 4 On s'appelle ?

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

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

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

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

TEXT BOOKS :

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

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
B.Sc. (PHYSICS) SEMESTER – II
MAJOR CORE – 2: ELECTRICITY AND ELECTROMAGNETISM

HOURS/WEEK:6 **CODE:U15PH2MCT02**
CREDITS: 6 **MARKS:100**

Course Objective: To study the basic principles of Electricity, Electrostatics and Electro Magnetism.

UNIT I: ELECTRICAL MEASUREMENTS & CAPACITORS

Carey Foster bridge- theory- Determination of the temperature co-efficient of resistance- Potentiometer- measurement of resistance- Ammeter calibration- Calibration of low range voltmeter.

Principle of a capacitor- capacitance of a spherical capacitor with outer sphere earthed and inner sphere earthed - capacitance of a cylindrical capacitor- energy stored in a charged capacitor- Loss of energy on sharing of charges between two capacitors- Quadrant electrometer- measurement of ionization currents and capacitance using the quadrant electrometer.

UNIT II: ELECTROMAGNETISM

Force on a current carrying conductor- Fleming's left hand rule- forces between long conductors carrying current- Definition of Ampere- field along the axis of a circular coil and solenoid- Theory of ballistic galvanometer- correction for damping in ballistic galvanometer- charge sensitivity of a ballistic galvanometer- application of ballistic galvanometer for measurement of absolute capacity of a condenser- Equivalence between a current circuit and magnetic shell (Ampere's theorem).

UNIT III: ELECTROMAGNETIC INDUCTION

Laws of Electromagnetic induction- self and mutual induction- self inductance of a solenoid- mutual inductance of a solenoid inductor- coefficient of coupling- experimental determination of self inductance by Rayleigh's method and Anderson's method- mutual inductance by Rayleigh's method - growth and decay of current in circuit containing C & R and L &R – high resistance by leakage- charging and discharging of a condenser through L&R- condition for discharge to be oscillatory- induction coil.

UNIT IV: ELECTRIC GENERATORS AND MOTORS

Alternating current generator- distribution of three phase alternating current- three phase four wire system- direct current generator- types of DC dynamos- direct current motor-

back e.m.f. of a motor- types of direct current motors- series wound, shunt wound, compound wound motor- efficiency of a motor- rotating magnetic field- induction motor.

UNIT V: ALTERNATING CURRENTS

Peak, average and RMS values of alternating current- analysis of AC circuits by j operator method- alternating EMF applied to a circuit containing resistance, inductance and capacitance in series- alternating EMF applied to a circuit containing resistance, inductance and capacitance in parallel- series and parallel resonant circuits- sharpness of resonance and Q- factor- power in AC circuits- power factor – wattless current- choke coil.

BOOKS FOR STUDY:

1. Murugesan R., Electricity And Magnetism S. Chand and Co., New Delhi (2003)
2. Ambrose and Vincent Devaraj, Introduction To Electronics, 5 th Edition (1992)

BOOK FOR REFERENCE:

1. Narayanamoorthy & Nagaratnam, Electricity And Magnetism, NPC, Chennai (1992).
2. N.D Tiwari, Electricity And Electromagnetism, Sultan and Chand Co., New Delhi,1998
3. Brijlal and Subramanium, Electricity And Electromagnetism, S. Chand and Co, New Delhi (2000)
4. C.L. Arora, Electricity And Magnetism, S. Chand and Co., New Delhi 16th Edition,1999

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
B.Sc., (PHYSICS) SEMESTER – II
MAJOR CORE – 3: MAIN PRACTICAL I: GENERAL PHYSICS PRACTICALS

HOURS/WEEK:4 **CODE:U15PH2MCP03**
CREDITS: 3 **MARKS:100**

Course Objective: To apply the basic principles of properties of matter, Electricity, Electronics and Optics by doing the relevant experiments.

Any Fourteen Experiments Only

1. Determination of Young's modulus by non uniform bending - Microscope
2. Determination of Young's modulus by uniform bending - Telescope
3. Determination of Young's modulus by Cantilever method - using Microscope
4. Determination of Rigidity modulus of a wire by Torsion Pendulum
5. Determination of Rigidity modulus of a rod by Static Torsion method
6. Ammeter Calibration using Potentiometer
7. Measurement of Resistance using Potentiometer
8. Study of Series Resonant circuits
9. Determination of Refractive Index of material of a prism using Spectrometer
10. Determination of Impedance and Power Factor of a coil
11. Determination of Charge Sensitivity of a galvanometer
12. Study of Parallel Resonant Circuits
13. Study of the characteristics of a Junction Diode
14. Study of Logic gates using discrete components – AND & OR.
15. Determination of thickness of a wire by forming Air Wedge
16. Determination of Refractive Index of the given liquid using Spectrometer
17. Determination of co-efficient of viscosity of liquid by capillary method.
18. Determination of the surface tension of a liquid by capillary tube method.
19. Determination of absolute capacity of a condenser using B.G.
20. Determination of high resistance by leakage using B.G.
21. Determination of thermal conductivity of a bad conductor using Lee's disc method.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
SEMESTER II
ALLIED PHYSICS - III: BASIC PHYSICS – 2

HOURS/WEEKS: 4 **CODE: U15PH2ACT03**
CREDITS: 3 **MARKS:100**

Course Objective: To understand the basics of Electricity, electromagnetism, analog and digital electronics, atomic and nuclear physics.

UNIT I: ELECTRICITY

Coulomb's law - Electric field - Electric field due to point charge - electric field intensity - Electric potential - Capacitors - Principle of capacitor - Capacity of an isolated sphere - Spherical capacitor- Energy of a charged capacitor - Sharing of charges and loss of energy.

UNIT II: ELECTROMAGNETISM

Force on a current carrying conductor - Flemings left hand rule – Laws of Electromagnetic induction - Self and Mutual induction - experimental determination of self inductance by Anderson's method - experimental determination of mutual inductance by Rayleigh's method.

UNIT III: ANALOG ELECTRONICS

Semiconductors - Types of semiconductors - PN junction diode - V-I characteristics of junction diode - Junction diode as a rectifier (full wave Bridge rectifier) - Zener diode characteristics - Zener diode as a regulator - Transistor- Transistor action- Characteristics of transistor **(CE Mode).**

UNIT IV: DIGITAL ELECTRONICS

Logic gates-construction of AND, OR & NOT gates using discrete components - Truth tables- NAND and NOR gates - Universal building blocks - Demorgan's theorem - Boolean algebra- Simplification of Boolean expressions(upto 3 variables) - Elementary ideas of IC's - SSI, MSI, LSI and VLSI.

UNIT V: ATOMIC & NUCLEAR PHYSICS

X-ray - Properties - Characteristic and continuous Spectrum - Mosley's law and its importance - Vector Atom Model.

Radioactivity - Law of disintegration - Radioactive equilibrium - Age of earth - Nuclear mass defect - binding energy - packing fraction - Binding energy formula - Liquid drop model -Explanation of fission and fusion(Quantitative study only)

BOOK FOR STUDY:

1. Murugeshan.R, Allied Physics, S. Chand & Co. Ltd, New Delhi, (2005).
2. Murugeshan R, Allied physics and spectroscopy, S. Chand & Co. Ltd, New Delhi (2007).
3. Mehta V.K., Rohit Mehta, Principles of Electronics, New Delhi: S. Chand & Co. Ltd. 10 th edition New Delhi (2006).
4. Murugeshan. R, Electricity and Magnetism, S. Chand & Co., New Delhi (2003).
5. Murugeshan R, Modern Physics, S. Chand & Co. (10th revised edition), (2002).

BOOK FOR REFERENCE:

1. Narayanamurti, Electricity and Magnetism, The National Publishing Co. Madras (3rd edition) (1994).
2. David Halliday, Robert Resnik, Kenneta S. Krane, The Physics, John Willey and sons, Singapore, (2005).
3. Murugeshan R and Kiruthiga Sivaprasath, Properties of matter and Acoustics S. Chand & company Ltd. (2nd edition) ,New Delhi (2012).
4. Brijlal and Subramaniam, Text Book of Optics, S. Chand & Co., New Delhi (1998).
5. Brijlal and Subramaniam, Text Book of Sound, Vikas Publishing House Pvt Ltd (1993).

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

SBE-1 SOFT SKILL DEVELOPMENT

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

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

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

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

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

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

UNIT V:
Self Development Plan
Concept and Need for Self Development Plan–Preparing Self Development Plan9 Format is used to complete the self development Plan), Monitoring and Evaluation of self Development plan– Developing indicators for self development introduction to National Skill Development Mission.

REFERENCE

Delhi Meena K.AyothiV. (2013). A Book on Development of Soft Skills (Soft Skills: A Road Map to Success), P.R. Publishers & Distributors, Trichy.

Francis Thamburaj S.J.(2009).Communications of skills for Professional Excellence,1st Ed., Grace Publishers,

Rathan ReddyB.(2005).Team Development and Leadership, Jaico Publishing House, Mumbai.

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

RURAL ENRICHMENT AND SUSTAINABLE DEVELOPMENT

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

Course Objective:

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

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

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

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

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

.

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

REFERENCES:

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

(for the candidates admitted from June 2015 onwards)

(For Candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2

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

LIFE ORIENTED EDUCATION

ETHICS – I: RELIGION AND VALUE SYSTEMS

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

CREDITS :1

MARKS : 100

OBJECTIVES:

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

UNIT – I: RELIGION

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

UNIT – II: DIFFERENT RELIGIONS

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

UNIT – III: UNITY OF RELIGION

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

UNIT – IV: FUNDAMENTALISM, COMMUNALISM AND SECULARISM

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

UNIT – V: VALUE SYSTEMS

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

REFERENCES:

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

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

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

OBJECTIVE:

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

UNIT – I: BIBLE – THE WORD OF GOD

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

UNIT – II: MINISTRY OF JESUS

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

UNIT – III: CHURCH – BIRTH AND GROWTH

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

UNIT – IV: DISCIPLES AND APOSTLES

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

UNIT – V: MISSIONARIES AND EVANGELISTS

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

REFERENCES:

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

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI -2
B.A/B.Sc./B.Com/B.R.Sc/B.C.A-DEGEE COURSES
LIFE ORIENTED EDUCATION
CATECHISM – I: GOD OF LIFE

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

OBJECTIVES:

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

UNIT – I: CREATION AND COVENANT

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

UNIT – II: GOD OF THE PROPHETS

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

UNIT – III: GOD OF WISDOM

God experience through wisdom Literature, its origin and growth

UNIT – IV: SYNOPTIC GOSPELS

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

UNIT – V: LUKE'S GOSPEL

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

REFERENCES:

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

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2.

TAMIL DEPARTMENT

BA/ B.SC/ B.COM DEGREE

Part - I : Language: Tamil Paper - III

Total Hours : 90 **Code : U15TL3TAM03**

Hrs : 6Hrs /Wk **Marks : 100**

Credit : 3

நோக்கங்கள்:

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

பயன்கள்:

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

அலகு:1 செய்யுள்

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

அலகு:2 செய்யுள்

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

அலகு:3

தமிழ் இலக்கிய வரலாறு

சோழர் காலம்

அலகு:4

நாடகம்

சத்திய வேள்வி – அய்க்கண்

அலகு:5

கோயிற்கலை - திட்டக்கட்டுரை, வினாடி வினா

பாட நூல்கள்

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

(for the candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-620002

DEPARTMENT OF HINDI

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

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

SEMESTER – III

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

CREDITS : 3 **MARKS : 100**

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

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

UNIT- III : Bakthi Kaal

UNIT- IV : Poetics

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

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

Books Prescribed :

- 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

SYLLABUS

SEMESTER III

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

(For candidates admitted 2013 onwards)

HRS/WEEK : 6 **CODE : U15FR3FRE03**
CREDIT : 3 **MARKS : 100**

Unit 1 Vivement demain !

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

Unit 2 Tu as du boulot ?

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

Unit 3 Qu'en pensez-vous?

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

Unit 4 C'est tout un programme !

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

Unit 5 On se retrouve

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

TEXT BOOKS :

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

HOLY CROSS COLLEGE (AUTOMOMOUS), TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
B.Sc. (PHYSICS) SEMESTER - III
MAJOR CORE - 4: ELECTRONICS

HOURS/WEEK: 5 **CODE: U15PH3MCT04**
CREDITS: 5 **MARKS:100**

Course Objective: To know the Fundamentals of Diodes, Transistors, JFET, MOSFET,UJT, Transistor Amplifiers, Feedback Amplifiers, Oscillators and Operational Amplifiers.

UNIT I: SEMICONDUCTOR DIODES

PN junction – formation of PN junction – volt ampere characteristics of PN junction – Diode as a rectifier – Half wave rectifier –Efficiency of Half wave rectifier - Full wave rectifier – Efficiency of Full wave rectifier - full wave bridge rectifier – Filter circuits – Clipping and Clamping circuits - Capacitor filter – Zener diode – breakdown mechanisms – Zener diode as voltage stabilizer.

UNIT II: TRANSISTORS

Transistor action – characteristics of common base configuration – characteristics of common emitter configuration – comparison of transistor configurations – Transistor biasing – voltage divider bias method – Transistor as an amplifier – Analysis of single stage CE amplifier using h parameters – RC coupled transistor amplifier –frequency response of RC coupled amplifier - classification of power amplifier –class B push pull amplifier

UNIT III: FEEDBACK AMPLIFIERS AND OSCILLATORS

Principle of negative voltage feedback in amplifiers – gain – advantages of negative voltage feedback – principles of negative current feedback – emitter follower – positive feedback amplifier – oscillator – barkhausen criterion – LC oscillators – Hartley oscillator – Colpitt's oscillator - RC oscillators – phase shift oscillator - Wein bridge oscillator

UNIT IV: SEMICONDUCTOR DEVICES

Junction field effect transistor – principle and working of JFET – Difference between JFET and bipolar transistor - output characteristics of JFET – parameters of JFET – MOSFET – symbols for MOSFET – circuit operation of D and E MOSFET – transfer characteristics – Uni junction transistor – characteristics of UJT – applications of UJT – UJT relaxation oscillator.

UNIT V: OPERATIONAL AMPLIFIERS

Operational amplifier – differential amplifier – commom mode and differential mode signals - CMRR – ideal characteristics of OP amp – applications of OP amp – inverting amplifier – non inverting amplifier – voltage follower – summing amplifier – difference amplifier – OP amp integrator – OP amp differentiator – solving differential equations using OP amp

BOOKS FOR STUDY:

1. Mehta V.K., Principles of Electronics, S.chand and Company Ltd,New Delhi,11 th Edition (2015).
2. Bagde M.K., Singh S.P. and Kaman Singh - Elements of Electronics, S.Chand and company Ltd. (2002).
3. Bhargava N.N, Kulshreshthra D.C.and Gupta S.G., Basic Electronics and Linear circuits- Tata Mc Graw Hill Publishing Co. Ltd, New Delhi (1984).

BOOKS FOR REFERENCE:

1. Chattpadhyay D.C.,.Rakshit P.C, Saha B. and Purkait N.N.,Foundation of electronics,Wiley Eastern Limited, New Delhi, 2nd Edition (1988)
2. Narayana Rao B.V., Principles of Electronics, Vol III, Wiley Eastern and New Age International Limited, New Delhi, 2nd Edition (1988) .
3. Sedha R.S., A text book of applied Electronics, S.Chand & company Ltd, New Delhi (2002).

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
B.Sc. (PHYSICS) SEMESTER - III
MAJOR CORE -5: MAIN PRACTICAL II: OPTICS AND ELECTRICITY PRACTICALS

HOURS/WEEK: 5 **CODE: U15PH3MCP05**
CREDITS: 5 **MARKS:100**

Course objective: To experiment and understand the basic laws of optics and electricity.

Any Sixteen Experiments Only

1. Determination of refractive index of glass by forming Newton's rings.
2. Determination of dispersive power of a prism using spectrometer
3. Determination of wavelength of spectral lines using a grating - normal incidence (spectrometer)
4. Determination of refractive index of the material of a prism – i-d curve (Spectrometer)
5. Determination of dispersive power of a grating (Spectrometer)
6. Determination of Cauchy's constants using Spectrometer
7. Determination of specific rotatory power of sugar solution using polarimeter
8. Conversion of Galvanometer into Ammeter
9. Conversion of Galvanometer into Voltmeter
10. Determination of temperature coefficient of thermistor using P.O Box
11. Study of the characteristics of a Junction Diode
12. Study of Characteristics of a Zener diode
13. Study of transistor characteristics – common base configuration
14 Study of transistor characteristics – common emitter configuration
15. Determination of absolute capacity of a condenser using BG
16. Comparison of EMF-BG
17. Determination of internal resistance of a primary cell-BG
18. Comparison of capacities using De Sauty's bridge
19. Determination of self inductance of a coil using Anderson's method
20. Determination of mutual inductance of a coil using Rayleigh's method
21. Construction of Zener regulated power supply.
22. Determination of High resistance by leakage using table Galvanometer.
23. Construction of power pack.
24. Study of Characteristics of JFET.

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
SEMESTER III
ALLIED PHYSICS OPTIONAL PAPER – 1
PROPERTIES OF MATTER, HEAT AND MODERN PHYSICS

HOURS/WEEK: 4 **CODE: U15PH3AOT01**
CREDITS: 3 **MARKS:100**

Course objectives: To understand the properties of matter and appreciate how the relevant theories find application in various devices, the modes of transfer of heat and the methods of achieving low temperature and the justifications for the vector model of an atom and the liquid drop model for a nucleus.

UNIT I: ELASTICITY

Stress and Strain- Hooke's law - Moduli of Elasticity – Poisson's Ratio –relation between the elastic moduli-Bending of Beams – Bending Moment – Cantilever(pin and microscope) – Uniform Bending(optic lever method) –Rigidity modulus : static torsion-Torsion pendulum– Couple per unit twist-work done- I shape of Girders.

UNIT II: FLUID MECHANICS

Bernoulli's theorem – venturimeter - filter pump- the atomizer- viscosity- coefficient of viscosity- Streamlined motion and turbulent motion - Poisuelle's formula- experiment to determine viscosity of low viscous liquid by burette method- viscosity of high viscous liquids-Stoke's method.

UNIT III: DIFFUSION AND OSMOSIS

Diffusion- Graham's laws of diffusion- Diffusion and kinetic theory-Fick's law-coefficient of diffusion- Analogy between heat conduction and diffusion- determination of coefficient of diffusion- Osmosis- Osmotic pressure- experimental determination of osmotic pressure-Berkeley and Hartley method-Laws of osmotic pressure-difference between osmosis and diffusion.

UNIT IV: THERMAL PHYSICS

Transmission of Heat – Co-efficient of Thermal Conductivity – applications of conduction of heat – convection -applications of convection-properties and applications of Radiations – Stefan's law - Solar constant- temperature of the sun.

Production of low temperature - Porous plug experiment - JK effect – Theory – Inversion Temperature – Liquefaction of air-Linde's process.

UNIT V: ATOMIC AND NUCLEAR PHYSICS

X-rays - Compton Effect – Compton shift- Experimental Verification of Compton effect – Photo electric effect – Laws of photoelectric effect – Einstein's equation - applications of Photo electric effect– Photo electric cells –Applications of photoelectric cells- Vector Atom Model – Pauli's Exclusion Principle.

Radioactivity – properties of radioactive radiations- law of radioactive disintegration –Mean life-law of Successive disintegration –Applications of radio isotopes - Nuclear fission and fusion (Quantitative study only)- Liquid drop model.

BOOK FOR STUDY:

1. Brijlal and Subramaniam,Heat and Thermodynamics S. Chand & Company Ltd, New Delhi(2002).
2. Murughesan , Modern Physics, S. Chand & Company Ltd,New Delhi, (2006)
3. Brijlal and Subramaniam, Text Book of Heat, Vikas Publishing House Pvt Ltd (1993).

BOOKS FOR REFERENCE:

1. J.B Rajam ,Atomic Physics, S.Chand & Co., New Delhi.
2. Halliday**,** Resnick**,**Walker**,** Fundamentals of Physics, 8th Edition , Wiley India Pvt. Ltd., (2008).
3. D.S.Mathur , Mechanics,Thirteen edition, S.Chand & Co., New Delhi(1998).
4. Murugeshan R and Kiruthiga Sivaprasath, Properties of matter and Acoustics (2nd ed.). S. Chand & company Ltd , New Delhi (2012).
5. Murughesan , Mechanics S.Chand & Co,New Delhi, (2006).

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

GENDER STUDIES

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

Objectives

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

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

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

Unit I

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

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

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

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

Unit – V

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

BOOK FOR STUDY

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

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

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

OBJECTIVES:

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

UNIT – I: GENDER ISSUES

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

UNIT – II: WOMEN AND MEDIA

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

UNIT – III: SOCIAL ISSUES RELATED TO WOMEN

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

UNIT – IV: WAYS OF EMPOWERING WOMEN

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

UNIT – V: CYBER CRIME AGAINST WOMEN

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

REFERENCES:

1. Dr.M.Arumairaj et al., 1999, "Marching towards the Millenium ahead".
2. Thomas Anjugandam, 1999, "Grow Free Live Free" Salesian Publicaiton.
3. H.C PrettiNandhiniUpretti, jaipur 2000 "Women and problems of GenderDiscrimination".
4. Thomas B.Jayaseelan, 2002, "Women: Rights and law" Indian Social Institute, New Delhi.

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

Empowerment, Ed,"

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

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

OBJECTIVE:

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

UNIT – I: PURPOSE OF LIFE

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

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

UNIT – II: JUDGES AND KINGS

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

UNIT – III: WOMEN IN THE BIBLE

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

UNIT – IV: MINOR PROPHETS

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

UNIT – V: MAJOR PROPHETS:

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

REFERENCES:

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

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

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

OBJECTIVES:

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

UNIT – I: MISSION OF THE CHURCH

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

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

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

UNIT – III: THE FUNCTIONARY CHURCH AND I

Ministerial Church – Relating Church –Parish Church- Role of lay faithful in the Church – Its challenges – Church and I. Sacraments – Initiation- Social – Healing (all the seven) - stress on Confession, Confirmation and Holy Communion - Sacramental: holy "things" used –their sanctity

UNIT – IV: SACRAMENTS AND SACRAMENTAL

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

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

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

REFERENCES:

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

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

TAMIL DEPARTMENT

BA/ B.SC/ B.COM DEGREE

Part - I : Language: Tamil Paper - IV

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

நோக்கங்கள்:

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

பயன்கள்:

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

அலகு:1 செய்யுள்

1. குறுந்தொகை

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

2. நற்றிணை

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

3. கலித்தொகை

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

அலகு:2 செய்யுள்

4.புறநானூறு

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

5. பதிற்றுப்பத்து - ஐந்தாம் பத்து

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

6. திருக்குறள்

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

அலகு:3

தமிழ் இலக்கிய வரலாறு (துறை வெளியீடு)

சங்ககாலம் - சங்கம் மருவியகாலம்

எட்டுத்தொகை, பத்துப்பாட்டு, பதினெண்கீழ்க்கணக்கு நூல்கள்

அலகு:4

வாழ்க்கை வரலாறு

அன்னை தெரசா - பா. தீனதயாளன்

அலகு:5

பொது – மொழிபெயர்ப்பு

பாட நூல்கள்

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

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

(for the candidates admitted from June 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

SYLLABUS

SEMESTER IV

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

(For candidates admitted 2013 onwards)

HRS/WEEK : 5 **CODE : U15FR4FRE04**

MARKS : 100 **.CREDIT : 3**

Unit 1 C'est la fête !

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

Unit 2 Vous plaisantez !

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

Unit 3 On s'entend bien !

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

Unit 4 À vos risqué et périls !

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

Unit 5 La vie est dure

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

(for candidates admitted from 2014 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2.

2015 - 2016

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

PART II – ENGLISH IV - GENERAL ENGLISH PAPER IV

HOURS – 6 PER WEEK **CREDIT : 3**

CODE : U13EL4GEN04

OBJECTIVES

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

To develop skills required for referential and independent learning.

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

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

UNIT I: READ AND COMMUNICATE: HISTORICAL SKETCHES

The Renaissance

India under the British Raj

UNIT II: READ AND COMMUNICATE : MODERN FABLES

Nonchi Nona and Kotiya the Cat

The Competition

UNIT III: READ AND COMMUNICATE : MODERN FABLES

The Nightingale and the Rose

The Butterfly that Stamped

UNIT IV -READ AND COMMUNICATE : BIOGRAPHIES AND MODERN FABLES

Napoleon Bonaparte

The Hiding Place

UNIT V

GRAMMAR - Tenses

COMPREHENSION - General

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

GENERAL ESSAY – 5 TOPICS

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

THINK BETTER - READ AND COMMUNICATE : MODERN FABLES

1 – 10 for Internal Testing

BOOKS FOR REFERENCE

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

*****

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

1. Store house of knowledge
2. Genre
3. To be divided over
4. Taboo
5. To take over
6. Hump
7. Bushy
8. Tiered
9. To roll from side to side

10. Flickered
11. To sail through
12. To tremble all over
13. Ecstasy
14. Thunder-clap
15. Mousy-quite
16. Collision
17. Exiled
18. Revolution
19. To come round
20. To fight for a cause

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
B.Sc., (PHYSICS) SEMESTER - IV
MAJOR CORE – 6: OPTICS AND SPECTROSCOPY

HOURS/WEEK: 5 **CODE: U15PH4MCT06**
CREDITS: 5 **MARKS:100**

Course objective: To understand the basic laws of geometrical optics, interference of light, diffraction, polarisation and spectroscopy

UNIT I: REFLECTION AND REFRACTION

Lens System - Equivalent focal length of two thin lenses in contact and separated by a distance - Aberration in lenses - Spherical aberration in a lens and methods of minimizing it - Chromatic aberration and achromatic combination of lenses - Huygen's and Ramsden's eyepieces - Comparison of Huygen's and Ramsden's eyepieces - Dispersion of light - Refraction through prism.

UNIT II: INTERFERENCE

Introduction - Theory of Interference fringes - Interference in thin films by reflected light - Interference in thin films by transmitted systems - Wedge shaped films - Air wedge - determination of diameter of a thin wire - Testing the planeness of a surface – Michelson's Interferometer – Determination of wavelength of monochromatic light and difference in wavelength between neighbouring lines - Newton's Rings-Determination of wavelength of sodium light and refractive index of a liquid.

UNIT III: DIFFRACTION

Fresnel diffraction - Fraunhofer diffraction –Plane transmission grating – Normal incidence – Oblique incidence – Overlapping and absent spectra – Dispersive power of a grating - Resolving power of a grating – Comparison of prism spectrum and grating spectrum.

UNIT IV: POLARISATION

Transverse nature of light –Double refraction – Huygens's explanation of double refraction –Nicol prism – Theory, production and analysis of circularly, elliptically and linearly polarized light – Quarter wave and Half wave plates – Optical activity- Rotatory Polarisation – Fresnel's theory of optical rotation – Specific rotation – Biot's law for Laurent's half shade polarimeter – Determination of specific rotatory power of sugar solution.

UNIT V: SPECTROSCOPY

Types of spectra – Emission spectra – Absorption spectra - IR Spectroscopy - Radiation Sources - Detectors – IR photography - uses – UV spectroscopy - Radiation Sources - Detectors - Raman Effect – Explanation of Raman effect using simple Quantum theory – Experiment – Applications - NMR Spectroscopy - Basic Principle -Applications.

BOOK FOR STUDY:

1. Murugeshan,R and Kiruthiga Sivaprasath, Optics and Spectroscopy, S.Chand and Company, Ltd. (2010)

2. ArulDas G., Molecular Structure and Spectroscopy, PHI Learning Private Editor, New Delhi (2005)

BOOKS FOR REFERENCE:

1. Subramaniyam N, Brijlal and Avadhanulu. M.N, A Text Book of Optics ,S.Chand and Company, Ltd (2007).

2. Gupta S.L., Kumar.V. and Sharma.R.C., Elements of Spectroscopy, 16th Edition, Pragati Prakashan, Meerut (2001).

3. Murugeshan, R Optics and Spectroscopy S.Chand and Company, Ltd. (1997)

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
B.Sc., (PHYSICS) SEMESTER – IV
MAJOR ELECTIVE- 1: DIGITAL ELECTRONICS

HOURS/WEEK: 5 **CODE: U15PH4MET01**
CREDITS: 5 **MARKS:100**

Course objective: To understand the number system, Boolean algebra, combinational and sequential circuits, counters, shift registers, A/D & D/A Conversion.

UNIT I: NUMBER SYSTEMS, CODES AND LOGIC GATES

Binary numbers – Binary arithmetic – 1's and 2's complements – Decimal to Binary conversion – Binary to decimal conversion – Octal numbers, Hexadecimal numbers – Binary coded decimal – Digital codes – Excess-3, Gray and Alphanumeric (ASCII) codes – Logic gates – AND, OR gates construction using discrete components- Inverter, AND, OR, NAND, NOR, EX-OR gates – operation and truth tables.

UNIT II: BOOLEAN ALGEBRA AND SIMPLIFICATION OF BOOLEAN EQUATIONS

Boolean operations – Rules and Laws of Boolean Algebra – DeMorgan's theorems – NAND and NOR as Universal Building block - Boolean expressions for gate networks – Algebraic simplification of Boolean expressions – Minterms- Sum of Products– Karnaugh map forming up to four variables - Simplification using Karnaugh map- AND – OR, NAND-NAND circuit equivalence - EX-OR gate applications: Binary to Gray and Gray to Binary conversion, Parity generator and checker.

UNIT III: ARITHMETIC, COMBINATIONAL AND SEQUENTIAL CIRCUITS

Half adder – Full adder – Half subtractor – Multiplexer: 4-1 Multiplexer, 8-1 Multiplexer – Demultiplexer: 1-4 Demultiplexer, 1-16 Demultiplexer – Decoder: 3-8 decoder, BCD to Seven segment decoder - Encoder – Flip Flops- SR Flip Flop, Clocked SR Flip Flop, D Flip Flop, JK Flip Flop, JK Master slave Flip Flop (Edge Triggering) and T Flip Flop.

UNIT IV: REGISTERS AND COUNTERS

Registers - Shift registers – Series and Parallel Shift registers – Application of Shift registers: Ring Counter - Asynchronous counters - Modulo –N counter - Asynchronous Decade counter- Synchronous counters – Design of Synchronous counters - Modulo –N counter - Synchronous Decade counter.

UNIT V: ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERSION

D/A conversion – Resistive divider – Binary ladder — D/A Performance characteristics- D/A Accuracy and Resolution – A/D conversion - Successive Approximation method - Counter method – A/D Accuracy and Resolution .

BOOKS FOR STUDY:

1. R. P. Jain, Modern Digital Electronics, 4th Edition, Tata McGraw - Hill Education, New Delhi.
2. Floyd, Digital Fundamentals, 8th Edition, Pearson Education, India.

BOOKS FOR REFERENCE:

1. William H. Gothmann, Digital Electronics- An Introduction to theory & Practice, Second Edition, Prentice Hall of India (1999).
2. Vijayendran V. Introduction to Integrated Electronics Digital And Analog , First Edition, S. Viswanathan (Printers & Publishers) Pvt., Ltd (2005).
3. Malvino. A and Leach, Digital Principles and Applications, 4th Edition, Mc-Graw Hill, New York.
4. Theraja B.L., Basic Electronics – Solid State- S. Chand and Company Limited, New Delhi,1st Edition (2005).

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
B.Sc., (PHYSICS) SEMESTER IV:
MAJOR ELECTIVE- I ENERGY
PHYSICS

CODE: U15PH4MET02

NO. OF HOURS/WEEK: 5 **NO. OF CREDITS: 5**

Course Objective: To make the students to understand the present day crisis of need for conserving energy and alternatives are provided.

UNIT I: INTRODUCTION TO ENERGY SOURCES

An Introduction to Energy Sources and their availability-conventional energy sources-nonconventional energy sources- various forms of energy - coal, oil and natural gas - applications - merits and demerits.

UNIT II: SOLAR ENERGY

Solar energy - nature of solar radiation - components - solar heaters - crop dryers - space cooling - solar cookers - water desalination - photovoltaic generation basics - merits and demerits of solar energy.

UNIT III: BIOMASS ENERGY

Biomass energy - classification - photosynthesis - biomass conversion process - gobar gas plants - wood gasification - ethanol from wood - advantages and disadvantages of biomass as energy source.

UNIT IV: GEOTHERMAL ENERGY

Geothermal energy - wind energy - ocean thermal energy conversion (OTEC) - energy from waves and tides (Basic ideas, nature, applications, merits and demerits).

UNIT V: ENERGY STORAGE & IMPACTS OF NON-CONVENTIONAL ENERGY

Conversion of energy - patterns of energy consumption in domestic, industrial, transpotation, agricultural sectors - conservation principles - energy crisis and possible solutions - energy storage and hydrogen as a fuel (basics) - impact due to non-conventional energy sources.

BOOKS FOR STUDY:

1. G.D. Raj, Solar Energy, 4th edition, (1997).

2. G.D. Raj, Non conventional energy sources, 4th edition, (1997).

BOOK FOR REFERENCE:

1. S. Rao and Dr. B.B. Parulekar Energy Technology, 2nd Edition, (1997).

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2
DEPARTMENT OF PHYSICS
SEMESTER IV
ALLIED PHYSICS OPTIONAL PAPER 3
BASIC PHYSICS PRACTICALS-II

HOURS/WEEK: 4 **CODE: U15PH4AOP03**
CREDITS: 3 **MARKS:100**

Course Objective: To understand and apply the principles of physics by doing related experiments in Properties of Matter, Optics, Electricity and Electronics.

Any Sixteen Experiments Only

1. Determination of Young's modulus of the material of a bar using Cantilever (Pin and Microscope).
2. Determination of Young's modulus of the material of a bar by Non –Uniform bending (pin and Microscope).
3. Determination of Young's modulus of the material of a bar by uniform bending (Scale and telescope)
4. Determination of Rigidity modulus of the material of a wire using Torsion Pendulum.
5. Determination of Rigidity modulus of the material of a rod – Static Torsion.
6. Determination of refractive index of a Prism using Spectrometer.
7. Determination of refractive index of a liquid using Spectrometer and Hollow prism.
8. Determination of the thickness of the wire by using Air wedge method.
9. Determination of the radius of curvature of the lens by forming Newton's rings.
10. Determination of wavelengths of prominent lines of mercury spectrum using grating
11. Determination of Coefficient of viscosity of liquid by poiseuille's flow method
12. Study of Junction Diode characteristics.
13. Study of Zener Diode characteristics.
14. Construction of Bridge Rectifier.
15. Construction of Regulated Power Supply using Zener Diode.
16. Study of IC –Chips.
17. Study of Logic gates AND and OR using discrete components.
18. Verification of De Morgan's theorems.
19. Study of NOR as universal gate.
20. Study of NAND as universal gate.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
SEMESTER IV
ALLIED PHYSICS OPTIONAL PAPER 2
OPTICS, ELECTRICITY AND ELECTRONICS

HOURS/WEEK: 4 **CODE: U15PH4AOT02**
CREDITS: 4 **MARKS:100**

Course objectives: To understand the concepts of optics, Electricity, Electromagnetism, analog and digital electronics.

UNIT I: OPTICS

Refraction - Refraction through prism- Refractive index – Interference - Condition for Interference – Newton's rings - Air wedge – Diffraction - theory of grating - difference between prism and grating spectrum- Determination of wavelength of light using transmission grating(Normal incidence)- LASER principles- He-Ne Laser.

UNIT II: ELECTRICITY

Electrostatics - Coulomb's inverse square law - electric field- electric field intensity- electric potential- Gauss theorem and its applications (Intensity at a point due to a charged sphere & cylinder) – Principle of a capacitor – Capacity of spherical and cylindrical capacitors – Energy stored in a capacitor – Loss of energy due to sharing of charges.

UNIT III: ELECTROMAGNETISM

Laws of electromagnetic induction-Self induction –self inductance of a long solenoid-Mutual induction- coefficient of coupling- determination of coefficient of Self inductance by Anderson's method- determination of coefficient of mutual inductance by Rayleigh's method- growth and decay of current in a circuit having L& R- growth and decay of charge in a circuit having C & R.

UNIT IV: ANALOG ELECTRONICS

PN junction diode- characteristics- Zener diode characteristics- Zener as a voltage regulator- junction diode as a rectifier- bridge rectifier- Principle and working of a transistor- Characteristics of a transistor in CE configuration- transistor as an amplifier.

UNIT V: DIGITAL ELECTRONICS

Decimal, binary, octal and hexadecimal Number system – mutual conversion-binary arithmetic- Basic logic gates- Boolean Algebra- De Morgan's theorems-verification

using truth tables - NAND and NOR as universal gates- simplification of Boolean equations – Half and full adder.

BOOK FOR STUDY:

1. R.Murugeshan ,Allied Physics , Third edition, S.Chand , New Delhi(2012)
2. R.Murugeshan, Optics and spectroscopy, First edition, S.Chand , New Delhi(2005)

BOOKS FOR REFERENCE:

1. Brijlal and Subramaniam, Electricity and Magnetism, Palaniappa Bros., Chennai (1974)
2. Gupta and Kumar, Hand Book of Electronics, Pragathi Prakashan, Meerut (1970)
3. Jain, R.P., Modern Digital Electronics, Tata McGraw Hill India Ltd., New Delhi(1984)
4. R.Murugeshan, ,Allied Physics, First edition, S.Chand , New Delhi,(2005)
5. David Halliday, Robert Resnik, Kenneta S. Krane, The Physics, John Willey and sons, Singapore, (2005)
6. V Vijayendran ,Introduction to integrated electronics S.Viswanathan publishers (2008)

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

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

OBJECTIVES:

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

UNIT – I: GENDER ISSUES

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

UNIT – II: WOMEN AND MEDIA

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

UNIT – III: SOCIAL ISSUES RELATED TO WOMEN

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

UNIT – IV: WAYS OF EMPOWERING WOMEN

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

UNIT – V: CYBER CRIME AGAINST WOMEN

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

REFERENCES:

1. Dr.M.Arumairaj et al., 1999, "Marching towards the Millenium ahead".
2. Thomas Anjugandam, 1999, "Grow Free Live Free" Salesian Publicaiton.
3. H.C PrettiNandhiniUpretti, jaipur 2000 "Women and problems of GenderDiscrimination".
4. Thomas B.Jayaseelan, 2002, "Women: Rights and law" Indian Social Institute, New Delhi.

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

Empowerment, Ed,"

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

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

OBJECTIVE:

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

UNIT – I: PURPOSE OF LIFE

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

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

UNIT – II: JUDGES AND KINGS

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

UNIT – III: WOMEN IN THE BIBLE

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

UNIT – IV: MINOR PROPHETS

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

UNIT – V: MAJOR PROPHETS:

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

REFERENCES:

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

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

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

OBJECTIVES:

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

UNIT – I: MISSION OF THE CHURCH

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

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

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

UNIT – III: THE FUNCTIONARY CHURCH AND I

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

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

UNIT – IV: SACRAMENTS AND SACRAMENTAL

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

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

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

REFERENCES:

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

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
B.Sc. (PHYSICS) SEMESTER V
MAJOR CORE – 7: ATOMIC AND MOLECULAR PHYSICS

HOURS/WEEK:5 **CODE: U15PH5MCT07**
CREDITS: 4 **MARKS:100**

Course objective: To understand the outgrowth of the atomic and molecular structure and the origin of their characteristic spectra.

UNIT I: PHOTOELECTRIC EFFECT AND X-RAYS

Photoelectric effect - Richardson and Compton experiment - Experimental investigation on the photoelectric effect - Laws of photoelectric emission - Einstein's photoelectric equation - Experimental verification - Millikan's experiment - Photoelectric cells - Applications of Photoelectric cells- X-rays - Properties of X-rays-Compton effect-experimental verification-X-ray spectra-continuous spectrum-characteristics spectrum-Moseley's law and its importance.

UNIT II: ATOM MODEL & ATOMOIC SPECTRA

Bohr and atom model –Vector atom model- Quantum numbers associated with vector atom model - coupling schemes- L-S coupling –J-J coupling - Electronic configuration of elements and periodic table - Pauli's exclusion principle- Magnetic dipole moment due to orbital and spin motion of the electron - Stern and Gerlach experiment – Optical spectra-Spectral terms and notations – selection rules- intensity rule and interval rule – Fine structure of sodium D lines.

UNIT III: FINE STRUCTURE OF SPECTRAL LINES

Zeeman effect - Experimental arrangement for the normal Zeeman effect- Classical theory of normal Zeeman effect –expression for the Zeeman shift- Larmor's theorem - Quantum mechanical explanation of the normal Zeeman effect - Anomalous Zeeman effect-Paschen –Back effect-stark effect-experimental study-results.

UNIT IV: LASER PHYSICS

Absorption and Emission - Spontaneous emission - Stimulated emission – Einstein coefficients - principle of laser-population inversion-pumping- pumping schemes - optical

resonator - The Ruby laser – Helium –neon laser - Semiconductor laser - Properties of laser beam – Holography- Applications of laser in Medicine and Industry.

UNIT V: MOLECULAR SPECTRA

Origin and nature of molecular spectra - different modes of molecular excitation- factors affecting line width- factors affecting intensity of molecular spectra-Born-Oppenheimer approximation-rotation of linear system- Theory of the pure rotational spectrum of a molecule- Energy of a diatomic molecule - Infra red spectra - Theory of the vibration - rotation spectrum of a molecule – electronic spectra of molecules.

BOOK FOR STUDY

1. R. Murugesan, Sivaprasath Murugesan, Modern Physics, S. Chand & Co Ltd., New Delhi, 14th Revised edition (2014).
2. J.B. Rajam, Atomic Physics, S. Chand & Co Ltd., New Delhi, Revised edition (2009).
3. G.Arul Dhas, Molecular structure and spectroscopy, PHI Learning private limited, 2nd Edition (2008).

BOOKS FOR REFERENCE

1. Sehgal, Chopra and Sehgal, Modern Physics, Sultan Chand & Sons, New Delhi.
2. C.L.Arora, Atomic and Molecular Physics, S.Chand &Co Ltd., New Delhi,I edition (1999).
3. S.N.Ghosal, Atomic Physics, S. Chand & Co Ltd., New Delhi, Revised edition (2004).
4. Kupta, Kumar, Sharma, Elements of spectroscopy, Pragati prakashan (2015).
5. Mathews, P M & Venkatesan, K, A text book of quantum mechanics, Tata McGraw-Hill publishing company Ltd., New Delhi, Seventeenth reprint 1992.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
B.Sc. (PHYSICS) - SEMESTER V
MAJOR CORE – 8: CLASSICAL AND QUANTUM MECHANICS

HOURS /WEEK: 5 **CODE: U15PH5MCT08**
CREDITS: 4 **MARKS: 100**

General Objective: To gain knowledge about fundamentals of classical and quantum mechanics and to appreciate the link between them.

UNIT I: INTRODUCTION TO CLASSICAL MECHANICS

Introduction- Conservation laws-Mechanics of a system of particles- Conservation of linear momentum,angular momentum and energy- Conservation theorem-Co-ordinate systems- Degrees of freedom - Constraints - Types of constrains – Examples of constraints - Difficulties introduced by the constraints and their removal.
Extra reading / Key words: *Coriolis, Spacecraft*

UNIT II: LAGRANGIAN FORMULATION

Generalized coordinates- Principle of virtual work - D'Alembert's principle - Lagrange's equation from D'Alembert's principle - Formation of Lagrange's equations- Applications of Lagrange's equation: simple pendulum - Atwood's machine - compound pendulum- Lagrange's equations in the presence of non-conservative forces.
Extra reading / Key words: *Dissipation function, Gauge function*

UNIT III: HAMILTONIAN FORMULATION

Generalized momentum - Cyclic co-ordinates - Hamiltonian function-Physical significance - Hamilton's equations - Applications of Hamilton's equation: Harmonic oscillator - Motion of a particle in a central force field -Hamilton's principle - Δ-variation - Principle of least action.
Extra reading / Key words: *Catenary, Geodesic*

UNIT IV: QUANTUM MECHANICS I

Limitations of classical mechanics - Introduction to Quantum mechanics -Wave particle duality - De Broglie waves - Davission and Germer's experiment - G.P.Thomson experiment - Group and phase velocities - Wave packets - Heisenberg's uncertainty principle- Illustration of uncertainty principle –Gamma ray microscope- Electron microscope – Diffraction of a beam of electron through a narrow slit-Application: Radius of the Bohr's first orbit- non- existence of the electron in the nucleus.

UNIT V: QUANTUM MECHANICS II

Postulates of wave mechanics - Operators - Properties of wave function - Derivation of time dependent and time independent one dimensional Schrodinger equation - Application of Schrodinger equation - Particle in a box - Barrier penetration problem - Linear harmonic oscillator - Hydrogen atom.

BOOKS FOR STUDY

1. J.C. Upadhyaya, Classical Mechanics, Himalaya publishing house, (2005),
2. Chatwal and Anand, Quantum mechanics, Himalaya Publishing House, (2012).

BOOKS FOR REFERENCE

1. Goldstein Herbert, Classical Mechanics- Narosa Publishing House,New Delhi (2001).
2. Gupta, Kumar and Sharma, Classical Mechanics,Pragati prakasan,Meerut (2003)
3. Sathya Prakash, Quantum Mechanics, S.Chand & Company,New Delhi (2001).
4. Aruldhas G., Quantum Mechanics, Prentice Hall of India Pvt., Ltd., New Delhi (2002).
5. Mathews, P M & Venkatesan, K, A text book of quantum mechanics, Tata McGraw-Hill publishing company Ltd., New Delhi, Seventeenth reprint 1992.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
B.Sc. (PHYSICS) SEMESTER – V
MAJOR CORE – 9: ELECTROMAGNETICS AND MATHEMATICAL PHYSICS

HOURS / WEEK: 5 **CODE: U15PH5MCT10**
CREDITS: 4 **MARKS:100**

Course Objective: To understand the basic principles of Electrostatics, Magneto statics and to be familiarized with special functions, vector calculus and matrix theory.

UNIT I: ELECTROSTATICS

Electric field – Continuous Charge Distribution – Gauss law – Differential Form – Poisson and Laplace equations –Applications: The field outside an isolated charged sphere, the field inside an uniformly charged sphere – Potentials with Dirichlet and Neumann boundary conditions – Electrostatic Boundary Conditions – Electrostatic potential – Method of separation of variables in Cartesian Co-ordinates – Uniqueness theorem – Laplace equation in rectangular co-ordinates – Solution of Laplace's equation in a rectangular box.

UNIT II: MAGNETOSTATICS

Magnetic field – Magnetic forces – Ampere's law of force - Biot-Savart law – Applications: Long straight wire, Circular Coil – Magnetic scalar and vector potential – Magnetostatic Boundary conditions – Multipole expansion of a current distribution – Magnetization – Magnetic susceptibility and permeability - Comparison between electrostatics and magnetostatics.

UNIT III: VECTOR CALCULUS

Scalar and Vector fields – Directional derivatives – Level Surfaces – The gradient of a scalar field – The divergence of vector point function – The curl or rotation of a vector point function – physical interpretation - Integration of a vector - The line integral – surface integral – volume integral – Gauss ' divergence theorem – physical interpretation of Gauss ' divergence theorem.

UNIT IV: SPECIAL FUNCTIONS

Gamma and Beta functions – Properties of Beta and Gamma functions – Relation between Beta and Gamma function – Bessel's differential equation – Power series solution – Generating function – Recurrence relations.

UNIT V: MATRIX THEORY

Real, symmetric and Hermitian matrices – Normal matrix – Triangular matrix– trace of a matrix – Orthogonal matrix –Unitary matrix – System of linear equations – Eigenvalue problems – Eigenvectors – Diagonalisation of matrix – Cayley - Hamilton theorem – Power and roots of a matrix.

BOOKS FOR STUDY

1. B. D. Gupta, Mathematical Physics, Vikas Publishing House Pvt. Limited (2006) (Unit III and IV).
2. A. W. Joshi, Matrices and Tensors in Physics, New Age International Publishers, 3rd Ed.(1995) (Unit-V).
3. K. K. Chopra, and G. C. Agarwal and, Electromagnetic Theory, 6th Edition, K. Nath & Co., Meerut (2003).

BOOKS FOR REFERENCE

1. H. K. Dass, Mathematical Physics, S. Chand & Co (1999).
2. B. S. Rajput, Mathematical Physics. Prakati Prakashan & Company, Meerut (2008).
3. Sathyaprakash, Mathematical Physics including Classical Mechanics, S.Chand & Company, New Delhi (1985).
4. B. B. Laud, Electromagnetics, 2nd edition, New Age International Publishers, New York (1987).
5. Gupta, Kumar and Singh, Electrodynamics -Pragati Prakashan, Meerut (2000).
6. David J.Griffiths, Introduction to Electrodynamics, Prentice Hall of India. 3rd Edition, New Delhi (2002).
7. J. D Jackson, Classical Electrodynamics, Wiley – Eastern Ltd, New Delhi (1999).
8. L.C Andrews, Special functions of Mathematics for Engineers, SPIE Press, 1992 Edition.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
B.Sc. (PHYSICS) SEMESTER - V
MAJOR CORE – 10: MAIN PRACTICAL III: ELECTRONICS PRACTICALS

HOURS/WEEK: 5 **CODE: U15PH5MCP12**
CREDITS: 4 **MARKS:100**

Course objective: To understand the basic role of various components in electronic circuits, to build the circuits such as amplifiers, oscillators, to study the basic digital circuits and to do simple programs in microprocessor.

Any Sixteen Experiments Only

1. Construction of a Voltage doubler
2. Construction and study of Half Wave rectifier with and without filter
3. Construction of a Single stage amplifier using transistor
4. Hartley Oscillator using transistor
5. Colpitt's Oscillator using transistor
6. Study of the characteristics of LDR
7. Op-Amp – Determination of the parameters – open loop gain, closed loop gain, input impedance and output impedance.
8. Study of the function of Op-Amp as Inverting and Non-inverting amplifier
9. Verification of Truth Tables of Logic gates- Study of IC chips
10. Verification of De Morgan's theorems
11. Study of NAND & NOR as Universal logic builders.
12. Study of Encoders and Decoders
13. Karnaugh Map – Simplification of Boolean expression
14. Half adder, Half Subtractor and Full adder circuits
15. Microprocessor – Programming for addition, Multiplication and Block transfer
16. Microprocessor – Programming for Subtraction and division

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2.
DEPARTMENT OF PHYSICS
B.Sc., (PHYSICS)
SEMESTER V: MAJOR ELECTIVE II
CIRCUIT AND NETWORK THEORY

CODE: U15PH5MET01

NO.OF HRS. /WEEK: 5 **NO.OF CREDITS: 5**

Course objective: To understand the basic ideas of circuits and networks and to prove the network theorem and apply them to solve the problems.

UNIT : I KIRCHOFF'S LAWS:

The circuit – resistance parameter – inductance parameter – capacitance parameter –energy sources (Independent sources only) – Kirchoff 's voltage law – voltage division - power in series circuit – Kirchoff's current law – parallel resistance – current division – power in parallel circuits.

UNIT II : METHODS OF ANALYSING RESISTIVE CIRCUITS:

Mesh analysis – Mesh equation by inspection method – super Mesh analysis – nodal analysis – Nodal equation by inspection method – super Node analysis – source transformation technique – Star-Delta transformation**.**

UNIT III: THEOREMS IN RESISTIVE CIRCUIT ANALYSIS:

Superposition theorem – Thevenin's theorem – Norton's theorem – reciprocity theorem –Compensation theorem – maximum power transfer theorem – duals and duality – Millman's theorem – dual Millman's theorem.

UNIT IV: ALTERNATING CURRENTS AND VOLTAGES:

The sine wave – angular relation of a sine wave – the sine wave equation – voltage and current values of A sine wave – phase relation in a pure resistor - phase relation in a pure capacitor – series circuits – parallel circuits – compound circuits.

UNIT V: STEADY STATE AC ANALYSIS:

Mesh analysis - Mesh equation by inspection– nodal analysis – Nodal equation by inspection– Superposition theorems – Thevenin's theorem – Norton's theorem – maximum power transfer theorem

BOOK FOR STUDY:

1. SUDHAKAR. A, SHYAM MOHAN S.P., - CIRCUIT AND NETWORKS-ANALYSIS AND SYNTHESIS, Tata McGraw Hill Publishing Company Limited, New Delhi.

BOOKS FOR REFERENCE:

1. PARANJOTHI S.R., Electrical circuit analysis , NEW AGE PUBLISHERS.

2. Dr. BOLTON A.G., Dr. JAIN L.C. , Prof. Mithal A.K. , Networks and systems, Khanna Publishers, New Delhi.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
B.Sc. (PHYSICS) SEMESTER V
MAJOR ELECTIVE 2: MICROPROCESSOR- INTEL 8085

HOURS/WEEK:5 **CODE: U15PH5MET02**
CREDITS: 5 **MARKS:100**

Course Objectives: To acquire basic knowledge of INTEL 8085, to write simple programs using the instruction set and to know some applications by interfacing.

UNIT I: ARCHITECTURE OF INTEL 8085

General architecture of microcomputer- Architecture of Intel 8085 – functions of individual blocks – registers in 8085 – pin configuration – functions of individual pins – opcode and operand – instruction cycle – fetch operation – execute operation – machine cycle and state – instruction and data flow.

UNIT II: INSTRUCTION SET OF INTEL 8085

Instruction word size - instruction and data formats – addressing modes– status flags – Data transfer group – arithmetic group – logical group – branch control group – stack, I/O and machine control group.

UNIT III: PROGRAMMING OF MICROPROCESSOR

Assembly language - subroutine - addition, subtraction of 8 bit numbers - sum of a series of eight bit numbers – comparing two 8 bit numbers - finding smallest/largest element of an integer array- sorting integers in ascending and descending order - multiplication and division of 8 bit numbers.

UNIT IV: INTERFACING

Address space partitioning – memory and I/O interfacing – data transfer scheme – interrupts of Intel 8085 – programmable peripheral interface –Architecture of Intel 8255 – operating modes – control word.

UNIT V: MICROPROCESSOR APPLICATIONS

Delay subroutine – Delay subroutine using one register, register pair, two registers - 7 segment LED display – display of decimal numbers 0 to 9 - display of alphanumeric characters – formation of codes for alpha numeric characters – multiple digit display-

microprocessor - based Traffic Control - to generate square wave using I / O port - to generate square wave using SOD line – water level indicator.

BOOKS FOR STUDY

1. Ram B. Fundamentals of microprocessors and microcomputer – Eighth Edition, Dhanapat Rai Publications (P) Ltd, New Delhi (2013).

BOOKS FOR REFERENCE:

1. Ramesh Gaonkar, Microprocessor: Architecture, Programming and Applications with 8085, Sixth Edition, Penram International Publishing (India) Pvt.**Ltd**. Mumbai (2013).

2. Nagoor Kani A., Microprocessors and Microcontrollers, First Edition, RBA Publications, Chennai (2006).

HOLY CROSS COLLEGE (AUTONOMUS), TIRUCHIRAPPALLI
DEPRTMENT OF PHYSICS
III UG - SEMESTER V
NON MAJOR ELECTIVE – 1: BASICS OF COMPUTER ELECTRONICS

HOURS / WEEK: 2 **CODE: U15PH5NMT01**
CREDITS: 2 **MARKS:50**

Course Objective: To understand the fundamentals and idea of the basic circuits used in computers.

UNIT I: BINARY NUMBER SYSTEM

Binary numbers - Binary-to-Decimal conversion – Decimal – to- Binary conversion –Binary addition – Binary subtraction – 1's complement and 2's complement methods.

Extra reading / Key words: *Octal numbers, Hexadecimal numbers*

UNIT II: LOGIC GATES

Introduction-Analog signal and Digital signal-Basic logic gates-Inverter – AND, OR, NAND, NOR, XOR gates – operation and truth tables.

UNIT: III BOOLEAN ALGEBRA

Boolean operations- Rules and laws of Boolean algebra – DeMorgan's Theorems – Verification using truth tables-NAND and NOR as Universal gates. - Algebric simplification of Boolean expressions.

UNIT IV: ARITHMETIC CIRCUITS

Half Adder – Full Adder – Half Subtractor – Implementation of Boolean expressions using gate network.

UNIT V: MEMORIES

Basic ideas of memory - Main memory and secondary memory – volatile and non volatile memory – program memory and Data memory –Semiconductor memories – RAM-ROM, PROM, EPROM AND EEPROM.

BOOKS FOR STUDY

1. Ram B. Fundamentals of microprocessors and microcomputer – Eighth Edition, Dhanapat Rai Publications (P) Ltd, New Delhi (2013).

2. Floyd, Digital Fundamentals, 8th Edition, Pearson Education, India.
3. Vijayendran V. Introduction to Integrated Electronics Digital And Analog, First Edition, S. Viswanathan (Printers & Publishers) Pvt., Ltd (2005).

BOOKS FOR REFERENCE:

1. Malvino. A and Leach, Digital Principles and Applications, 4th Edition, Mc-Graw Hill, New York.
2. Theraja B.L., Basic Electronics – Solid State- S. Chand and Company Limited, New Delhi,1st Edition (2005).

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
SKILL BASED ELECTIVE– PHYSICS FOR LIFE SCIENCES

CODE: U15PH3SBP03 (SBE3 - II B.Sc. Zoology) /
HOURS/ WEEK: 2 **U15PH5SBP04 (SBE4 - III B.Sc. Botany)**
CREDITS: 2 **MARKS: 50**

Course Objective: To apply the basic principles of physics by doing related experiments in Properties of Matter, Optics and Electronics.

PRACTICAL SYLLABUS

Any Ten Experiments Only

UNIT I:

1. Defects in eye and its rectification (Field visit)
2. Determination of the focal length of a convex lens
3. Determination of the focal length of a concave lens

UNIT II:

4. Determination of the Numerical Aperture measurement using LASER beam
5. Determination of the Thickness of a wire using Laser
6. Determination of the Thickness of thin wire using air wedge method
7. Determination of the Concentration of sugar in sugar solution using Saccharimeter

UNIT III:

8. Determine the surface tension of the liquid by Drop Weight method
9. Viscosity measurement by Burette method (low viscous liquids)
10. Viscosity measurement by Redwood viscometer(high viscous liquids)
11. Determination of the density of a liquid by Hare's apparatus.

UNIT IV:

12. Study the wave forms using CRO
13. Study the Lissajou's figures using CRO
14. Measurement the loudness of a voice using decibel meter
15. Ultra sonogram (Field visit)

UNIT V:

16. To grow Crystals in lab by the preparation of stock solution
17. To grow Crystals in lab using sol-gel method
18. To grow Crystals in lab using slow evaporation method
19. Study of the Crystal Properties (Calculi)
20. Material synthesis using hydrothermal method

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

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

OBJECTIVES:

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

UNIT – I: PERSONAL COMPETENCE

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

UNIT – II: MARRIAGE AND FAMILY

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

UNIT – III: MOTHERHOOD

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

UNIT – IV: PERSONALITY DEVELOPMENT

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

UNIT – V: CAREER CHOICE

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

REFERENCES:

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

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

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

OBJECTIVES:

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

UNIT – I: LITURGY

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

UNIT – II: HOLY SACRIFICE OF THE MASS

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

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

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

UNIT – IV: CHRISTIAN FAMILY

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

UNIT – V: CONSECRATED LIFE

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

REFERENCES:

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

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

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

Objective:

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

UNIT – I: ESSENTIALS OF CHRISTIAN FAITH

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

UNIT – II: MAARIAGE AND FAMILY LIFE

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

UNIT – III: CHRISTIAN HOME

- Parental Responsibilities and bringing up children – Abraham (Gen 22), Eli (I Sam 2: 24-36,3: 11- 18), Mary Mother of Jesus (Luke 2: 51,52
- Caring for the Aged (I Sam 2: 31,32)
- Entertainments (I Cor 10: 23)

UNIT – IV: CHRISTIAN ETHICS

- Holiness – Joseph (Gen 39:9)Levi 11: 45, Ecc 12
- Obedience to God - Abraham (Gen 12) ; St. Paul (Acts 9)
- Freedom and Accountability
- Justice and Love

- Choices in Life – Making Decisions(Studies, job, life Partner)• Model to follow – Who is your model? (John 15: 1-17)
- Social Evils – Dowry, Caste discrimination, Accumulation of wealth
- Freedom of Options, Time Management, Work Ethics (I Peter 2: 11-25)

UNIT – V: ROLE IN CHURCH AND SOCIETY

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

REFERENCES:

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

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
B.Sc., (PHYSICS) SEMESTER - VI MAJOR
CORE – 11: SOLID STATE PHYSICS

HOURS/WEEK:6 **CODE: U15PH6MCT13**
CREDITS: 5 **MARKS:100**

Course Objective: To understand the basic ideas of crystallography, nanomaterials, conductors, dielectric materials, magnetic materials and superconductors.

UNIT I: CRYSTALLOGRAPHY AND NANOMATERIALS

Ionic, covalent, metallic, Van der Waals and hydrogen bonds - properties - Crystal structure – crystal lattice – basis – unit cell – Bravais lattice – Miller indices – Calculation of number of atoms per unit cell – Atomic radius – Coordination number – Packing factor for SC, BCC and FCC structures – Bragg's law – X-ray study of crystal structure: Laue method – Powder crystal method.

Nanomaterials – Properties of nanomaterials – synthesis of nanomaterials: preparation methods – plasma arcing,chemical vapour deposition, electro deposition and ball milling methods (quantitative treatment) – Applications of CNT's.

UNIT II: CONDUCTORS

Conductors – Classical free electron theory of metals – Electrical and thermal conductivity – Wiedemann-Franz law – Draw backs of classical theory – Specific heat capacity of solids: Einstein's theory and Debye's theory of specific heat capacity of solids - Quantum theory – Fermi distribution function – Fermi energy- Effect of temperature on Fermi Function – Density of energy states – carrier concentration in metals.

UNIT III: DIELECTRIC MATERIALS

Definitions – electric polarization, polarization vector, electric displacement vector – dielectric constant and electric susceptibility – types of polarization – effect of frequency and temperature on polarization – Dielectric loss – local or internal field – Clausius – Mosotti equation – Spontaneous Polarization – Ferroelectricity – electrets (qualitative study only).

UNIT IV: MAGNETIC MATERIALS

Definitions – magnetic dipole – magnetic flux density – magnetic permeability – magnetic field strength – magnetic susceptibility –Types of magnetic materials - Classical Langevin Theory of diamagnetic and Paramagnetic Domains - Quantum Mechanical Treatment of Paramagnetism - Curie's law, Weiss's Theory of Ferromagnetism and Ferromagnetic Domains - Discussion of B-H Curve - Hysteresis and Energy Loss.

UNIT V: SUPERCONDUCTORS

Superconductors – Properties: Critical Temperature, Critical magnetic field, Persistent current, Meissner effect and Isotope effect - Type I and type II Superconductors (qualitative study only) - BCS theory: Cooper Pair - Coherence length – London's I & II equations – Applications of superconductors.

BOOKS FOR STUDY

1. Arumugam M., Materials Science. Anuradha Publishers (2010).
2. S.O.Pillai, Solid State Physics, New Age Publications, Edition 1997.
3. Saexena, Gupta Saexena,Fundamentals of Solid State Physics, Pragati Prakashan, Tenth Revised edition 2003.
4. M. Willson, K.K.M Smith and B.Raguse, Nanotechnology: Basic science and emerging technology, Overseas Press Edition(2005).

BOOKS FOR REFERENCE:

1. Phillips, Introduction to Crystallography, John Wiley publishers.
2. I. Timp, Gregory L Nanotechnology, AIP Press, Springer-Verlag New York 1999.
3. Senthilkumar G. Engineering Physics I - VRB Publishers (2011).
4. Senthilkumar G. Engineering Physics II - VRB Publishers (2011).

HOLY CROSS COLLEGE (AUTONOMUS), TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
B.Sc., (PHYSICS) SEMESTER -VI
MAJOR CORE – 12: NUCLEAR, PARTICLE AND ASTROPHYSICS

HOURS/WEEK:6 **CODE:U15PH6MCT14**
CREDITS: 5 **MARKS:100**

Course objective: To understand properties of nucleus, radioactivity, nuclear fission and fusion and basic introduction to elementary particles and astrophysics.

UNIT I: INTRODUCTION TO THE NUCLEUS

Classification of nuclei - isotopes, isobars, isotones - general properties of Nucleus – Binding energy – Nuclear stability – Models of Nuclear structure: The liquid drop model – Semi empirical mass formula – The Shell model.

UNIT II: RADIOACTIVITY

Natural radioactivity – properties of α, β and γ rays – range of the α- particle – Geiger – Nuttal Law – Alpha particle spectra – Fundamental laws of radioactivity: Soddy Fajan's displacement Law – Natural radioactive series – Laws of radioactive disintegration – The mean life – unit of radioactivity – Law of successive Disintegration – radioactive dating : The age of the earth.

UNIT III: NUCLEAR FISSION AND FUSION

Nuclear Fission – energy released in fission – Bohr and Wheeler's theory of nuclear fission – chain reaction – Atom bomb – Nuclear reactors – Nuclear fusion – Source of stellar energy – thermonuclear reactions – Hydrogen bomb – controlled thermonuclear reactions.

UNIT IV: PARTICLE PHYSICS

Classification of elementary particles – elementary particle quantum numbers – conservation laws and symmetry – The Quark model – Basic ideas of quantum chromo dynamics – Higg's boson, history of the Universe – the future of Universe – Dark matter.
Extra reading / Key words: *Standard model, Gravitational lensing*

UNIT V: ASTROPHYSICS

The objects in the sky: The microwave background radiation – The Stars – Neutron stars and Black holes – Supernovae – galaxies – The structure of Milky Way.

The solar system: Sun and planets – formation of the planets – comets – planets and satellites – Asteroids – Meteorites.

BOOKS FOR STUDY

1. Murugesan, Modern Physics, S. Chand and company Ltd., Ram Nagar, New Delhi,(2008).
2. Padmanabhan.T, Theoretical Astrophysics, Vols. 1-3, Cambridge University Press, (2005).
3. Cesare Emiliani, Planet Earth, Cambridge University Press, (1995).

BOOKS FOR REFERENCE:

1. Rao .B.V.N., Modern Physics, Wiley Eastern Ltd., New Delhi (1993).
2. Aruldas.G and Rajagopal, Modern Physics, PHI, New Delhi, 2005.
3. Rajam. J.B., Modern Physics, S.Chand & Co. Pvt. Ltd, New Delhi (1972).
4. Tayal. D.C., Nuclear Physics, Himalaya publishing House, 4^{th} edition.
5. Beiser.A, Concepts of Modern Physics, Tata McGraw-Hill Ltd., New Delhi, 6^{th} edition.
6. Abhayankar K.D., Astrophysics, Cambridge University Press, 2001.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
B.Sc., (PHYSICS) SEMESTER - VI
MAJOR CORE – 13: MAIN PRACTICAL IV-A: ELECTRONICS AND MICROPROCESSOR PRACTICALS

HOURS/WEEK: 6 **CODE: U15PH6MCP16**
CREDITS: 5 **MARKS:100**

Course objective: To understand the basic role of various components in electronic circuits, to build the circuits such as amplifiers, oscillators, to study the basic digital circuits and to do simple programs in microprocessor.

Any Sixteen Experiments Only

1. Construction of Full Wave Rectifier with two diodes- with and without filter.
2. Construction of Bridge Rectifier using diodes.
3. Construction of Emitter Follower using Transistor.
4. Construction of summing and Difference Amplifier using OP-AMP
5. Construction of Differentiator and Integrator using OP-AMP.
6. Study of R-S and J-K Flip Flops.
7. Study the functions of Shift Registers.
8. Construction of Modulus Counters using IC 7490 and Verify its Truth Tables.
9. Microprocessor INTEL 8085 – Programming to find the Sum of Series of 8 – bit numbers.
10. Study of Multiplexer and Demultiplexer using ICs.
11. Study of Up, Down and Ring Counters.
12. Construction of IC Regulated Power Supply.
13. Microprocessor INTEL 8085 – Programming for identifying the biggest and smallest number from a series.
14. Microprocessor INTEL 8085 – Programming for Arranging the numbers in Ascending and descending orders.
15. Microprocessor INTEL 8085 – Programming for Seven Segment Display.
16. Op- Amp Waveform generator – sine waveform.
17. Op- Amp Waveform generator – square waveform.
18. D/A converter, Binary weighted resistor method.
19. Construction of Synchronous counters using excitation table.
20. Binary to Gray and Gray to binary code conversion and parity checker using EXOR gates.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
B.Sc., (PHYSICS) SEMESTER - VI
MAJOR ELECTIVE-3: COMMUNICATION PHYSICS HOURS/WEEK:5
CODE: U15PH6MET04

CREDITS: 5 **MARKS:100**

Course objective: To understand the basic ideas of Radio, Microwave, Satellite, Fiber optic and digital communication systems.

UNIT I: RADIO COMMUNICATION SYSTEM

Modulation - Types of modulation - Analysis of amplitude modulated wave - carrier suppression -SSB transmission - advantages and disadvantages - generation of SSB signals - Filter method - FM modulation - FM station - Diode detector - receiver - super heterodyne receiver.

UNIT II: MICROWAVE COMMUNICATION

Introduction - Generation of microwaves - Klystron oscillator - Television picture tube - image orthicon - scanning - synchronization - T.V. Transmission - T.V. reception - Principle of a colour TV - PAL colour receiver - Television screens - CRT and LCD - fundamentals of RADAR - RADAR equation - Automatic Tracking RADAR - Applications of RADAR.

UNIT III: SATELLITE COMMUNICATION

Introduction - Kepler's I, II, III laws - orbits -satellite launching - station keeping - satellite attitude - power systems - transmission path - path loss - Satellite earth station - satellite station –satellite navigational system- GSM- GPS- DTH- Indian satellites.
Extra reading / Key words: *Mangalyan, Artificial satellite*

UNIT IV: FIBER OPTIC COMMUNICATION

Optical fiber - advantages - Total internal reflection - propagation of light waves in optical fiber - acceptance angle - numerical aperture –Types of fibers - basics of fiber optic system- light sources for fiber optics - LASER diode - light detectors - avalanche photo diode - losses in fiber -Applications in telecommunication.

UNIT V: DIGITAL COMMUNICATION SYSTEMS

Introduction- Layered view of digital communication- Pulse Amplitude Modulation - Pulse Width Modulation - Pulse Position Modulation - Time Division Multiplexing -

Frequency Division Multiplexing - Wireless communication systems - Cell phone - Internet - GPRS - Bluetooth.

BOOKS FOR STUDY

1. Ambrose A and Vincent Devaraj. T, Introduction to Electronics, GaungalMera,5th Edition (1992).
2. Dennis Roddy and John Coolen , Electronic Communication , 3rd Edition, Prentice Hall of India.
3. Robert J. Schoenbeck, Electronic communications, 2ndEdition, Prentice Hall of India Private Limited, New Delhi (1999).

BOOKS FOR REFERENCE

1. Deshpande N.D.,Deshpande D. A., and Rangole P.K., Communication Electronics, Fifteenth reprint, Tata McGraw Hill Publishing Company Limited, New Delhi (2001).
2. Kennedy, Electronic Communication systems, 4thEdition, Tata McGraw Hill publishing co., Ltd., New Delhi (2002).
3. Kumar R., Communication systems, Anuradha agencies, Educational publishers, Kumbakonam (2000).
4. Anokhsingh, Principles of communication engineering, S. Chand & Co, New Delhi.
5. B.B Laud, Lasers and Non-linear Optics, 2 nd Edition ,Wiley, 1991

HOLY CROSS COLLEGE (AUTONOMUS) TIRUCHIRAPPALLI-620002
DEPARTMENT OF PHYSICS
B.Sc., (PHYSICS)
SEMESTER VI: MAJOR ELECTIVE- III
APPLIED ELECTRONICS

CODE: U15PH6MET05

NO.OF HRS/WEEK. : 5 **NO.OF CREDITS: 5**

Course objective: To understand the basic ideas of fabrication, power electronic devices, optoelectronic devices, special diodes and MOSFETs.

UNIT: I INTEGRATED CIRCUIT FABRICATION:

Basic monolithic integrated circuits – epitaxial growth – masking and etching – Diffusion of impurities – Integrated Resistors – Capacitors and Inductors – Large scale and medium scale integration – Fabrication of printed circuit board – Kodak Photo resist method – developing and etching processes.

UNIT: II : POWER ELETRONICS:

Unijunction transistor – UJT relaxation oscillators – Silicon controlled rectifier – SCR Half wave rectifier – SCR full wave rectifier – Phase control of SCR – 90 Phase control of SCR – 180 phase control of SCR controlled circuit – DIAC – TRIAC – Silicon controlled switch.

UNIT: III : OPTO ELECTRONIC DEVICES :

Introduction – spectral response of human eye – Light emitting diode (LED) Photo emissive devices – Photo multiplier tube – Photo transistors – Photo voltaic devices – Bulk type photoconductive cells – Photo diodes – PN junction photo diode – PIN photodiode – Avalanche photo diode.

UNIT: IV : SPECIAL DIODES AND DISPLAYS :

Tunneling effect – Tunnel diode – Tunnel diode oscillators – Varactor diode – Schottky diode – Step recovery diode – Thermistors – Gunn effect – Gunn diode – Seven Segment display – Nixie tube – Decimal Decoders – Diode matrix.- Dot matrix

UNIT: V : MOSFET :

Introduction – Depletion type MOSFET – working of a depletion type MOSFET – Drain characteristic of Depletion type MOSFET – Transfer characteristic of depletion type MOSFET – Circuit symbol for depletion type MOSFET – Enhancement type MOSFET – Drain characteristics for Enhancement type MOSFET – Transfer characteristic for Enhancement type MOSFET – Circuit symbol for Enhancement type MOSFET – The MOSFET as a resistor – Advantages of N channel MOSFET over P Channel.

BOOKS FOR STUDY:

1. Microelectronics by Jacob Millman – Tata McGraw Hill Edition (Unit I)

2. Basic Electronics By B.L. Thereja (Units II, III & IV)

3. Applied Electronics by Sedha (Unit V)

BOOKS FOR REFERENCE:

1. Principles of Electronics by V.K. Mehta.

2. Electrical and Electronic Measurement and Instrumentation by A.K. Sawhney, Dhanpat Rai and Sons.

HOLY CROSS COLLEGE (AUTONOMUS), TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
III UG - SEMESTER VI NON
MAJOR ELECTIVE - 2
BASICS OF MODERN COMMUNICATION SYSTEMS

HOURS/WEEK: 2 **CODE: U15PH6NMT02**
CREDITS: 2 **MARKS:50**

Course Objective: To understand the basic ideas of radio communication, satellite communication, fiber optic, mobile communication and internet.

.

UNIT I: RADIO COMMUNICATION

Transmitter – Modulation – Propagation of waves – Surface, space and sky waves - Amplitude modulation – Frequency modulation – Phase modulation – Receivers – Superhetrodyne.

UNIT II: SATELLITE COMMUNICATION

Introduction – Classification of satellites - Satellite orbit – Satellite Launching - Application of satellite – Navigation and Weather.

UNIT III: FIBER OPTIC COMMUNICATION SYSTEM

Introduction – Total internal reflection in optical fiber - Principles of light transmission in a fiber – Numerical aperture – Fiber optic communication link (Block diagram) - Advantages of optic fibers.

UNIT IV: MOBILE COMMUNICATION

Cellular Phone : Basics and signal transmission – GSM - Mobile service – Wifi – 3G & 4G- Bluetooth (Basic idea).

UNIT V: INTERNET

INTERNET (Basic ideas)- Search engines - E-MAIL (Basic ideas) – Blogs – Twitter – Whatsapp – Facebook.

BOOKS FOR STUDY

Course Material prepared by staff.

BOOKS FOR REFERENCE

1. Dennis Roddy & John Coolen-Electronic Communication, 3rd Edn, Prentice Hall Of India.
2. Kumar. R Communication systems, Anuradha Agencies, Educational publishers, Kumbakonam (2000).

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
B.Sc., (PHYSICS) SEMESTER – VI
SKILL BASED ELECTIVE – 5: TROUBLE SHOOTING AND MAINTENANCE OF ELECTRONIC EQUIPMENTS

HOURS/WEEK:2 **CODE: U15PH6SBT05**
CREDITS: 2 **MARKS:50**

Course Objective: To understand the fundamentals of trouble shooting and maintenance of various electronic equipments and also to gain practical knowledge to rectify the problem.

UNIT I – FUNCTIONAL ASPECTS OF ELECTRONIC EQUIPMENT

Reliability aspects – Equipment failures – Causes of Failures – Reliability predictions – Maintenance policy – Process of Trouble Shooting – Manual and its importance.

UNIT II – TROUBLE SHOOTING PROCEDURES

Testing instruments– Multimeter – Oscilloscope - Systematic Trouble Shooting Checks – Corrective Action – Preventive Maintenance.

UNIT III – PASSIVE COMPONENTS

Resistors – Types – Identification Marking in Resistors - Failures in Fixed Resistors – Capacitor – Types– Identification Marking in Capacitors - Failures in Fixed Capacitors.

UNIT IV – SEMICONDUCTOR DEVICES

Types of Semi Conductors Devices – Causes of Failures in Semi Conductors Devices – PN Junction Diodes – Zener Diodes – LED.

Bipolar Transistor – Symbols and Terminals – Field Effect Transistor.

UNIT V – TESTING OF PASSIVE AND ACTIVE COMPONENTS

Testing of Resistors – Capacitors – Inductors – Diodes – Transistors – FET.

BOOKS FOR STUDY

1. R.S. Khandpur, Modern electronic Equipment, Tata McGraw Hill Publishing Company Ltd.

BOOK FOR REFERENCE:

1. Millmann J. Halkias, Electronic Circuits and Devices, Printice Hall India,New Delhi.

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI -2
DEPARTMENT OF PHYSICS B.Sc.
(PHYSICS) SEMESTER – VI
SKILL BASED ELECTIVE – 6: RESEARCH METHODOLOGY

HOURS /WEEK: 2 **CODE:U15DS6SBT06**
CREDITS: 2 **MARKS:50**

Course Objective: : To help the learner develop research skills. To expose the learner to the concept of research and to implement a research project.

UNIT I: INTRODUCTION TO RESEARCH

Definition, type, nature and scope of research - Research design

UNIT II: DATA COLLECTION

Types – Primary and secondary data – Data Processing – Hypothesis testing

UNIT III: PLAN AND EXECUTION

Methodology – plan and execution – Analysis - Documentation

UNIT IV: FORMAT AND PRESENTATION OF PROJECT REPORT

Art of writing and Structure of a project report – Viva - voce

UNIT V: PROJECT

Project Work

BOOKS FOR REFERENCE:

1.Kothari C.R. Research Methodology, New Delhi: New Age International (P) Ltd Publishers (2009).

1. Rahim F.A.Thesis Writing: A Manual for researchers, New Delhi: New Age International Publishers (1988).
3. Gopalana., Thesis Writing, Chennai: Vijay Nicole, (2005).
4. Oliver, Paul, Writing Your Thesis. New Delhi: Sage Publication (2008).

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

HRS / WK :1

CODE:U12VE6LVC03
CREDIT :1
MARKS : 100

OBJECTIVES:

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

UNIT – I: LITURGY

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

UNIT – II: HOLY SACRIFICE OF THE MASS

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

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

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

UNIT – IV: CHRISTIAN FAMILY

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

UNIT – V: CONSECRATED LIFE

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

REFERENCES:

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

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

HRS / Wk :1

CODE: U13VE6LVE03
CREDIT :1
MARKS : 100

OBJECTIVES:

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

UNIT – I: PERSONAL COMPETENCE

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

UNIT – II: MARRIAGE AND FAMILY

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

UNIT – III: MOTHERHOOD

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

UNIT – IV: PERSONALITY DEVELOPMENT

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

UNIT – V: CAREER CHOICE

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

REFERENCES:

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

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

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

Objective:

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

UNIT – I: ESSENTIALS OF CHRISTIAN FAITH

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

UNIT – II: MAARIAGE AND FAMILY LIFE

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

UNIT – III: CHRISTIAN HOME

- Parental Responsibilities and bringing up children – Abraham (Gen 22),
- 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.