DEPARTMENT OF PHYSICS

UG SYLLABUS

SHIFT – II

B.Sc Physics with Specialization in Electronics

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS – CBCS -UG COURSE PATTERN
B.Sc Physics With Specialization In Electronics (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 U16FR1FRE01	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	U16PH1ACT01	4	4	100
	III	Allied Physics–II (for Chemistry)	Basic Physics Practicals I	U16PH1ACP02	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 U16FR2FRE02	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	U16PH2MCP03	4	3	100
	III	Allied Physics – III(for hemistry)	Basic Physics–2	U16PH2ACT03	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 U16FR3FRE03	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(for Maths)	Properties of matter,Heat and Modern Physics	U15PH3AOT01	4	3	100
	IV	Skill Based Elective-3	House wiring	U15PH3SBT03	2	2	100

		Gender Studies	Gender Studies	U15WS3GST01	1	1	100
	IV	Value Education	Ethics/Bible studies/Catechism	U15VE2LVE01/ U15VE2LVB01/ U15VE2LVC01	1	--	-

Sem	Part		Subject	Code	Hrs	Credit	Marks
IV	I	Language – 4	Tamil paper –IV Hindi Paper IV/ French Paper IV	U15TL4TAM04 U15HN4HIN04 U16FR4FRE04	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-1	Digital Electronics/ Energy Physics	U15PH4MET01/ U15PH4MET02	5	5	100
	III	Allied Physics Optional Paper- 2 (For Maths) Allied Physics Optional Paper- 4 (For Computer Science)	Optics, Electricity and Electronics Basics of Electronics	U15PH4AOT02 U15PH4AOT04	4	4	100
	III	Allied Physics Optional Paper-3 (for Maths) Allied Physics Optional Paper- 5 (For Computer Science)	Basic Physics Practicals-II Electronics Practicals	U15PH4AOP03 U15PH4AOP05	4	3	100
	IV	Value Education	Ethics/Bible studies/ Catechism	U15VE4LVE02/ U15VE4LVB02/ U15VE4LVC02	1	1	100
V	III	Major core-7	Atomic and Molecular physics	U15PH5MCT07	5	4	100
	III	Major core – 8	Circuit and Network Analysis	U15PH5MCT09	5	4	100
	III	Major core - 9	Mathematical Physics, Classical and Quantum Mechanics	U15PH5MCT11	5	4	100
	III	Major core 10	Main Practical III: Electronics Practicals	U15PH5MCP12	5	4	100
	III	Major Elective- 2	Microprocessor INTEL 8085/ Microprocessor and its Applications	U15PH5MET02/ U15PH5MET03	5	5	100
	IV	Non Major Elective – 1	Basics of Computer Electronics	U15PH5NMT01	2	2	100
	IV	Skill Based Elective -4	Printed Circuit Techniques	U15PH6SBT04	2	2	100
	IV	Value Education	Ethics/Biblestudies/ Catechism	U15VE6LVE03/ U15VE6LVB03/ U15VE6LVC03	1	--	

VI	III	Major Core-11	Solid State Physics	U15PH6MCT13	6	5	100
	III	Major core -12	Communication Electronics	U15PH6MCT15	6	5	100
	III	Major core –13	Main Practical IV- B : Special Electronics and Microprocessor practicals	U15PH6MCP17	6	5	100
	III	Major Elective- 3	Instrumentation / 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	U15PH5SBT05	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**

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

DEPARTMENT OF FRENCH

SYLLABUS

SEMESTER I

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

(For candidates admitted 2016 onwards)

HRS/WEEK : 6 **CODE : U16FR1FRE01**
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, 2013.

(for candidates admitted from June 2017 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2.

I YEAR UG – SEMESTER I

PART II – ENGLISH 1 - GENERAL ENGLISH I

HOURS : 6 **CODE : U15EL1GEN01**

CREDIT : 3 **MARKS: 100**

OBJECTIVES

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

UNIT I - I, ME, MYSELF

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

TEXTS

This is the Photograph of me by Margaret Atwood - Poem **(Internal Testing)**
1. *The Mayonnaise Jar*
2. *In Prison* by Jawaharlal Nehru (edited)
3. An extract from Shakespeare's *Othello* Act V Scene II

UNIT II -MY FAMILY AND FRIENDS

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

TEXTS

Night of the Scorpion by Nissim Ezekiel - Poem **(Internal Testing)**
1. *The Old Folks at Home* by Alphonse Daudet (edited)
2. *Will you, Daddy?* (Story from Reader's Digest)
3. An extract from Shakespeare's *King Lear Act I Scene I*

UNIT III -THE WORLD AROUND ME

Listening To identify specific information
Speaking –Discussing and expressing opinions
Reading To infer meaning
Writing Descriptive and Diary writing

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

TEXTS
Snake by D.H. Lawrence – Poem **(Internal Testing)**
1. *Floating Fantasy* by Vinu Abraham (Prose)
2. *Discovery by Herman Ould* (Play)
3. *A Handful of Dates* by Tayeb Salih (Short story)

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

TEXTS
I have a Dream by Martin Luther King Jr - **(Internal Testing)**
1. *What I have lived for?* by Bernard Russell
2. *Three days to see* by Helen Keller(edited)
3. An extract from Shakespeare's *The Merchant of Venice Act IV Scene I*

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

TEXTS
Profile of a successful personality **(Internal Testing)**
1. Extract from a profile and an Interview of Indra Krishnamoorthy Nooyi
2. *The Verger* by Somerset Maugham
3. Profile of Bill Gates

PRESCRIBED BOOK:
English for Communication –PoGo publication Trichy

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, Theoryof 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: U16PH1ACT01**
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).

1. Brijlal and Subramaniam, Text Book of Optics, S. Chand & Co, New Delhi (1998).

2. Brijlal and Subramaniam & Jivan Seshan, Mechanics and Electrodynamics, Eurasia publishing house(pvt) Ltd,Ram nagar, New Delhi,(2005).

3. 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: U16PH1ACP02**

CREDITS: 3 **MARKS: 100**

Course Objective: To understand the basics of Properties of matter, Optics, Electricity andElectronics 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.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI
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 chains and food web–causes and effects of weakening food chains

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

Unit III–Environmental Pollution

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

Unit IV–Human population and Environment

Population growth at national and global level.

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

Environmental pollutions and diseases-malaria- chikungunya

Unit V–Environment and Social Issues Rich–

poor wide–at national and global levels

Urbanization –slums

Changing value systems–AIDS Family welfare programs

REFERENCES:

Agarwal,K.C.(2001). Environmental Biology, Nidi Publication Ltd. Bikaner.

Chairas,D.D.(1985).Environmental Science. The Benjamin Cummings Publishing company.,Inc.

Clarke George,L. (1954). Elements of Ecology. Hohn Wiley and SONS, Inc.

Hodges,L. (1977). Environmental Pollution, II Edition. Holt, Rinehart and Winston, New York. Krebs,C.J

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:1செய்யுள்

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

அலகு:2செய்யுள்

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, Meritheertha yatra

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

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

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

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

Books Prescribed :

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

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 2

DEPARTMENT OF FRENCH

SYLLABUS

SEMESTER II

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

(For candidates admitted 2016 onwards)

HRS/WEEK : 5 **CODE : U16FR2FRE02**
CREDIT : 3 **MARKS : 100**

Unit 1 Quelle journée !

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

Unit 2 Qu'on est bien ici !

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

Unit 3 Souvenez-vous ?

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

Unit 4 On s'appelle ?

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

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

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

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

TEXT BOOKS :

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

(for candidates admitted from June 2017 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2.

I YEAR UG – SEMESTER II

PART II – ENGLISH 2 - GENERAL ENGLISH II

HOURS : 6 **CODE : U15EL2GEN02**

CREDIT : 3 **MARKS: 100**

OBJECTIVES

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

UNIT I – SELF

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

TEXTS

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

UNIT II – STRENGTHS

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

TEXTS

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

UNIT III - POSITIVE SHORTCOMINGS

Listening - Listening to facts and opinions and trying to differentiate it
Speaking - Pair Work – about have's & have not's, understanding the strengths and overcoming the weaknesses
Reading - Reading newspapers, articles, magazines, anecdotes for global and specific in

analytical thinking
Writing - Filing Complaints, Travelogues
Grammar - Tenses, Direct and Indirect Speech
Vocabulary - Compound words
Composition - Dialogue Writing
General essay – Adversity is the seed of success.

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

UNIT IV POTENTIALS

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

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

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

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

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: **CODE:U16PH2MCP03**
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: U16PH2ACT03**
CREDITS: 3 **MARKS: 100**

Course Objective: To understand the basics of Electricity, electromagnetism, analog anddigital 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(Quantitative study only) - Explanation of 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

Hrs – 2/Week

CODE: U15RE2SBT01

CREDITS -2

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

REFERENCES:

Alex K.(2012)Soft Skills–Know Yourself & Know the World, S. Chand &Company Ltd., New 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 Reddy B.(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,DEGREEEXAMINATION

SEMESTER II

SBE- 2 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-amirtha karaisal, 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:

- Packages of organic practices from Tamil Nadu Center for Indian Knowledge System(CIKS)

.2.www.fao.org.in

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

HRS / Wk : 1

CODE: U15VE2LVC01
CREDIT : 1
MARKS : 100

OBJECTIVES:

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

UNIT – I: CREATION AND COVENANT

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

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

UNIT – II: GOD OF THE PROPHETS

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

UNIT – III: GOD OF WISDOM

God experience through wisdom Literature, its origin and growth

UNIT – IV: SYNOPTIC GOSPELS

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

UNIT – V: LUKE'S GOSPEL

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

REFERENCES:

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

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

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

OBJECTIVES:

- To understand and appreciate other Religions and Culture
- To learn from other Religions and Culture
- To interact with all 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 – Faith, Religion, Definition, Nature, Characteristics and Basic values of different religions. Impact of Globalization on religion – Importance of worship in holy places – celebration, Communion (come-union) – Socialization

UNIT – II: DIFFERENT RELIGIONS

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

UNIT – III: UNITY OF RELIGION

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

UNIT – IV: FUNDAMENTALISM, COMMUNALISM AND SECULARISM

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

UNIT – V: VALUE SYSTEMS

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

REFERENCES:

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

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

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

OBJECTIVE:

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

UNIT – I: BIBLE – THE WORD OF GOD

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

UNIT – II: MINISTRY OF JESUS

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

UNIT – III: CHURCH – BIRTH AND GROWTH

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

UNIT – IV: DISCIPLES AND APOSTLES

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

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

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

REFERENCES:

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

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

TAMIL DEPARTMENT

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 2015 onwards)

HRS/WEEK : 6 **CODE : U16FR3FRE03**
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 – l'économie en France - le travail en dix points

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 région 'Poitou- Charentes' - la vie politique

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, 2013.

(for candidates admitted from June 2016 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2.

II YEAR UG – SEMESTER III

PART II – ENGLISH 3 - GENERAL ENGLISH III

HOURS : 6 **CODE : U15EL3GEN03**

CREDIT : 3 **MARKS: 100**

GROWING WITH VALUES

Objectives:

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

UNIT I – Love, Faith and Hope

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

TEXTS

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

UNIT II – Perseverance

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

TEXTS

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

UNIT III – Tolerance/Benevolence/Compassion

Listening- for developing / relating (speech)
Speaking- simulate any personality related to humanity

Reading – scan the passage (life of …) and write down key phrases to sum up [figurative languages]
Writing- case study / letter writing (personal)
Grammar –writing reports of events and processes (voices)
Vocabulary – Suffixes, idioms and phrases
Composition – imaginative writing

TEXTS:

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

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

UNIT IV – Essential Life Skills/ Resilience

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

TEXTS:

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

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

UNIT V – The Art of Living

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

TEXTS:

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

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

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,11th 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 relevanttheories 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. Murugeshan R and Kiruthiga Sivaprasath(2012). Properties of matter and Acoustics (2^{nd} ed.). New Delhi: S. Chand & company Ltd.
2. Murughesan , Mechanics , (2006)S. Chand ,New Delhi
3. Brijlal and Subramaniam,Heat and Thermodynamics S. Chand & Company Ltd, New Delhi(2002)
4. Murughesan , Modern Physics , (2006)S. Chand ,New Delhi
5. Brijlal and Subramaniam(1993). Text Book of Heat . Vikas Publishing House Pvt Ltd

BOOKS FOR REFERENCE:

1. J.B Rajam ,Atomic Physics, S.Chand & Co.,
2. Halliday**,** Resnick**,**Walker **:** Fundamentals of Physics, 8th Edition , Wiley India Pvt. Ltd., (2008)
3. D.S.Mathur , Mechanics,1998,Thirteen edition, S.Chand & Co.,

HOLY CROSS COLLEGE (AUTONOMUS) TIRUCHIRAPPALLI-620002 DEPARTMENT OF PHYSICS
B.Sc. PHYSICS WITH SPECIALIZATION IN ELECTRONICS
SEMESTER III: SKILL BASED ELECTIVE- 3: HOUSE WIRING

HOURS/WEEK: 2 **CODE: U15PH3SBT03**
CREDITS: 2 **MARKS:100**

Course objective: To acquire knowledge about tools, equipment and Instruments requiredfor different types of wiring systems & testing.

UNIT - I: POWER GENERATION

Sources of Electrical Energy-conventional-non conventional energy sources - Methods and Generation of Electrical power: Working of Hydal, Thermal and Nuclear power stations – Solar Inverters.

UNIT - 1I: TRANSFORMER AND POWER DISTRIBUTION

Transformer: Definition, Principle and Construction - Step up and step down transformers - Losses and efficiency of transformer - Uses of Transformer - Transmission of power from generating station to receiving stations - Single Phase and Three Phase House Distribution Systems.

UNIT - III: TOOLS AND MATERIALS

Tools: Nose Plier, Cutting Pliers, Screw Driver, Hack Screw, Firmer Chistel, Drill, Gimlet, Tester, Megger Tester – Insulators: Porcelain, Ebonite, Glass, Mica, Rubber, Silk, Paper, Bakelite - Conductors: Umpire Cloth, Aluminum, Copper, Eureka, Nichrome, Tungsten - Properties Of Insulated Materials.

UNIT - IV: WIRES AND WIRING

Types of Wires - Types of house wiring: Cleat wiring, CTS/TRS/Batten wiring, Conduit wiring, Casing capping wiring, Lead wiring – Comparison between different wiring methods -Tree system – Distribution system– I.E. Rules regarding house wiring.

UNIT - V: WIRING ACCESSORIES AND SAFETY PRECAUTIONS

Types of Switches: Single Pole, Single Pole Two Way, Two Pole One Way, Two Pole Two Way, Push Button – Main Switches – Sockets, Plugs, Ceiling Rose, Lamp Holders, Choke.

Earthing - Types of Earthing: Pipe earthing, Strip earthing and plate earthing – Lightening Arresters - Safety rules: Electrical maintenance rules and Precautions.

BOOKS FOR REFERENCE:

1. R. K. Rajput, A Textbook of Electrical Engineering, Laxmi Publication, New Delhi, Second Revised Edition(2004)..
2. Principles of Electrical Engineering - Anwani

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
B.A./B.Sc./ B.Com./ B.C.A./B.B.A DEGREE COURSE
a. 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-GenderDiscrimination-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–GenderStudies :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'sDecade – 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 forWomen (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 - 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 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-620002

DEPARTMENT OF HINDI

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

HINDI PAPER-IV FUNCTIONAL HINDI & TRANSLATION

SEMESTER – IV

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

CREDITS : 3 **MARKS : 100**

UNIT – I Functional Hindi

UNIT- II Adhunic Kaal

UNIT- III General Essays

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

UNIT- IV Letter Writing

UNIT- V Anuvad Abhyas - III

Books Prescribed :

- 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 2015 onwards)

HRS/WEEK : 5 **CODE : U16FR4FRE04**

CREDIT : 3 **MARKS : 100**

Unit 1 C'est la fête !

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

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.

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.

TEXT BOOKS :

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

(for candidates admitted from June 2016 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2.

II YEAR UG – SEMESTER IV

PART II – ENGLISH 4 - GENERAL ENGLISH IV

HOURS : 6 **CODE : U15EL4GEN04**

CREDIT : 3 **MARKS: 100**

EMPLOYABILITY SKILLS

OBJECTIVES:

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

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

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

TEXTS

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

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

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

TEXTS

1. Our urgent need for self-esteem by Nathaniel Brandon.
2. Five senses by Judith Wright

3. Three questions by Leo Tolstoy

UNIT III – Team skills

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

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

UNIT IV – Communication skills for interpersonal relationship

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

TEXTS
1.The Refund by Fritz Karinthy

UNIT V –Presentation skills

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

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

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALI
DEPARTMENT OF PHYSICS
B.Sc., (PHYSICS) SEMESTER – IV
MAJOR CORE: 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, 16 th 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 andsequential 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

HOURS/WEEK: 5 **CODE: U15PH4MET02**
CREDITS: 5 **MARKS: 100**

Course Objective: To make the students to understand the present day crisis of need forconserving 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 2
BASIC PHYSICS PRACTICALS-II

HOURS/WEEK: 4 **CODE: U15PH4AOP02**
CREDITS: 3 **MARKS: 100**

Course Objective: To understand and apply the principles of physics by doing relatedexperiments 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), TIRUCHIRAPPALI
DEPARTMENT OF PHYSICS
SEMESTER - IV: ALLIED PHYSICS OPTIONAL PAPER - 3
OPTICS, ELECTRICITY AND ELECTRONICS

HOURS/WEEK: 4 **CODE: U15PH4AOT03**
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
DEPARTMENT OF PHYSICS
SEMESTER – IV: ALLIED PHYSICS OPTIONAL PAPER - 4
BASICS OF ELECTRONICS
(For computer science students)

HOURS / WEEK: 4 **CODE: U15PH4AOT04**

CREDITS: 4 **MARKS : 100**

Course objective: To understand the characteristics and functions of various electronicelements such as diode, transistor and operational amplifier and the basic principles of digital electronics and microprocessor.

UNIT I: SEMICONDUCTOR ELECTRONICS

Semiconductors – P type and N type semiconductors – PN Junction diode – Biasing of PN junction – Volt – Ampere characteristics of diode – Zener diode - Characteristics of Zener diode – Zener diode as a voltage regulator - Bipolar junction transistor – Basic configurations – Characteristics of transistor in CE mode.

UNIT II: OPERATIONAL AMPLIFIER

Differential amplifier – Common mode and Differential mode signals – CMRR - Characteristics of an ideal op-amp - Virtual ground – Inverting amplifier – Non Inverting amplifier –Applications: Adder, Subtractor, Integrator and Differentiator.

UNIT III: COMBINATIONAL CIRCUITS

Boolean operations – Rules and Law of Boolean Algebra – Logic gates (NOT , AND, OR, NAND, NOR and EX-OR) - Demorgan‘s theorems - NAND and NOR as universal gates – Karnaugh map - four variables - Half adder - Full adder – Half subtractor – Encoder – Decoder.

UNIT IV: FLIP FLOPS AND COUNTERS

Flip Flops: SR, JK, D and T Flip Flops, Counters: Modulus of a counter – Modulo – N counter (asynchronous counters) – asynchronous Decade counter – Shift register: Series and Parallel –shift left and shift right registers.

UNIT V: MICRPPROCESSOR

General architecture of Microcomputer and Microprocessor - Types of memories – Architecture of 8085 – Instruction and data formats – Instruction set - Addressing modes – Simple programming: Addition, subtraction and finding smallest/largest element of an integer array.

BOOK FOR STUDY:

1. Mehta V.K., Principles of Electronics, S.Chand and company Ltd, New Delhi, 7th edition (2001) (Unit I & II)
2. Vijayendran. V, Introduction to integrated Electronics, S. Viswanathan Pvt., Ltd. (2011) (Unit III & IV)
3. Ram. B, Fundamentals of microprossesors and microcomputer, Dhanapat. Rai & sons New Delhi, Fifth Edition (2001). (Unit V).

BOOK FOR REFERENCE:

1. Sedha R.S., A text book of applied Electronics, S. Chand & company Ltd, New Delhi (2002)
2. Malvino. A and Leach, Digital Principles and Applications, 4th edition, Mc-Graw Hill, New York (1986)
3. Ramesh Gaonkar, Microprocessor: Architecture, Programming and Applications by Wiley Eastern Limited.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 2
DEPARTMENT OF PHYSICS
SEMESTER – IV: ALLIED PHYSICS OPTIONAL PAPER - 5
ELECTRONICS PRACTICALS
(For computer science students)

HOURS/WEEK: 4 **CODE: U15PH4AOP05**

CREDITS: 3 **MARKS: 100**

Course objective: To understand the role of various components in electronic circuits and tobuilt basic circuits such as operational amplifiers and to study practical digital circuits like registers, adder, subtractor and microprocessor. **Any Sixteen Experiments Only**

1. Study of Junction Diode Characteristics.
2. Study of Zener Diode Characteristics.
3. Construction of Regulated Power Supply using Zener Diode.
4. Study of Transistor Characteristics – Common Emitter Configuration.
5. Op –Amp –Adder and Subtractor.
6. Op –Amp –Inverting and Non-inverting amplifiers.
7. Op –Amp – Integrator and Differentiator.
8. Study of logic gates AND & OR discrete components.
9. Study of IC Chips.
10. Verification of De – Morgan‘s Theorems.
11. NAND as a universal gate.
12. NOR as a universal gate
13. Karnaugh Map - Construction of simplified circuit.
14. Flip – Flops: S-R, J –K and D.
15. Study of Encoders and Decoders.
16. Half adder, Half Subtractor and Full adder circuits.
17. Shift Left and Right registers
18. Construct mod-2, mod 9 counters using IC 7490.
19. Microprocessor – Programming for addition and subtraction.
20. Microprocessor – Programming for identifying the largest and smallest number from a series

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2
B.A./ B.Sc./ B.Com/ BBA/ B.C.A - DEGREE COURSES
LIFE ORIENTED EDUCATION
CATECHISM – II: CHURCH AND SACRAMENTS

HRS / Wk : 1

CODE : U15VE4LVC02
CREDIT : 1
MARKS : 100

OBJECTIVES:

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

UNIT – I: MISSION OF THE CHURCH

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

UNIT – II: PARTICIPATORY CHURCH

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

UNIT – III: THE FUNCTIONARY CHURCH AND I

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

UNIT – IV: SACRAMENTS

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

UNIT – V: MARY AND SAINTS

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

REFERENCES:

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

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2
B.A. /B.Sc. / B.Com. / BBA/ B.C.A. DEGREE COURSE LIFE ORIENTED EDUCATION ETHICS – II: EMPOWERMENT OF WOMEN

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

OBJECTIVES:

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

UNIT – I: GENDER ISSUES

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

UNIT – II: SOCIAL ISSUES RELATED TO WOMEN

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

UNIT – III: WOMEN AND MEDIA

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

UNIT – IV: WAYS OF EMPOWERING WOMEN

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

UNIT – V: CYBER CRIME AGAINST WOMEN

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

REFERENCES:

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

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

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

OBJECTIVE:

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

UNIT – I: PURPOSE OF LIFE

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

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

UNIT – II: JUDGES AND KINGS

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

UNIT – III: MINOR PROPHETS

Brief Life History and teachings of

- Amos
- Jonah
- Micah
- Nahum
- Habakkuk

UNIT – IV: MAJOR PROPHETS

Brief Life History and teachings of

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

UNIT – V: WOMEN IN THE BIBLE

Women in the Old Testament

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

REFERENCES:

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

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 andthe 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, 2^{nd} 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: CIRCUIT AND NETWORK ANALYSIS

HORS/WEEK: 5 **CODE: U15PH5MCT09**

CREDITS: 4 **MARKS:100**

Course objective: To understand the basic concepts of circuits and networks, networktheorems and apply them to solve the problems.

UNIT - I: KIRCHOFF'S LAWS & METHODS OF ANALYSING CIRCUITS

The circuit – Kirchoff 's voltage law – Voltage division – Kirchoff's current law – Parallel resistance – Current division – Mesh analysis – Mesh equation by inspection method – Super Mesh analysis – Nodal analysis – Nodal equation by inspection method – Super Node analysis.

UNIT - II: THEOREMS IN CIRCUIT ANALYSIS

Superposition theorem – Thevenin's theorem – Norton's theorem – Reciprocity theorem – Compensation theorem – Maximum power transfer theorem – Duals and duality – Millman's theorem.

UNIT - III: 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 – Phase relation in a pure inductor – Series circuits – Parallel circuits – Compound circuits.

UNIT - IV: POWER AND POWER FACTOR

Energy sources – Power in series circuit – Power in parallel circuits – Source transformation technique – Star-Delta transformation technique – Instantaneous power – Average power – Apparent power and Power factor – Reactive power – The power triangle.

UNIT - V: TRANSIENTS

Steady state and transient response – DC response of an RL circuit – DC response of an RC circuit – DC response of an RLC circuit – Sinusoidal response of an RL circuit – Sinusoidal response of an RC circuit – Sinusoidal response of an RLC circuit.

BOOKS FOR STUDY

1. SUDHAKAR. A, SHYAM MOHAN S.P., - Circuit And Networks- Analysis And Synthesis, Tata McGraw Hill Publishing Company Limited, New Delhi (2000).

BOOKS FOR REFERENCE:

1. PARANJOTHI S.R., Electrical circuit analysis, New Age International (P) Limited, (2000).
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

B.Sc. (PHYSICS) - SEMESTER V

MAJOR CORE- 9: MATHEMATICAL PHYSICS, CLASSICAL AND QUANTUM MECHANICS

HOURS /WEEK : 5 **CODE: U15PH5MCT11**

CREDITS : 4 **MARKS: 100**

Course objective: To understand and solve the dynamic motion of classical mechanicalsystems using the Lagrangian formalism of classical mechanics, to develop familiarity with the physical concepts with the mathematical methods of quantum mechanics.

UNIT I: 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 II: CLASSICAL MECHANICS –I

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 .

UNIT III: CLASSICAL MECHANICS –II

Generalized coordinates – principle of virtual work – D‘Alembert‘s principle – Lagrange‘s formulation – Derivation of Lagrange‘s equations from D‘Alembert‘s principle – Applications of Lagrange‘s equation to simple pendulum & Atwood‘s machine- compound pendulum – Lagrange‘s equations in the presence of non conservative forces.

UNIT IV: QUANTUM MECHANICS

Particle properties of waves– wave properties of particles – wave function- Phase velocity and group velocity – de Broglie wavelength – Davisson and Germer experiment – G.P.Thomson‘s experiment – electron diffraction- Electron microscope – Heisenberg‘s uncertainty principle – illustration of uncertainty principle.

UNIT V: SCHRODINGER'S WAVE EQUATION

Wave function for a free particle – Schrodinger's wave equation – Physical significance of wave function – operators and Eigen values- Postulates of quantum mechanics – applications of Schrödinger's equation – particle in a box – linear harmonic oscillator- Barrier penetration problem.

BOOKS FOR STUDY

1. J.C. Upadhyaya, Classical Mechanics, Himalaya publishing house, (2005).
2. Chatwal and Anand, Quantum mechanics, Himalaya Publishing House, (2012).
3. Gupta B.D., Mathematical Physics,Vikas Publishing House Pvt Limited(2006).

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. Rajput B.S., Mathematical Physics. Prakati Prakashan & Company, Meerut (2008).
6. SathyaPrakash, Mathematical Physics including classical mechanics, S.Chand & Company, New Delhi (1985).
7. 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 – 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
DEPARTMENT OF PHYSICS
B.Sc. (PHYSICS) SEMESTER V
MAJOR ELECTIVE II: MICROPROCESSOR- INTEL 8085

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

Course Objectives: To know the operation of Intel 8085& Instruction set, to write SimplePrograms using the Instruction set of Microprocessor.

UNIT: I INTRODUCTION TO MICROCOMPUTERS AND MEMORY ELEMENTS

Digital computers – single chip microcomputers – General architecture of Microcomputer and microprocessor – CPU – Input/output devices – ALU – memory – types of memories – Semiconductor memories – RAM – static RAM – Dynamic RAM – ROM – Basics of PROM, EPROM and EEPROM– Program memory – real and virtual memory .

UNIT: II ORGANIZATION OF INTEL 8085

Architecture of Intel 8085 – functions of Individual blocks – registers in 8085 – Data Bus – address bus – control bus – pin configuration – Functions of individual pins – Opcode and operand – instruction word size – Instruction cycle – Fetch operation – Execute operation – Machine cycle and state – Instruction and data Flow.

UNIT: III INSTRUCTION SET OF INTEL 8085

Instruction and data formats – addressing modes – direct addressing – register addressing – register indirect addressing – immediate addressing – implicit addressing – status flags – Data transfer group – arithmetic group – logical group – branch control group – stack, I/O and machine control group.

UNIT: IV PROGRAMMING OF MICROPROCESSOR

Assembly language -stacks - subroutines - simple programs - addition, subtraction of 8 bit numbers - sum of a series of eight bit numbers - finding smaller/larger of two numbers - Finding smallest/largest element of an integer array- arranging an integer array in ascending and descending order - Multiplication and division of 8 bit numbers - finding square root.

UNIT: V 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- Applications Of 8255- Generation of square wave using 8255

BOOK FOR STUDY

1. Ram B. Fundamentals of microprocessors and microcomputer – Fifth Edition, Dhanapat. Rai Publications (P) Ltd, New Delhi (2003).

BOOKS FOR REFERENCE

1. Ramesh Gaonkar, Microprocessor: Architecture, Programming and Applications, 5th Edition, Wiley Eastern Limited, New Delhi.

2. Nagoor Kani A., Microprocessor and its applications, First Edition, RBA Publications, Chennai (1999).

HOLY CROSS COLLEGE (AUTONOMOUS)TIRUCHIRAPPALLI-2.
DEPARTMENT OF PHYSICS
B.Sc. (PHYSICS) SEMESTER V
MAJOR ELECTIVE 2: MICROPROCESSOR AND ITS APPLICATIONS

NO.OF HRS. /WEEK :5 **CODE: U15PH5MET03**
CREDITS :5 **MARKS: 100**

Course objective: To understand the Operation of Intel 8085, Instruction set, to writeSimple programs using instruction set and to know the interfacing techniques.

UNIT I: ARCHITECTURE AND INSTRUCTION SET OF INTEL 8085

General Architecture of microcomputer-Architecture of INTEL 8085–Pin configuration– Instruction word size - Instruction and data formats – Addressing modes – Data transfer group-Arithmetic group- Logical group- Branch group –Stack, I/O and machine control group.

UNIT II: PROGRAMMING OF MICROPROCESSOR

Assembly language- Stack – Subroutine- Addition of two 8 bit numbers (with and without carry) Subtraction of two 8 bit numbers - Finding smallest / largest element of an integer array- Arranging an integer array in ascending and descending order – Sum of a series of 8 bit numbers- 8 bit multiplication- 8 bit division .

UNIT III: INTERFACING TECHNIQUES

Address space partitioning – Data transfers Scheme - synchronous data transfer – Asynchronous data transfer –Interrupt driven data transfer- Interrupts of Intel 8085 – Programmable peripheral interface (Intel 8255) – Architecture – Operating modes-Control word-Programmable DMA controller-Intel 8257.

UNIT IV: MICROPROCESSOR BASED DATA ACQUISITION SYSTEM

Analog to digital converter- sample and hold circuit – Interfacing of ADC 0808/ADC0809- ADC 0800-Interfacing of A/D converter ADC 0800-Interfacing of ADC 0808 with sample and hold circuit- Digital to Analog converter- Operating Principle-Interfacing of DAC 0800 – Realization of A/D converter using D/A converter.

UNIT V: MICROPROCESSOR APPLICATIONS

Delay subroutine using one register, register pair and two registers - Microprocessor based traffic control- Generation of square wave using I/O port ,using SOD line-Configuring 8255 with a microprocessor- water level indicator, stepper motor- Microprocessor based control of firing circuit of a Thyristor.

BOOK 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 incomputers.

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.
1. Theraja B.L., Basic Electronics – Solid State- S. Chand and Company Limited, New Delhi,1st Edition (2005).

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-620002

DEPARTMENT OF PHYSICS

B.Sc. (PHYSICS) - SEMESTER V

SKILL BASED ELECTIVE- 4: PRINTED CIRCUIT TECHNIQUES

HOURS / WEEK. : 2 **CODE: U15PH5SBT04**

CREDITS: 2 **MARKS : 100**

Course objective: To help the students to understand printed circuit fundamentals, layoutdesign, film processing, fabrication and assembling the printed circuit board.

UNIT I: PRINTED CIRCUIT FUNDAMENTALS

Introduction- Reading Electronic symbols- Drawing symbols into schematic diagrams- Printed Layout Tracing- Pattern Layout Pads- (for the components: Resistors, Capacitors and Diodes only)

UNIT II: PRINTED CIRCUIT BOARD LAYOUT DESIGN

Single Sided Printed Circuit Board - Layout Design Requirements – Preliminary Layout Techniques – Designs Specifications and Procedures – Taping The Master Layout- PCB Design software.

UNIT III: FILM PROCESSING FOR SINGLE SIDED PCB

Taped Layout – Making A Negative From A Taped Layout - Photo Processing – Negative Film Processing – Constructing A Printed Circuit Board Holder.

UNIT IV: FABRICATION OF THE PRINTED CIRCUIT BOARD

Cutting And Cleaning Process – Photoresists – Procedure For Applying Negative Photoresists – Kodak Photoresist Method - KPR – 3 Process – Developing And Etching Process.

UNIT V: ASSEMBLING THE PRINTED CIRCUIT BOARD

Selection Of Tools for Assembling – Safety Rules For Handling The Tools – Resistor, Capacitor, Diode PCB Mounting Techniques Cleaning After Soldering.

BOOKS FOR STUDY

1. George Geragosian, Printed Circuit Fundamentals, Reston Publishing Company – A Printice Hall Company, Reston, Virginia (1985).

BOOKS FOR REFERENCE:

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

2. Khandpur, R.S., ―Modern Electronic Equipment‖ - Trouble Shooting, Repair and Maintenance, Tata McGraw Hill Company Ltd, New Delhi (1992).

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-620002

DEPARTMENT OF PHYSICS

B.Sc. (PHYSICS) SEMESTER VI

MAJOR CORE - 12: COMMUNICATION ELECTRONICS

HORS/WEEK. : 6 **CODE: U15PH6MCT15**

CREDITS: 5 **MARKS: 100**

Course objective: To expose the learners to understand basic communication principles, To understand the modulation techniques and various communication systems such as fiber optics, RADAR and satellite and to study the recent trends adopted in cellular systems.

UNIT I: MODULATION TECHINIQUES

Introduction to Communication Systems – Information – Transmitter – Channel – Noise – Receiver – Need for Modulation Band width requirement – Amplitude modulation: AM Theory – frequency spectrum of AM wave – Representation of AM – Power relations in AM wave – AM Transmitter block diagram – Frequency modulation – System description – Mathematical representation – Frequency Spectrum – Generation of FM – Direct and Indirect methods.

UNIT II: FIBER OPTIC COMMUNICATION

Introduction –structure of optical fiber –total internal reflection– principle and propagation of light in optical fiber - acceptance angle - numerical aperture – types of optical fibers based on material – number of modes – refractive index profile - fiber optical communication system (block diagram) - fiber optic sensors – Temperature sensor – fiber optic endoscope.

UNIT III: RADAR COMMUNICATION

Radar Communication Basic radar system -Radar range –Antenna scanning – Pulsed radar system – A Scope- Plan position indicator- Tracking radar- Moving target indicator- Doppler effect-MTI Principle- CW Doppler Radar- Frequency modulator CW Radar.

UNIT IV: MOBILE COMMUNICATION

Mobile Communication GSM – mobile services- concept of cell – system architecture – radio interface – logical channels and frame hierarchy – protocols – localization and calling – Handover- facsimile (FAX) – application – VSAT (very small aperture terminals) – Modem – IPTV (internet protocol television) – Wi-Fi - 3G (Basic ideas only).

UNIT V: BROAD BAND AND SATELLITE COMMUNICATION

Time division multiplexing – frequency division multiplexing – computer communication – ISDN – LAN – star topology, ring topology and hybrid topology.PBX – modems – Basic components of satellite communication – uplink and downlink.

BOOKS FOR STUDY

1. Anokh Singh and Chopra A.K., Principles of communication Engineering, S. Chand & Company PVT. Ltd.(2013).
2. Poornima Thangam I, Satellite communication, Charulatha Publications (2012) .
3. Jochen H.Schiller., Mobile communications (second education), Pearson education Ltd.

BOOKS FOR REFERENCE:

1. Metha V.K., Principles of Electronics, S. Chand & Company Ltd., (2013).
2. William C.Y. lee, Cellular telecommunication (second edition), Tata Mcgraw hill,
3. K.D. Prasad, Antenna & Wave Propagation, Satya Prakashan, (2012).
4. Taub & Schilling, Principle of Communication system, TMH Publishers., I Edn, (1999).
5. GK. Mithal, Fundamentals of Electronic & Radio, Khanna Publishers.
6. Dennis Roddy and John Coolen, Electronic Communications, PHI, 4th edition, (1995).

HOLY CROSS COLLEGE (AUTONOMOUS)TIRUCHIRAPPALLI-2.

DEPARTMENT OF PHYSICS

B.Sc. (PHYSICS) SEMESTER VI

MAJOR CORE- 13: MAIN PRACTICAL IV-B

SPECIAL ELECTRONICS AND MICROPROCESSOR PRACTICALS

HOURS/WEEK. : 6 **CODE : U15PH6MCP17**

CREDITS : 5 **MARKS: 100**

Course objective: To understand the basic role of various components in electronic circuits,to study the basic digital and electrical 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. UJT Characteristics
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. OP AMP – Square wave generator
8. Construction of Modulus Counters using IC 7490 and Verify its Truth Tables.
9. Study of Multiplexer and Demultiplexer using ICs.
10. Study of Up, Down and Ring Counters.
11. UJT Relaxation Oscillator
12. Microprocessor – Programming for identifying the biggest and smallest number from a series.
13. Microprocessor – Programming for arranging the numbers in Ascending and descending orders.
14. Microprocessor – Programming for Code Conversion
15. Microprocessor – Sum of series of 8 bit numbers
16. Interfacing of INTEL 8255 with Microprocessor
17. Network Analysis: Thevenin‘s and Norton theorm
18. Kirchoff‘s law verification
19. V-I Characteristics of Solar Cell
20. Measurement of Peak Voltage, Frequency and Phase using CRO.

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI
DEPARTMENT OF PHYSICS
B.Sc., (PHYSICS)
SEMESTER VI: MAJOR ELECTIVE-III
INSTRUMENTATION

HOURS/WEEK: 5 **CODE: U15PH6MET04**
CREDITS: 5 **MARKS: 100**

Course objective: To study the measurement and performance characteristics of electricaland electronic transducers.

Unit I: MEASUREMENT AND PERFORMANCE CHARACTERISTICS

Basic concepts of measurements- introduction- system configuration- basic characteristics of measuring devices- accuracy - precision- error- systematic and instrumental error- zero drift- installation error- operational error- linearity- Hysterisis-resolution- scale readability- threshold- reliability- calibration - performance characteristics of an instrumentation system- zero order system- step and ramp response of 1^{st} order system.

Unit II: TRANSDUCERS

Basic Requirements Of a Transducer – Classification- Modulating Transducer- Generating Transducer- Strain Gauges- Bonded Strain Gauges and Unbonded Strain Gauge- Uses of Strain Gauges- Measurement of Temperature- Characteristics Of a Thermistor- - Measurement Of Temperature With Thermistor- Variable Inductance Transducer- Principle- LVDT.

Unit III: ELECTRICAL INSTRUMENTATION

Resistors- materials used for resistors- resistance standards- methods of reducing residual inductance and capacitance in resistors- DC potentiometer- basic potentiometer circuit- constructional details of potentiometers- applications of DC potentiometers- calibration of voltmeter and ammeter- measurement of resistance.

Unit IV: ELECTRONIC INSTRUMENTATION

Multimeter - Electronic voltmeters and their advantages- CRO- measurement of voltage, current, phase and frequency- recorders- necessity of recorders- analog- graphic strip chart recorders- principle of tape recorders- methods of recording- direct recording-frequency modulated recording.

Unit V: TELEMETRY

Methods of data transmission- telemetry- general telemetry system- electrical telemetry system- voltage, current and position telemetry system- Basic ideas of pulse modulation- pulse amplitude, pulse duration, pulse frequency and pulse code modulation- transmission channels and media- wireline, radio, microwave powerline, carrier channels.

BOOK FOR STUDY

1. Sawhney A. K., Electical and Electronic Measurements and Instrumentations – Dhanpat Rai & Sons, New Delhi (1989).

BOOKS FOR REFERENCE

1. Umesh Sinha- Electrical and Electronic Measurements and Instrumentations – Satyaprakash Co., Delhi (1990).

2. William Cooper And Albert Helfrich, Electronic Instrumentation and measurement Techniques– Prentice Hall Of India, New Delhi (1987).

3. Rangan C.S., Insrumentation- Devices And Systems-McGraw Hill, New Delhi (1998).

HOLY CROSS COLLEGE (AUTONOMUS) TIRUCHIRAPPALLI-620002

DEPARTMENT OF PHYSICS

B.Sc. (PHYSICS) SEMESTER VI

MAJOR ELECTIVE- 3: APPLIED ELECTRONICS

HOURS/WEEK : 5 **CODE: U15PH6MET05**
CREDITS: 5 **MARKS: 100**

Course objective: To understand the basic ideas of fabrication and the functioning of powerelectronic devices, optoelectronic devices, special diode, MOSFETs and transducers.

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: THYRISTORS

Members of Thyristor Family -Triggering of series connected Thyristors- Simultaneous – Sequential- Optical Triggering- Parallel operation of Thyristors -Silicon controlled rectifier – SCR Half wave rectifier – SCR full wave rectifier-Pulse Control of SCR -90° &180° Phase Control of SCR - Silicon controlled switch- IGBT –Working and operation – Field controlled transistor- Working and operation -DIAC – TRIAC .

UNIT III: OPTO ELECTRONIC DEVICES

Introduction – spectral response of human eye – Principle of optical detection- – Light emitting diode (LED) - Different LED structure - LCD plasma display - Photo emissive devices – Photo multiplier tube – Photo transistors – Photo voltaic devices – Bulk type photoconductive cells – Photo detector materials –Noise in Photo detector.

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 –Decimal Decoders.

UNIT V: TRANSDUCERS

Introduction – Classification of Transducers - Resistive position Transducer - Resistive pressure Transducer -Linear Variable Differential Transformer (LVDT) –

Piezoelectric Transducer- Strain Transducer - Strain Guage- Temperature Transducers- Ultrasonic Temperature Transducers- Photoelectric Transducers- Applications of Transducers.

BOOKS FOR STUDY

1. Jacob Millman, Microelectronics – Tata McGraw Hill Edition (Unit I)
2. Theraja B.L.,Basic Electronics- Solid state,S.Chand & Co., Ltd.,NewDelhi (2005)
3. M D SINGH ,K B KHANCHANDANI, Power Electronics -– Tata McGraw Hill Edition (unit, II).

BOOKS FOR REFERENCE:

1. Mehta V.K., Principles of Electronics, 7th Edition, S.Chand and Company Ltd, New Delhi (2001).
2. A.K. Sawhney, Electrical and Electronic Measurement and Instrumentation, Dhanpat Rai and Sons (1995).
3. J. Wilson, J.F.B Hawkes, Optoelectronics an Introduction 2nd Prentice Hall of India (P) Ltd, New Delhi (2001).
4. C.K. SarKar, D.C. Sarkar ,Optoelectronics and Fiber Optics Communication New International (P) Ltd, New Delhi (2001).

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, satellitecommunication, 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 ofvarious 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 theconcept 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).

(For Candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2

B.A./B.Sc./B.Com/BBA./B.C.A - DEGREE COURSES LIFE ORIENTED EDUCATION CATECHISM – III: LITURGY AND CHRISTIAN LIFE

HRS / Wk : 1 **CODE:U15VE6LVC03**

CREDIT : 1

MARKS : 100

OBJECTIVES:

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

UNIT – I: LITURGY

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

UNIT – II: HOLY SACRIFICE OF THE MASS

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

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

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

UNIT – IV: CHRISTIAN FAMILY

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

UNIT – V: CONSECRATED LIFE

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

REFERENCES:

1. Compendium – Catechism of the Catholic Church Published by Vaigarai Publishing House for the Catholic Church of India.
2. You are the light of the World, A course on Christian living for II year Religion published by Department of Foundation Courses, St. Joseph's College (Autonomous), Tiruchirappalli– 620 002.
3. Documents of Vatican II – St. Paul's Publications, Bombay 1966.

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

HRS / Wk : 1

CODE: U15VE6LVE03
CREDIT : 1
MARKS : 100

OBJECTIVES:

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

UNIT – I: PERSONAL COMPETENCE

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

UNIT – II: MARRIAGE AND FAMILY

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

UNIT – III: PARENTHOOD

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

UNIT – IV: PERSONALITY DEVELOPMENT

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

UNIT – V: CAREER CHOICE

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

REFERENCES:

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

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

HRS / Wk : 1 **CODE: U15VE6LVBO3**
CREDIT : 1
MARKS : 100

OBJECTIVE:

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

UNIT – I: ESSENTIALS OF CHRISTIAN FAITH

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

UNIT – II: MARRIAGE AND FAMILY LIFE

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

UNIT – III: CHRISTIAN HOME

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

UNIT – IV: CHRISTIAN ETHICS

- Holiness – Joseph (Gen 39:9) Levi 11: 45, Ecc 12
- Obedience to God - Abraham (Gen 12) ; St.Paul (Acts 9)
- Freedom and Accountability
- Justice and Love
- Choices in Life – Making Decisions (Studies, job, life Partner)
- Model to follow – Who is your model? (John 15: 1-17)
- Social Evils – Dowry, Caste discrimination, Accumulation of wealth

UNIT – V: MISSIONARIES DOWN THE LANE

- William Carrie (Calcutta)
- Pandithar Rama Bai (Karnataka)
- Amy Carcheal (Dohnavur)
- Dr. Ida Scuddar (Vellore)
- Devasagayam (Nagercoil)
- St. John De Britto (Oriyur)
- Graham Staines & Family (Odisha)
- St. Mother Teresa (Calcutta)

REFERENCES:

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