HOLY CROSS COLLEGE (AUTONOMOUS)

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

DEPARTMENT OF COMPUTER SCIENCE

Programme: B.C.A

PO No.	Programme Outcomes *Upon completion of the B.C.A Degree Programme, the graduate will be able to*
PO-1	Attain excellence in the area of Computer Applications
PO-2	Utilize the practical skill to examine, plan and engineer the applications of technology using computing tools and techniques
PO-3	Design innovative methodologies/techniques/ideas for solving real time problems to cater to the need for the society.
PO-4	Create student employability and be competent enough to work in IT industry.
PO-5	Integrate ethical values in designing computer application.

PSO No.	Programme Specific Outcomes *Upon completion of these courses the student would*
PSO-1	Acquire advanced knowledge in various area of computer Applications
PSO-2	Analyze and find the best techniques for solving computational problem
PSO-3	Develop competent technical writing skills for software
PSO-4	Apply the recent technology in various domains and evaluate the methods of implementing it.
PSO-5	Design and Create innovative ideas that meet the requirements of software industry

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPALLI-620 002.
DEPARTMENT OF COMPUTER
SCIENCE CHOICE BASED
CREDIT SYSTEM
BACHELOR OF COMPUTER APPLICATIONS

Semester	Part	Course	Title of the Course	Code	Hrs / Wk	Credits	Marks
I	I	Language	Tamil Paper I / Hindi Paper I / French Paper I	U19TL1TAM01/ U18HN1HIN01/ U16FR1FRE01	6	3	100
	II	English	English Paper I	U15EL1GEN01	6	3	100
	III	Major Core -1	Problem Solving Using C	U19CA1MCT01	5	4	100
	III	Major Core - 2	Problem Solving Using C Lab	U19CA1MCP02	3	3	100
	III	Allied - 1 (Compulsory)	Allied Paper I Business Information Systems	U18CA1ACT01	3	2	100
	III	Allied - 2 (Compulsory)	Allied Paper II Applied Mathematics I	U15MA1ACT0	4	3	100
	IV	Environmental Studies	Environmental Studies	U18RE1EST01	2	1	100
	IV	Value Education	Ethics/ Bible Studies/ Catechism	U15VE2LVE01/ U15VE2LVB01/ U15VE2LVC01	1	-	-
	VI		Service Oriented Course		1	-	-
		Internship/Field Work/Field Project 30 hours- **Extra Credit**		U18SP1ECC01			
			TOTAL		**30**	**19**	**700**
II	I	Language	Tamil Paper II/Hindi Paper II/ French Paper II	U19TL2TAM02/ U18HN2HIN02/ U16FR2FRE02	5	3	100
	II	English	English Paper II	U15EL2GEN02	6	3	100
	III	Major Core - 3	Data Structures and Algorithms	U19CA2MCT03	5	5	100
	III	Major Core - 4	Data Structures Lab	U19CA2MCP04	5	4	100
	III	Allied - 3 (Compulsory)	Allied Paper III Applied Mathematics II	U15MA2ACT11	4	3	100
	IV	SkillBasedElective-1	Soft Skill Development	U15RE2SBT01	2	2	100
	IV	SkillBasedElective-2	Sustainable Rural Development and Student Social Responsibility	U18RE2SBT02	1	1	100
		Industry Relations	Recent Technologies in IT	U19CA2IRT01	1	1	100
	IV	Value Education	Ethics I/ Bible Studies I/ Catechism I	U15VE2LVE01/ U15VE2LVB01/ U15VE2LVC01	1	1	100
	VI		Service Oriented Course		-	-	-
		Internship/Field Work/Field Project 30 hours- **Extra Credit**		U18SP2ECC02			
			TOTAL		**30**	**23**	**900**
III	I	Language	Tamil Paper III/Hindi Paper III/ French Paper III	U19TL3TAM03/ U15HN3HIN03/ U16FR3FRE03	6	3	100
	II	English	English Paper III	U15EL3GEN03	6	3	100
	III	Major Core - 5	Database Systems	U19CA3MCT05	5	5	100
	III	Major Core - 6	Database Systems Lab	U19CA3MCP06	5	5	100
	III	Allied - 4 (Optional)	Allied Optional Paper I Applied Mathematics III	U15MA3AOT13	4	3	100
	IV	SkillBasedElective - 3	Multimedia Lab	U19CA3SBP03	2	2	100
	IV	Gender Studies	Gender Studies	U15WS3GST01	1	1	100
	IV	Value Education	Ethics / Bible Studies / Catechism	U15VE4LVE02/ U15VE4LVB02/ U15VE4LVC02	1	-	-
	VI		Service Oriented Course		-	-	-
		Internship/Field Work/Field Project 30 hours- **Extra Credit**		U18SP3ECC02/ U18SP3ECC03			

			TOTAL		**30**	**22**	**700**
IV	I	Language	Tamil Paper IV/Hindi Paper IV/ French Paper IV	U15TL4TAM04/ U18HN4HIN04/ U16FR4FRE04	5	3	100
	II	English	English Paper IV	U15EL4GEN04	6	3	100
	III	Major Core - 7	Java Programming	U18CA4MCT07	5	5	100
	III	Major Elective - 1	Web Designing and PHP Lab / Unix and Shell Programming Lab / Ruby on Rails Lab	U18CA4MEP01/U 1 8CA4MEP02/U18 C A4MEP03	5	5	100
	III	Allied - 5 (Optional)	Allied Optional Paper II Basics of Accounting	U18CO4AOT10	4	4	100
	III	Allied - 6 (Optional)	Allied Optional Paper III Java Programming Lab	U18CA4AOP03	4	3	100
	IV	Value Education	Ethics II/ Bible Studies II/ Catechism II	U15VE4LVE02/ U15VE4LVB02/ U15VE4LVC02	1	1	100
	VI		Service Oriented Course		-	1	100
		Internship/Field Work/Field Project 30 hours- **Extra Credit**		U18SP4ECC02/ U18SP4ECC04			
			TOTAL		**30**	**25**	**800**
V	III	Major Core – 7	Computer Organization and Architecture	U17CA5MCT07	4	4	100
	III	Major Core – 8	Operating Systems	U19CA5MCT08	4	3	100
	III	Major Core – 9	Computer Networks	U19CA5MCT09	4	3	100
	III	Major Core – 10	Object-oriented Programming Using C# and .Net	U19CA5MCT10	4	3	100
	III	Major Core – 11	C# and .Net Programming Lab	U17CA5MCP11	4	3	100
	III	Major Elective – 2	Cloud Computing/ Green Computing/ Fog Computing	U19CA5MET04 U19CA5MET05 U19CA5MET06	5	5	100
	IV	Non Major Elective - 1	Desktop Publishing Lab	U15CA5NMP01	2	2	100
	IV	Skill Based Elective - 4	Online Course	U19OC5SBT04	2	2	100
	IV	Value Education	Ethics / Bible Studies/ Catechism	U15VE6LVE03/ U15VE6LVB03/ U15VE6LVC03	1	-	
		Internship/Field Work/Field Project 30 hours- **Extra Credit**		U18SP5ECC02/ U18SP5ECC05			
		TOTAL			**30**	**25**	**800**

VI	III	Major Core – 12	Software Engineering Concepts	U19CA6MCT12	5	4	100
	III	Major Core – 13	Computer Graphics	U18CA6MCT13	5	4	100
	III	Major Core – 14	Internet of Things	U19CA6MCT14	4	4	100
	III	Major Core – 15	Graphics and Animation Lab	U18CA6MCP15	4	3	100
	III	Major Elective – 3	Data Mining/ Principles of Data Science/ Big Data Analytics	U19CA6MET07/ U19CA6MET08/ U18CA6MET09	5	5	100
	IV	Non Major Elective - 2	Multimedia Lab	U18CA6NMP02	2	2	100
	IV	Skill Based Elective - 5	Python Programming Lab	U19CA6SBP05	2	2	100
	IV	Skill Based Elective - 6	Research Methodology	U15DS6SBT06	2	2	100
	IV	Value Education	Ethics / Bible Studies/ Catechism	U15VE6LVE03/ U15VE6LVB03/ U15VE6LVC03	1	-	100
	V	Extension Activity	RESCAPES-Impact Study of Project		-	1	100
		Internship/Field Work/Field Project 30 hours- **Extra Credit**		U18SP6ECC02/ U18SP6ECC06			
			TOTAL		**30**	**27**	**1000**
			GRAND TOTAL		**180**	**141**	**4900**
			ED : Extra Credit (Compulsory) : Mini Project	U18CA6ECP01		2	100

LIST OF MAJOR ELECTIVES

Semester	Part	Course	Title of the Course	Code	Hrs / Wk	Credits	Marks
IV	III	Major Elective - 1	Web Designing and PHP Lab / Unix and Shell Programming Lab/ Ruby on Rails Lab	U18CA4MEP01/ U18CA4MEP02/ U18CA4MEP03	5	5	100
V	III	Major Elective – 2	Cloud Computing/ Green Computing/ Fog Computing	U19CA5MET04 U19CA5MET05 U19CA5MET06	5	5	100
VI	III	Major Elective -3	Data Mining/ Principles of Data Science/ Big Data Analytics	U19CA6MET07/ U19CA6MET08/ U18CA6MET09	5	5	100

LIST OF NON - MAJOR ELECTIVES

Semester	Part	Course	Title of the Course	Code	Hrs / Wk	Credits	Marks
V	IV	Non Major Elective - 1	Desktop Publishing Lab	U15CA5NMP01	2	2	100
VI	IV	Non Major Elective - 2	Multimedia Lab	U18CA6NMP02	2	2	100

COURSES OFFERED BY THE

DEPARTMENT OF COMPUTER SCIENCE

TO THE DEPARTMENT OF COMMERCE

2019 - 2020

SEMESTER	CODE	NEW PAPER NAME	HRS	CREDITS
III	U18CA3AOP05	DATA ANALYTICS	4	3
V	U19CO5MCT15	FUNDAMENTALS OF PROGRAMMING	5	4
V	U19CO5MET06	INTRODUCTION TO DATABASE SYSTEMS	5	5

SEMESTER	CODE	NEW PAPER NAME	HRS	CREDITS
II	U18CA2AOT03	COMPUTER APPLICATIONS IN BUSINESS	4	3
VI	U19CO6MCT16	DIGITAL MARKETING	6	5
VI	U19CO6MET07	FUNDAMENTALS OF E-COMMERCE	5	5

For Candidates admitted from 2015 onwards)

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

PG & RESEARCH DEPARTMENT OF TAMIL

First Year - Semester – I

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

General Objectives:

தமிழ் இலக்கியப் பரப்பையும், பாரம்பரியத்தையும் அறிமுகப்படுத்துதல்.

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

Course Objectives:

CO No.	Course Objectives
CO-1	தமிழ் இலக்கியப் பரப்பையும்,விழுமியங்களையும் அறிமுகப்படுத்துதல்.
CO-2	தமிழ் மொழியின் தொன்மை, தாய்மொழிப்பற்று, தன்னம்பிக்கை சூழல்களை எதிர்கொள்ளும் திறன் முதலியவற்றை அறிந்து கொள்வர்.
CO-3	கவிதையின் வாயிலாக அன்பு உணர்வினை வளர்க்கச் செய்தல்.
CO-4	கலைச்சொற்கள் வாயிலாக பிறமொழிச் சொற்களை ஆராயும் தன்மைப் பெறுவர்.
CO-5	படைப்பாற்றல் திறனை வளர்த்துக்கொள்வர்.

அலகு:1 செய்யுள் **18 Hrs**

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

Key Words (Extra Reading)

1. ந. காமராசு கவிதைகள்
2. தமிழன்பன் கவிதைகள்

அலகு:2 செய்யுள் **18 Hrs**

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

Key Words (Extra Reading)

1. ந.முத்துக்குமார் கவிதைகள்
2. செனட்ரியூ கவிதைகள்

அலகு:3 **18 Hrs**

தமிழ் இலக்கிய வரலாறு
தமிழாய்வுத்துறை வெளியீடு 20-ஆம் நூற்றாண்டு (தற்காலம்)

Key Words (Extra Reading)

தமிழ் இலக்கிய வரலாறு -மு.வரதராசன்

அலகு:4 **18 Hrs**

படைப்பிலக்கியம் - சிறுகதைத் தொகுப்பு(துறை வெளியீடு)

அலகு:5 **18 Hrs**

பொதுப்பகுதி - கலைச்சொற்கள்

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

Course Outcomes:

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

பார்வை நூல்கள் **பாட நூல்கள்**

செய்யுள் - தமிழாய்வுத்துறை வுத்துறை வெளியீடு

தமிழ் இலக்கிய வரலாறு - தமிழாய்வுத்துறை வெளியீடு

சிறுகதைத் தொகுப்பு - தமிழாய்வுத்துறை வெளியீடு

கலைச்சொற்கள் - தமிழாய்வுத்துறை வெளியீடு

(For the candidates admitted from June 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-620002

DEPARTMENT OF HINDI

SEMESTER – I

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

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

Course Objectives (CO):

The learner will be able to:

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

UNIT – I **(18 Hours)**

1. Aatma Nirbharatha
2. Idgah
3. Sangya

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

UNIT- II **(18 Hours)**

1. Mahatma Gandhi
2. Vusne Kaha Tha
3. Sarva Naam

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

UNIT- III **(18 Hours)**

1. Sabhyata Ka Rahasya
2. Karva Va Ka Vrat
3. Visheshan

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

UNIT- IV **(18 Hours)**

1. Bharat Ek Hai
2. Sharandhata
3. Kriya

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

UNIT- V **(18 Hours)**

1. Mitrata
2. Vapasi
3. Ling Aur Vachan

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

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

Course Outcomes:

The learner will be able to:

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

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

Reference Books :

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

(For candidates admitted 2016 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2

DEPARTMENT OF FRENCH

SEMESTER I

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

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

Course Objectives(CO):

The learner will be able to

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

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

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

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

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

Unit 2 Autravail! (15Hours)

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

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

Unit 3 Onsedétend! (15Hours)

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

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

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

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

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

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

Unit 5 Bonappétit! (15Hours)

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

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

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

TEXT BOOKS :

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

Books for Reference:

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

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

(For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS),
TIRUCHIRAPPALLI – 620 002 PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. First Year - Semester – I

Course Title	Major Core 1: Problem Solving using C
Total Hours	75
Hours/Week	5 Hrs/Wk
Code	U19CA1MCT01/ U19CS1MCT01
Course Type	Theory
Credits	4
Marks	100

General Objective:

To understand the concepts of problem solving approaches and to develop programming skills using C language.

Course Objectives:

CO No.	Course Objectives
CO-1	Understand the concepts of Algorithms and create flowcharts for a given problem
CO-2	Apply the basic concepts of C in real-time applications
CO-3	Analyze different types of arrays and apply the concepts for solving problems in real time
CO-4	Understand the concept of memory management
CO-5	Remember the file concept and create files using C

UNIT I **15 Hrs**

INTRODUCTION TO COMPUTER PROBLEM SOLVING

Introduction: Steps involved in Problem Solving Using Computers – Algorithms – Flow Charts – Pseudocode – Evolution of Programming Languages: Introduction – Classification of Programming Languages - Compiler – Interpreter, Loader and Linker.

Extra Reading: Develop Algorithms for real time applications.

UNIT II **15 Hrs**

CONSTANTS, VARIABLES, AND DATA TYPES: Introduction – Character Set – C Tokens – Keywords and Identifiers – Constants – Variables – Data Types – Declaration of Storage Class.

OPERATORS AND EXPRESSIONS: Introduction - Arithmetic Operators - Relational Operators - Logical Operators - Assignment Operators - Increment and Decrement Operators- Conditional Operators - Bitwise Operators - Special Operators - Arithmetic Expressions - Evaluation of Expressions - Precedence of Arithmetic Operators - Some Computational Problems.

MANAGING INPUT AND OUTPUT OPERATORS: Introduction - Formatted Input - Formatted Output.

Extra Reading: Basic I/O and Control operations in Python.

UNIT III **15 Hrs**

DECISION MAKING AND BRANCHING: Introduction - Decision Making with if Statement - Simple if Statement- The if else Statement - Nesting of if...else Statements - The Else if Ladder - Switch Statement - ?: Operator - Goto Statement.

DECISION MAKING AND LOOPING: Introduction – The While Statement - The do Statement – The for Statement - Jumps in Loops.

ARRAYS: Introduction – One-dimensional Array – Two-dimensional Arrays - Initializing Two - dimensional Arrays – Multi-dimensional Arrays.

Extra Reading: Develop multidimensional array programs

UNIT IV **15 Hrs**

HANDLING OF CHARACTER STRINGS: Introduction - Declaring and Initializing String Variables - Arithmetic Operations on Characters - String- handling Functions - Table of Strings.

USER DEFINED FUNCTIONS: Introduction - Definition of Functions - Function Declaration - Category of functions - No Arguments and No Return Values - Argument but No Return Values - Arguments with Return Values – No Arguments but Returns a Value – Functions that Return Multiple Values – Recursion.

STRUCTURES AND UNIONS : Introduction – Defining a Structure - Declaring Structure Variables – Accessing Structure Members - Structure Initialization - Arrays of Structures - Arrays Within Structures – Structures Within Structures - Structures and Functions – Unions.

Extra Reading: Create Programs using functions.

UNIT V **15 Hrs**

POINTERS: POINTERS : Introduction - Understanding Pointers - Accessing the Address of a Variable - Declaring and Initializing Pointers - Accessing a Variable through its Pointer - Chain of Pointers - Pointer Expressions - Pointers and Arrays - Pointers and Character Strings – Arrays of Pointers - Pointers to Functions – Pointers and Structures.

FILE MANAGEMENT IN C: Introduction - Defining and Opening a File - Closing a File - Input/Output Operations on Files - Error Handling during I/O Operations - Random Access to Files - Command Line Arguments. ***Extra Reading: Implement the system and file concepts using emulator.***

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Know the correct and efficient ways of solving problems.	PSO 1, PSO 2	U
CO-2	Write C program for simple applications	PSO 2	An
CO-3	Formulate algorithm for simple problems	PSO 2	U
CO-4	Analyze different data types and arrays	PSO 5	An
CO-5	Perform simple search and sort	PSO 1	Ap
CO-6	Understand memory management and write programs using structures for solving complex computational problem	PSO 2, PSO 3	U
CO-7	Create files and perform file operations using C	PSO 1, PSO5	R, An
CO-8	Use programming language to solve problems	PSO 1, PSO 5	E

PO – Programme Outcomes; CO – Course Outcome; R- Remember; U- Understand; Ap – Apply; An – Analyse; E- Evaluate; C – Create

TEXT BOOKS

1. M. T. Somashekara, "Problem Solving with C", PHI Learning Private Limited, 2009.
2. E. Balagurusamy, "Programming in ANSI C", Seventh Edition, McGraw Hill Education (India) Private Limited, New Delhi.

BOOKS FOR REFERENCE

1. BrianW. Kernighan and Dennis M. Ritchie, **"**The C programming Language**"**, Prentice-Hall Publishing Company, 2006.
2. Deitel and Deitel, **"**C How to Program**"**, Seventh Edition, Pearson Education Pvt. Ltd., 2013.
3. R.G.Dromey, **"**How to Solve it by Computer**"**, Fifth Edition, Pearson Education Pvt. Ltd., New Delhi, 2007.
4. Kamthane, A.N., **"**Programming with ANSI and Turbo C**"**, Pearson Education Pvt. Ltd., New Delhi, 2006.
5. K R Venugopal , Sudeep R Prasad, **"**Mastering C**"**, Second Edition, McGraw Hill Education Private Limited, 2015.

((For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS),
TIRUCHIRAPPALLI – 620 002 PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. First Year - Semester – I

Course Title	Major Core 2: Problem Solving using C Lab
Total Hours	30
Hours/Week	3 Hrs/Wk
Code	U19CA1MCP02 / U19CS1MCP02
Course Type	Practical
Credits	3
Marks	100

General Objective:
Student writes application programs using C for solving real time problems.

Course Objectives:

CO No.	Course Objectives
CO-1	Recall the syntax of control structures and solve problems using C
CO-2	Remember the syntax of looping statements and solve problems using C
CO-3	Create programs for arrays and strings using C
CO-4	Develop programs for Functions, Pointers and Structures in C
CO-5	Write programs for creating a file and perform I/O operation on files

EXERCISES

1. Control Statements
2. Loop Statements
3. Arrays (Searching and Sorting)
4. Strings
5. Functions and Pointers
6. Structure and Union
7. Dynamic Memory Allocation
8. Macros and File Handling

((For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS),
TIRUCHIRAPPALLI – 620 002 PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. First Year - Semester – I

Course Title	Allied 1 (Compulsory): Business Information Systems
Total Hours	45
Hours/Week	3 Hrs Wk
Code	U18CA1ACT01
Course Type	Theory
Credits	2
Marks	100

General Objective

Students explore how technology and information can be best used to achieve the organization‟s goals and in doing so gain strategic and sustainable competitive advantage within its business sector.

Course Objectives

CO No.	Course Objective
CO -1	Understand and remember the foundations and use of information systems.
CO -2	Understand and interpret the personal, social and business implications of using information systems.
CO -3	Observe and explain the real-world use of information systems, citing practical examples.
CO -4	Understand the basic principles of modeling information systems processes and outcomes.
CO -5	Evaluate and critically analyze problems of Information systems.

UNIT I: AN OVERVIEW **9 Hrs**

An Introduction to Information Systems:
Information Concepts – System Concepts – What is an Information System? – Business Information Systems. **Information Systems in Organizations:** Organizations and Information Systems – Competitive Advantage – Careers in information systems.
Extra Reading (Keywords): Data mining, Big Data.

UNIT II: INFORMATION TECHNOLOGY CONCEPTS **9 Hrs**

Hardware: Input and Output Devices - Software: Systems **Software:** Operating Systems – Current Operating Systems - Application Software: Overview of Application Software – Personal Application Software – **Database Systems and Business Intelligence:** Database Management Systems – **Telecommunications and Networks:** An overview of Telecommunications: Short Range Wireless options – Networks and Distributed Processing: Network Types – **The Internet, Intranets and Extranets:** Use and Functioning of the Internet: How the Internet works.
Extra Reading (Keywords): OODBMS and RDBMS

UNIT III: BUSINESS INFORMATION SYSTEMS **9 Hrs**

Electronic and Mobile Commerce: An Introduction to Electronic Commerce – An Introduction to Mobile Commerce – Electronic and Mobile Commerce Applications – **Enterprise Systems:** An Overview of Enterprise Systems: Transaction Processing Systems – Transaction Processing Activities – **Information and Decision Support Systems:** Decision Making and Problem Solving – **Knowledge Management and Specialized Information Systems:** Knowledge Management Systems.

Extra Reading (Keywords): B2B, B2C, C2C.

UNIT IV: SYSTEMS DEVELOPMENT **9 Hrs**

Systems Development: Investigation and Analysis: Systems Development Life Cycles – Systems Investigation

- Systems Analysis. **Systems Development:** Design, Implementation, Maintenance and Review.

Extra Reading (Keywords): Explore CASE Tools, SDLC.

UNIT V: INFORMATION SYSTEMS IN BUSINESS AND SOCIETY **9 Hrs**

The Personal and Social Impact of Computers: Computer Waste and Mistakes - Preventing Computer-Related Waste and Mistakes - Computer Crime: The Computer as a Tool to Commit Crime - The Computer as the Object of Crime - Preventing Computer-Related Crime - Privacy Issues.

Extra Reading (Keywords): Botnets, Cyberstalking, Phishing.

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

Course Outcomes:

CO No.	Course Outcomes	PSOs addressed	Cognitive Level
CO-1	Analyze and model the flow of information through business processes.	PSO 1	R, An
CO-2	Formulate plans and architectures for the capture, storage and retrieval of data.	PSO 2	U, Ap
CO-3	Develop computer programs to support or automate business processes.	PSO 3	Ap, C
CO-4	Apply networking concepts and technologies to support business needs.	PSO 4	Ap
CO-5	Align information systems and services with business strategy and formulate plans for the retrieval and analysis of supporting data.	PSO 5	An, Ap
CO-6	Document, monitor and assess the effectiveness of IT controls.	PSO 1	R, U, E

PO – Programme Outcomes; CO – Course Outcome; R- Remember; U- Understand; Ap – Apply; An – Analyse; E- Evaluate; C – Create

.

References

TEXT BOOK

1. Ralph M. Stair, George W. Reynolds, **"Principles of Information Systems, A Managerial Approach"**, Ninth Edition, Thomson Publishing.

REFERENCE BOOKS

1. A.K. Gupta, S. Chand, **"Management Information System"**, 2010.
2. Dr. S.P. Rajagopalan, **"Management Information System"**, Margham Publications, 2012.
3. P. Mohan, **"Management Information System"**, Himalaya Publishing House, 2006.
4. Elizabeth Hardcastle, **"Business Information** Systems**"**, Elizabeth Hardcastle & Ventus Publishing, 2008.
5. Paul Bocij Andrew Greasley Simon Hickie, **"Business Information Systems"**, Third Edition, Prentice Hall, 2008.

For Candidates admitted from June 2018 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002 PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. First Year - Semester – I

Course Title	**ALLIED 2 : APPLIED MATHEMATICS I (for BCA and B.Sc. Computer science students)**
Total Hours	**60**
Hours / Week	**4**
Code	**U15MA1ACT05**
Course type	**Theory**
Credits	**3**
Marks	**100**

General Objective:

To enable the students to understand the concept of mathematical logic. To provide sufficient knowledge of statistics which enables them to compute various statistical measures.

Course Objectives(CO) :
The learner will be able to

CO No.	Course Objectives
CO – 1	Understand the concept of logic and truth table
CO – 2	Understand WFF, Tautology and derivation of equivalence of formula
CO – 3	Evaluate measures of central tendency
CO – 4	Evaluate dispersion , Skewness, kurtosis
CO – 5	Evaluate Correlation and regression

UNIT 1:MATHEMATICALLOGIC **12Hrs**

Introduction – Notations – Negation – Conjunction – Disjunction - Conditional and bi-conditional Statements
– Statement Formulas – Truth Table

Extra Reading/ Keywords: Symbolic logic, Formal logical system

UNIT II : MATHEMATICAL LOGIC (CONTINUED) **12Hrs**

Well formed formulae – Tautology – Equivalence of formulae – Truth table - Truth table method – Replacement Process

Extra Reading/ Keywords:*Logical operations, Logical equations, Tautologies*

UNIT III: MEASURES OFCENTRAL TENDENCY **12Hrs**

Mean – Median – Mode (Excluded: Graphic location of mode & median, Deciles &Percentile) **Extra Reading/ Keywords:** *Geometric and harmonic mean, Appropriate and Positional measures, Deciles and percentile, Lorenz curve*

UNIT IV: DISPERSION, SKEWNESS&KURTOSIS **12Hrs**

Range – Quartile deviation – Mean deviation &Standard deviation – Karl Pearson‟s Coefficient of Skewness– Kurtosis.

Extra Reading/ Keywords: *Co-efficient of variation, Method of moments, Bowley's co-efficient of skewness,*
Sheppard's correction for moments, Kelly's co-efficient

UNIT V : CORRELATIONANDREGRESSION **12Hrs**

Karl Pearson‟s Coefficient of Correlation – Spearman‟s Rank Correlation Coefficient – Regression- Lines of Regression (Excluded Graphic method & standard error of estimate).

Extra Reading/ Keywords: *Index number, Time reversal test and factor reversal test, Least square method, Concurrent deviation method*

Note: Tests given in the Extra Reading /Key Word: must be tested only through assignment andseminars.

Course Outcomes (CO):
The learner will be able to

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO –1	Recall logic and truth table	**PSO - 3**	**R,U**
CO –2	Recognize WFF, Tautology and Summarize equivalence of formula.	**PSO - 5**	**U,Ap**
CO –3	Compute measures of central tendency	**PSO - 2**	**U,E**
CO –4	Calculate and compare dispersion , Skewness, kurtosis	**PSO - 4**	**E**
CO –5	Evaluate Correlation and regression	**PSO - 1**	**E**
CO – 6	Enable the students to understand the concept of mathematical logic. To provide sufficient knowledge of statistics which enablesthemto compute various statistical measures- SkillDevelopment	**PSO - 4**	**R,U, Ap**

TEXT BOOKS:

1. Treatment and content as in G.S.S. BHISHMA RAO, Discrete structure and graph theory(2006) ,Scitech Publications Pvt Ltd., Hydrabad, for
   Units I &II UNITI: Chapter 1 : Sections 1-5
   UNITII: Chapter 1 : Sections 6-8

2. Treatment and content as in R.S.N. PILLAI & BHAGAVATHI (2007) ,Statistics Theory &practice ,S.Chand and Company Ltd., for Units III , IV ,V

   UNIT III : Chapter 9 (Relevant portions only) UNIT IV : Chapter 10 & 11 (Relevant portions only) UNIT V : Chapter 12 & 13 (Relevant portions only)

REFERENCE BOOKS :

1. J.N.Kapur&H.C..Saxena(2003), "MATHEMATICALSTATISTICS",
2. Shukla M.C(2000), "STATISTICS", S .Chand and S.Chand and Company, New Delhi.company, NewDelhi.
3. Vittal .P.R.,(2004), "BUSINESS STATISTICS", Margham publishers,Chennai

(For candidates admitted from 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS),

TIRUCHIRAPPALLI-2

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

SEMESTER I / V

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

General Objectives:

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

Course Objectives:

The student will be able to

1. understand the prospects of the various naturalresources.
2. analyse the concept and need forbiodiversity
3. evaluate the effect of the different types ofpollution.
4. understand the need for disastermanagement
5. understand the Environment and SocialIssues

Unit I – Awareness and Natural Resources 3hrs

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

Extra reading (Key Words):*Non renewable sources- location in India*

Unit II – Ecosystems and Biodiversity 3hrs

Ecosystem – concepts, structure and types – concept of food chains and food web – causes and effects of weakening food chains - Biodiversity – concept of genetic, species and ecological biodiversity – ecological and economic values – India, a mega diversity country, hotspots – threats to biodiversity and conservation measures

Extra reading (Key Words): *Red list (any 10 plants and animals)*

Unit III –Environmental Pollution 3hrs

Causes, effects and control of water, and air pollution – global warming – ozone depletion – nuclear hazards. Population growth at national and global level

World food production – effects of modern agriculture on land ecosystems – GMOs and related issues .Environmental pollution and diseases – malaria, chikungunya

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

Unit IV –DisasterManagement 3hrs

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

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

Unit V – Environment andSocialIssues 3hrs

Rich – poor wide – at national and global levels

Urbanization – slums

Changing value systems – AIDS Family welfare programs

Extra reading (Key Words): *Scholarships and funds benefitting the welfare of the family*

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

Course Outcomes:

1. Explain the importance of the various natural resources.
2. Analyze the concepts, structure and types of ecosystem. Add note on the bio diversity concepts
3. Evaluate the effect of the different types of pollution
4. Explains the various disaster management
5. Discuss the need of environment and the social issues

REFERENCES:

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

Chairas, D.D. (1985). EnvironmentalScience. TheBenjaminCummings Publishing company.,Inc.

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

Hodges, L. (1977). Environmental Pollution, II Edition. Holt, Rinehart and Winston, New York.Krebs, C.J. (2001).Ecology.VI Edition.Benjamin Cummings.

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

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

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

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

(For Candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2

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

LIFE ORIENTED EDUCATION

ETHICS – I: RELIGIONS AND VALUE SYSTEMS

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

CREDITS:1 **MARKS :100**

OBJECTIVES:

- To enable the students to understand and appreciate all Religions andCulture
- To help the students tobecom
- To aware of the negative forces ofreligions.

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 andexercises

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 FoundationCourses, 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 foryouth.
5. MarieMigon 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:U15VE2LVB01**

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 ofChrist.

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,Micah5:2)
- The Birth and Ministry of John the Baptist (Luke 1:1-80,Mat3:1-17,14:1-12)
- 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,John2:1-12)
- Parables (Luke6:46-49,8:4-15,10:25-37,15:1-32)
- Preaching
  - Sermon on the mount (Mat5-7)
  - 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,Mark14:32-42)
- Rich and Poor (Luke 16: 19-31,21:1-4)
- Women Liberation (John4:1-30,8:1-4)
- Women in the NewTestament
- Martha & Maria (Luke 10: 38- 42, John 11:1-46)

UNIT – III: CHURCH – BIRTH AND GROWTH

- EarlyChurch
- Birth (Acts2:1-41)
- Unity and sharing (Acts2:42-47,4:1-37,5:1-11)
- Witnessing life (Acts 3:1-26,5:12-42,8:26-40,16:20-34)

- Comparison between early Church and presentChurch.

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,Acts2:1-41,12:1-17)
- St. Andrew (Mat 4:18-20,John1:35-42,6:1-14)
- St. Stephen (Acts6,7)
- St. Paul (Acts 8,9,14,17,26 and28)
- St. Thomas (John20:24-31)

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

- I & IICorinthians
- Galatians
- Ephesians
- Philippians
- I & IITimothy
- Titus

REFERENCES:

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

(For Candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI -2

B.A/B. Sc /B.Com/ B.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 HolyBible
- To enable the students to know about the PaschalMystery

UNIT – I: CREATION AND COVENANT

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

(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 themessage – meaning and blessing of suffering and paschal joy in one‟s life - Passion – PaschalMystery

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 forIndia.
3. Vaazhvin Vazhiyil – St. John‟s Gospel- Fr.Eronimus
4. God‟s Word nourishes A catholic approach to the Scriptures Dr. Silvano RenuRita,O.C.V. STD and Dr. Mascarenhas Fio S.J. D.mim. Catholic Bible I
5. Documents of Vatican II – St. Paul‟s Publications, Bombay1966.

(For the candidates admitted from June 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI-620002

DEPARTMENT OF HINDI

SEMESTER – II

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

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

Course Objectives (CO):

The learner will be able to:

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

UNIT – I **(15 Hours)**

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

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

UNIT- II **(15 Hours)**

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

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

UNIT- III **(15 Hours)**

1. Ashad ka ek dhin
2. Gaban

3. Kriya Visheshan

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

UNIT- IV **(15 Hours)**

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

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

UNIT- V **(15 Hours)**

1. Ashad ka ek dhin
2. Gaban
3. Yojak(Samuchaya Bhodak) Aur Dhyodak (Vismyadhi Bhodak)

Extra Reading (Key Words): Poos Ki Raat, Shatranj Ke Khiladi

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

Course Outcomes:

The learner will be able to:

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

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

Reference Books :

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

(For candidates admitted 2016 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI – 2

DEPARTMENT OF FRENCH

SEMESTER II

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

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

Course Objectives (CO):

The learner will be able to

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

Unit 1 Quellejournée! (15Hours)

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

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

Unit 2 Qu‟onest bienici! (12Hours)

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

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

Unit 3 Souvenez-vous ? (12Hours)

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

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

Unit 4 Ons‟appelle ? (12Hours)

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

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

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

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

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

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

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

TEXT BOOKS :

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

Books for Reference:

La Conjugaison – Nathan

French made easy – Beginners level - Goodwill Publishing House Je parle français II - Abhay Publications

Le français avec des jeux et des activités – ELI Langue et la civilisation – I – Mauger Bleu

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

(For candidates admitted from June 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS), Tiruchirapalli – 620002

PG AND RESEARCH DEPARTMENT OF ENGLISH

I YEAR UG – SEMESTER I

PART II – ENGLISH 2 - GENERAL ENGLISH II

HOURS : 6 **CODE : U15EL2GEN02**

CREDIT : 3 **MARKS: 100**

OBJECTIVES

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

UNIT I – SELF

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

TEXTS

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

UNIT II – STRENGTHS

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

TEXTS

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

UNIT III - POSITIVE SHORTCOMINGS

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

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

UNIT IV POTENTIALS

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

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

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

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

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((For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002 PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. First Year - Semester – II

Course Title	DATA STRUCTURES AND ALGORITHMS
Total Hours	75
Hours/Week	5 Hrs /Wk
Code	U19CA2MCT03/U19CS2MCT03
Course Type	Theory
Credits	5
Marks	100

General Objective:
To impart fundamental knowledge on data structures and algorithms.
Course Objectives:
The Learner will be able to

CO No.	Course Objectives
CO-1	Learn the fundamental Concepts of Data Structures
CO-2	Understand the working principles of Linked List, Stack, Queue and Trees.
CO-3	Understanding of various sorting algorithms, including insertion sort, selection sort, merge sort, heap sort and quick sort.
CO-4	Understand the mapping of real-world problems to algorithmic solutions.
CO-5	Study how to balance a Binary Search trees and 2-3 and so on other Trees

Unit - I **15Hrs**
INTRODUCTION AND OVERVIEW: Introduction - Basic Terminology - Elementary Data Organization - Data Structures - Data Structure Operations. Arrays: Introduction - Linear Arrays - Representation - Traversing, Insertion and Deletion. SEARCHING: Linear Search - Binary Search.
Extra **Extra Reading /Key words:** *two dimensional and multi dimensional array concepts.*

Unit - II **15Hrs**
LINKED LISTS:Introduction - Linked Lists - Representation of Linked List in Memory - Traversing a Linked List - Searching a Linked List – Memory Allocation, Garbage Collection - Insertion into a Linked List - Deletion from a Linked List.
Extra Reading /Key words: *real time applications of Linked Lists.*

Unit - III **15Hrs**
STACKS, QUEUES AND RECURSION: Introduction - Stacks – Array Representations of Stacks - Arithmetic Expressions- Polish Notation - Recursion: Factorial Function and Fibonacci Sequence. QUEUES:Representation of Queues - Array Representation of Queues.
Extra Reading /Key words: *Postfix expression, Dequeue.*

Unit - IV **15Hrs**

TREES: Introduction - Binary Trees - Representing Binary Tress in Memory - Traversing Binary Trees- Binary Search Tree- Searching and Inserting in Binary Search Trees - Deleting in Binary Search Trees. SORTING: Introduction -Insertion Sort - Selection Sort - Merge Sort - Heap Sort.

Extra Reading /Key words: *Tree Traversals, Binary Search Tree.*

Unit - V **15Hrs**

GRAPH AND THEIR APPLICATIONS: Introduction- Graph theory terminology- Sequential representation of graphs; Adjacency matrix; Path matrix; - Warshall‟s Algorithm; Shortest path – linked representation of a Graphs – Operation on Graph – Traversing a Graph.

Extra Reading /Key words: *cyclic and acyclic graph, shortest path.*

Course Outcomes:
The Learner will be able to

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Recall the fundamental Concepts of Data Structures.	PSO 1	R, U
CO-2	Determine the applications of Linked List, Stack, Queue and Trees.	PSO 2	A
CO-3	Grasp various operations and searching methods applied using Binary Tree.	PSO 2	U
CO-4	Demonstrate of various sorting algorithms, including insertion sort, selection sort, merge sort, heap sort and quick sort.	PSO 3	Ap
CO-5	Comprehend various Algorithm Design Strategies.	PSO 4	An

Reference Books:

1.Seymour Lipschutz, “Data Structures”, Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.

Units: I, II, III, IV & V

Reference Books:

1. Ellis Horowitz, SartajSahni and Dinesh Mehta, “Fundamentals of Data Structures in C++”, University Press (India) Pvt. Ltd., Hyderabad, 2007.

2. Yashavant P. Kanetkar, “Data Structures Through C++”, BPB Publications, 2003.

3. 1. A. Chitra and P.T. Rajan, Data Structures, Tata McGraw – Hill Publishing Company Limited, New Delhi.

4. Jean Paul Tremblay and Paul G. Sorenson, An Introduction To Data Structures with Applications, Tata McGraw-Hill, Second Edition.

5. S.E. Goodman and S.T. Hedetniemi, “Introduction to the Design and Analysis of Algorithms”, Tata McGrawHill, International Edition, 1987.

((For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002 PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. First Year - Semester – II

Course Title	Major Core 4: Data Structures Lab
Total Hours	75
Hours/Week	5 Hrs Wk
Code	U19CA2MCP04 / U19CS2MCP04
Course Type	Lab
Credits	4
Marks	100

General Objective:

Student learns to develop C program for implementing different kind of Data Structures.

Course Objectives:

CO No.	Course Objectives
CO-1	Remember stack concepts and develop programs using C.
CO-2	Understand the concepts of Queue and develop programs using C.
CO-3	Insert and delete nodes into and from a linked list using C.
CO-4	Develop C programs for implementing different sorting techniques.
CO-5	Develop C programs for searching an element in an array.
CO-6	Find the shortest path in a graph using C.

EXERCISES

1. Operations on Stack and Conversion of expressions.
2. Operations on Queue.
3. Operations on Linked List.
4. Operations on Binary tree and Traversals.
5. SORTING:
    a. Bubble Sort.
    b. Insertion Sort.
    c. Selection Sort.
    d. Heap Sort.
    e. Quick Sort.
6. SEARCHING:
    a. Linear Search.
    b. Binary Search.
7. Dijkstra‟s Algorithm to find the Shortest Path.

(For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002 PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Second Year - Semester – III

Course Title	Major core 5 – Database Systems
Total Hours	75
Hours/Week	5 Hrs/Wk
Code	U19CA3MCT05/ U19CS3MCT05
Course Type	Theory
Credits	5
Marks	100

GENERAL OBJECTIVE

To impart the fundamental aspects of database design, database languages and database-system implementation.

CO No.	Course Objectives
CO-1	Understand, analyze the database, file management and data management system.
CO-2	Apply Structured Query Language to access data from database.
CO-3	Identify different data models and relate E-R model with relation
CO-4	Apply Normalization techniques to refine database
CO-5	Analyze Transaction Processing and Concurrency Control mechanism in database system

UNIT- I Introduction to DBMS **15 Hrs**

Introduction to Database Systems: Basic Concepts and Definitions - Data Dictionary - Database - Database System - Data Administrator - Database Administrator - Database System Architecture: Three-level ANSI-SPARC Data Base Architecture - Data Independence – Mappings.

Extra reading/Key words*: DB Software, Big Data*

UNIT- II Structured Query Language **15 Hrs**

Relational Query Languages: Query Language – Structured Query Language: Advantages and Disadvantages of SQL- Basic SQL Data Structure - SQL Data Types - SQL Operators - Data Definition Language - Data Query Language - Data Manipulation Language - Data Control Language - Data Administration Statements - Transaction Control Statements.

Extra reading/Key words*: PostgreSQL, Embedded SQL*

UNIT- III Types of Data Model **15 Hrs**

Data Models: Record-Based Data Model-Object-Based Data Model-Physical Data Model-Hierarchical Data Model- Network Data Model- Relational Data Model-Object-Oriented Data Model-Comparisons between Data Model- Entity- Relational Model: Basic E-R Concepts – Conversion of E-R Model into Relations.

Extra reading/Key words : *EER Model, Advanced Data Analysis*

UNIT- IV Normalization **15 Hrs**

Introduction – Normalization - Normal Forms - BCNF – Multi-value Dependencies and 4NF – Join Dependencies and 5NF- Query Processing: Introduction – Query Processing – Syntax Analyzer – Query Decomposition.

Extra reading/Key words*: 6NF, ONF*

UNIT- V Transaction Processing **15Hrs**

Transaction Processing and Concurrency Control: Introduction - Transaction Concepts - Concurrency Control - Locking Methods for Concurrency Control – Database Recovery System: Database Recovery Concepts - Types of Database Failures - Types of Database Recovery.

Extra reading/Key words*: Web Server, Transaction Processing Monitor*

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Recall and Relate file management systems with DBMS.	PSO 1	R, U
CO-2	Design relations using Database Schema	PSO 2 PSO 5	A
CO-3	Relate Relational Algebra Notation with Relation Operation to access the data.	PSO 2	An
CO-4	Differentiate and Refine the relations by applying normalization techniques.	PSO 4	An,E
CO-5	Sketch and Relate E-R diagrams with relations.	PSO 2	An
CO-6	Apply SQL queries to access the data.	PSO 4	Ap
CO-7	Understand Transaction concepts and Analyze Concurrency Control method	PSO 1	U,An
CO-8	Differentiate types of Database failures and Database recovery	PSO 2	An

PO – Programme Outcomes; CO – Course Outcome; R- Remember; U- Understand; Ap – Apply;An – Analyse; E- Evaluate; C – Create

Text Books

1. S.K. Singh, "Database Systems - Concepts, Design and Application", Pearson Education, 1st edition, 2013.

Reference Books:

1. G.K.Gupta **,"Database Management System",** 2011, Tata McGraw Hill Publications Company Limited, New Delhi.
2. Seema kedar, **"Database Management System",** 2011, Technical Publications.
3. Elmasri & Navathe, **"Fundamentals of Database Systems"**, 2006, Pearson Education Publications, New Delhi.
4. P.K. Yadav,**"Database Management System"**, 2013, Tata McGraw Hill Publications Company Limited, New Delhi.
5. Jiawei Hen and Micheline Kamber, **"Data Mining Concepts and Techniques"**, 2nd Edition, Morgan Kaufmann,2006

(For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002 PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Second Year - Semester – III

Course Title	Major Core 6 : Database Systems Lab
Total Hours	75
Hours/Week	5 Hrs /Wk
Code	U19CA3MCP06/ U19CS3MCP06
Course Type	Practical
Credits	5
Marks	100

General Objectives:

To examines the database architecture and data mining technologies required for solving complex problems of data and information management, information retrieval, and knowledge discovery facing modern organizations.

Course Objectives:

CO NO.	COURSE OBJECTIVES
CO-1	Understand to create table,aggregate functions,set operators using queries
CO-2	Provide pratices to partition the table,usage of nested queries
CO-3	Apply pl/sql program to prepare mark sheet,pay slip,electricity bill
CO-4	Apply pl/sql program to prepare multiplication table,count the strings
CO-5	Provide the exposure on weka tools.

- Table creation and simple queries.
- Queries using aggregate functions.
- Queries using set Operators.
- Table creation with various joins.
- Partitioned table creation.
- Nested sub queries and correlated sub queries.
- View creation and manipulations.
- PL/SQL program to prepare mark sheet.
- PL/SQL program to prepare a pay slip.
- PL/SQL program to prepare the electricity Bill.
- PL/SQL program to prepare the multiplication table for a given number.
- PL/SQL program to count the number of characters and digits in a string.
- Exposure on WEGA too

(For Candidates admitted from June 2018 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS),
TIRUCHIRAPPALLI – 620 002 PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. First Year - Semester – II

Course Title	**ALLIED-3 APPLIED MATHEMATICS- II (For BCA & Computer Science students)**
Total Hours	**60**
Hours / Week	**4**
Code	**U15MA2ACT11**
Course type	**Theory**
Credits	**3**
Marks	**100**

General Objective:

To provide an understanding of basic concepts in Operations Research Techniques for Analysis and Modeling in computer applications

Course Objectives(CO) :
The learner will be able to

CO No.	Course Objectives
CO – 1	Understand LPP and solving LPP using graphical and simplex method.
CO – 2	Understand Transportation problem and Evaluation of its initial basic feasible solution using North west corner rule, Least cost method, Vogel method.
CO – 3	Evaluate assignment problem using Hungarian algorithm.
CO – 4	Understand problem of sequencing and processing n jobs through 2 machines and 3 machines
CO – 5	Understand Network basic concepts, Rule of network construction and evaluation of PERT and CPM

UNIT I:
LINEARPROGRAMMINGPROBLEM **12Hrs**

Introduction –Mathematical formulation of the Problem – Solving LPP by graphical method – General LPP - Canonical and standard forms – Simplex method.**(Simple problems only)**

Extra Reading/ Keywords: *Integer linear programming, Mixed integer programming Karmarkar's algorithm.*

UNIT II:

TRANSPORTATIONPROBLEM **12Hrs**

Introduction – Mathematical Formulation –Initial basic feasible solution by North West Corner Rule – Least cost method – Vogel‟s approximation method- Unbalanced and maximization transportation problems.**(Initial basic feasible solution problems only)**

Extra Reading/ Keywords: *Modified distribution method (MODI), Russell's approximation method*

UNIT III:

Assignmentproblem **12Hrs**

Assignment Problem – Hungarian method – Unbalanced AP – Maximization in AP.

Extra Reading/ Keywords*: Generalised assignment problem, Linear bottleneck assignment problem*

UNIT IV:

SequencingProblem **12Hrs**

Introduction – problem of sequencing- Basic terms - Processing n jobs through 2 machines & 3 machines.

Extra Reading/ Keywords*:Job-shop scheduling, Flow-shop scheduling*

UNIT V:

Network SchedulingbyPERT/CPM **12Hrs**

Introduction – Network Basic components – logical sequencing – Rules of network construction – Concurrent activities - Critical path analysis.

Extra Reading/ Keywords*:Critical path analysis in project management, Graphical evaluation and review technique, Precedence diagram method.*

Note: Tests given in the Extra Reading /Key Word: must be tested only through assignment andseminars

Course Outcomes(CO):

The learner will be able to

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO – 1	Recognize and relate LPP and solving LPP using graphical and simplex method.	**PSO - 3**	**R,U,E**
CO – 2	Explain Transportation problem and Evaluate its initial basic feasible solution	**PSO -2**	**Ap, E**
CO – 3	Discuss and solve assignment problem using Hungarian algorithm.	**PSO -1**	**E**
CO – 4	Recall and evaluate the problem of sequencing with respect to processing n jobs through 2machinesand 3 machines.	**PSO -5**	**E**
CO – 5	Describe and Construct Network and compute PERT and CPM	**PSO -4**	**R,U,E**
CO – 6	Provide an understanding of basic concepts in Operations Research Techniques for Analysis and Modeling in computer applications Skill Development	**PSO – 2,5**	**U, Ap**

TEXT BOOK:

Treatment and content as in Kanti Swarup, Gupta P.K, Man Mohan (2007),13th revised edition **OPERATIONS RESEARCH**Sultan Chand & Sons, New Delhi.

UnitI : Chapter 2: Sections 2.1 to 2.4 , Chapter 3 : Sections 3.1 to 3.5, Chapter 4: Section4.3
Unit II : Chapter 10 : Sections 10.1 to 10.3, 10.5,10.9,10.15
Unit III: Chapter 11: Sections 11.1, 11.2, 11.3 (4), 11.4
Unit IV: Chapter 12 : Section 12.1 to 12.5.
Unit V: Chapter 25 : Sections 25.1 to 25.6

EFERENCE BOOKS:

1. S.Kalavathy , (2nd Reprint 2011), OPERATIONS RESEARCH , 3rd edition, Vikas Publishing House Pvt.Ltd, New Delhi.
2. Gupta P.K., Hira S.(2005) , **OPERATIONS RESEARCH**, S.Chand & Co.Limited , NewDelhi.
3. Mariappan P.(2001), **OPERATIONS RESEARCH METHODS& APPLICATIONS** New Century Book House PrivateLimited..
4. PanneerSelvam(2003),**OPERATIONSRESEARCH**,PrenticeHallofIndiaPrivate Limited, NewDelhi.
5. Sharma J.K.(2007), **OPERATION RESEARCH THEORY &APPLICATIONS**, Macmillan India Limited,Chennai.

(For the candidates admitted from 2015onwards)

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI

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

SEMESTER- II

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

General Objective:

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

Course Outcomes:

The student will be able to

1. Understand the importance of self awareness, values and leadership skills incapacitybuilding
2. Understand and analyze the factors affecting interpersonalskills
3. Understand and evaluate the concepts of vision, mission and goals for corporateskills
4. Understand, apply and analyze the importance of body language, time management andstress management
5. Understand the concept and need for self development plan

UNITI:

6hrs

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- Leadershipskills.

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

UNITII: 6hrs

Interpersonal skills

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

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

UNITIII: 6hrs

Corporate skills

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

Extra reading / Key Words: *Group dynamics and communication skills*

UNITIV: 6hrs

Management skills

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

Extra reading / Key Words: *Polite conversations and dialogue skills*

UNITV: 6 hrs

Self Development Plan

Concept and Need for Self Development Plan – Preparing Self Development Plan 9 Format is used to complete the self development Plan), Monitoring and Evaluation of self Development plan – Developing indicators for self development introduction to National Skill Development Mission.

Extra reading / Key Words: *Case study*

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

1. explain the importance of self awareness, values and leadership skills in capacitybuilding
2. analyze the factors affecting interpersonalskills
3. evaluate the concepts of vision, mission and goals for corporateskills
4. apply and analyze the importance of body language, time management and stressmanagement
5. summarize the concept and need for self developmentplan

REFERENCES:

Alex K.(2012) Soft Skills – Know Yourself & Know the World, S. Chand & Company Ltd., New Delhi Meena K. Ayothi V. (2013). A Book on Development of Soft Skills (Soft Skills: A Road Map to Success), P.R. Publishers & Distributors,Trichy.

Francis Thamburaj S.J. (2009). Communication soft skills for Professional Excellence, 1st Ed., Grace Publishers, Rathan Reddy B.(2005). Team Development and Leadership, Jaico Publishing House, Mumbai.

(For candidates admitted from 2018 onwards)

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

SEMESTER II / III

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

General Objective:

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

The student will be able to:

Course Objectives:

1. understand the functioning of NGO‟s andSHG‟s
2. educate themselves about the different farmingmethods.
3. practice alternative agriculturalmethods
4. understand the need for social responsibility throughNCC.
5. understand the Leadership and ManManagement

Unit–I 6hrs

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

Extra reading/Key word: *resource mapping tools*

Unit–II 6hrs

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

Extra reading / Key word: *Practices in India*

Unit–III 6hrs

Elements in Alternative Agriculture models ,Vermicompost,Azolla, Amirthakarasal,Mull igai Puchiviratti and neemproducts

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

UnitIV- 6hrs

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

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

Unit-V **6hrs**

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

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

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

Course Outcome:

1. Explain the functioning of NGO‟s andSHG‟s
2. Sumarize themselves about the different farmingmethods.
3. Explain the alternative agriculturalmethods
4. Point out the need for social responsibility throughNCC.
5. Evaluate the Leadership and ManManagement

REFERENCES:

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

   a. Tracey, S. andAnne, B.(2008). Sustainable development linking economy,society, environment. OECDinsights.

   b. 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

ETHICS – I: RELIGIONS AND VALUE SYSTEMS

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

CREDITS:1 **MARKS :100**

OBJECTIVES:

- To enable the students to understand and appreciate all Religions andCulture
- To help the students tobecom
- To aware of the negative forces ofreligions.

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 andexercises

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 foryouth.
5. MarieMigon 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:U15VE2LVB01**
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 ofChrist.

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,Micah5:2)
- The Birth and Ministry of John the Baptist (Luke 1:1-80,Mat3:1-17,14:1-12)
- 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,John2:1-12)
- Parables (Luke6:46-49,8:4-15,10:25-37,15:1-32)
- Preaching
  - Sermon on the mount (Mat5-7)
  - 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,Mark14:32-42)
- Rich and Poor (Luke 16: 19-31,21:1-4)
- Women Liberation (John4:1-30,8:1-4)
- Women in the NewTestament
- Martha & Maria (Luke 10: 38- 42, John 11:1-46)

UNIT – III: CHURCH – BIRTH AND GROWTH

- EarlyChurch
- Birth (Acts2:1-41)
- Unity and sharing (Acts2:42-47,4:1-37,5:1-11)
- Witnessing life (Acts 3:1-26,5:12-42,8:26-40,16:20-34)

- Comparison between early Church and presentChurch.

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,Acts2:1-41,12:1-17)
- St. Andrew (Mat 4:18-20,John1:35-42,6:1-14)
- St. Stephen (Acts6,7)
- St. Paul (Acts 8,9,14,17,26 and28)
- St. Thomas (John20:24-31)

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

- I & IICorinthians
- Galatians
- Ephesians
- Philippians
- I & IITimothy
- Titus

REFERENCES:

3. HolyBible
4. John Stott, 1994, **"Men with a Message"**, Angus Hudson Ltd.London.

(For Candidates admitted from June 2015 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPPALLI -2
B.A/B. Sc /B.Com/ B.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 HolyBible
- To enable the students to know about the PaschalMystery

UNIT – I: CREATION AND COVENANT

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

(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 themessage – meaning and blessing of suffering and paschal joy in one‟s life - Passion – PaschalMystery

REFERENCES:

6. Catechism of the Catholic Church published by Theological Publications in India for the Catholic Hierarchy of India,1994
7. The Holy Bible Revised Standard Version with Old and New Testaments Catholic Edition forIndia.
8. Vaazhvin Vazhiyil – St. John‟s Gospel- Fr.Eronimus
9. God‟s Word nourishes A catholic approach to the Scriptures Dr. Silvano RenuRita,O.C.V. STD and Dr. Mascarenhas Fio S.J. D.mim. Catholic Bible I
10. Documents of Vatican II – St. Paul‟s Publications, Bombay1966.

(For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002 PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Second Year - Semester – III

Course Title	Skill Based Elective 3: Multimedia Lab
Total Hours	26
Hours/Week	2 Hrs/Wk
Code	U19CA3SBP03
Course Type	Lab
Credits	2
Marks	100

General Objectives:

To learn use the basic tools found in Adobe Photoshop to create and edit images.

Course Objectives:

CO No.	Course Objectives
CO-1	Demonstrate the techniques of photo editing.
CO-2	Apply layer masks, filters and blending modes , share and save your images in various formats.
CO-3	Learn various retouching and repairing techniques to correct images.
CO-4	Demonstrate the techniques for resize and crop images.
CO-5	Demonstrate how to Remove or repair unwanted image areas.

PHOTOSHOP

1. Design a Greeting card
2. Designing an Invitation
3. Designing a Logo, Business Card
4. Designing a Identity Card
5. Designing a Book Wrapper
6. Coloring a Black and white photo
7. Placing an Image in Text With

Photoshop FLASH

8. Changing a Circle into a Square in Flash
9. Animating a Ball bouncing on Steps using Flash
10. Simulating A Ball Hitting another Ball in Flash
11. Create an Animation to represent the Growing Moon
12. Simulating Movement of a Cloud
13. Displaying The Background Through text
14. Animating Text
15. Animating a Butterfly

ILLUSTRATOR

1. Crop the object using Clipping Mask
2. Fill a Shape with an Image and Insert Text in an Image
3. Create an object group and apply the Distort and Transform Effects
4. Create a Rangoli design
5. Create a Floral Design
6. Create a Web Banner
7. Create an Invitation for the International Conference
8. Design a Book Mark and Business Card

(For candidates admitted from 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS),
TIRUCHIRAPPALLI-2 B.A./B.Sc./ B.Com./B.C.A./B.B.A
DEGREE COURSE

SEMESTER – III / VI

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

General Objective:

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

The student will be able to

Course Objectives**:**

1. understand the conceptsofgender.
2. differentiate women studies fromgenderstudies
3. analyze the areas ofgenderdiscrimination
4. analyze and evaluate the initiative and policies forwomenempowerment
5. remember the women‟s movements andsafeguardingmechanisms

UnitI 3 hrs

Concepts of Gender:

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

Extra reading /Key Words: *Acts on gender*

UnitII 3 hrs

Women‟s Studies Vs Gender Studies:

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

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

Unit–III 3hrs

Areas of Gender Discrimination:

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

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

Unit–IV 3hrs

Women Development and Gender Empowerment:

Initiatives – International Women‟s Decade – International Women‟s Year – National Policy for Empowerment of Women – Women Empowerment Year 2001 – Mainstreaming Global Policies. **Extra reading/Key Words:** *Case study*

Unit–V 3hrs

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

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

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

Course Outcomes:

1. evaluate the concepts of gender discrimination.
2. compare women‟s studies with genderstudies.
3. describe the areas of genderdiscrimination.
4. evaluate the initiative and policies for womenempowerment.
5. Explain the different womenmovement.

REFERENCES:

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

Bharathidasan University, Tiruchirappalli

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

(For Candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI-2

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

LIFE ORIENTED EDUCATION

ETHICS – II: EMPOWERMENT OF WOMEN

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

CREDIT:1 **MARKS :100**

OBJECTIVES:

- To make the learners aware of various gender and social issues and CyberCrimes.
- To make the learners understand and appreciate the role of media, in facing the challenges on various lifeissues.
- To enable the learners to understand the ways of empowering women and cybercrime againstwomen

UNIT – I: GENDER ISSUES

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

UNIT – II: SOCIAL ISSUES RELATED TO WOMEN

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

UNIT – III: WOMEN AND MEDIA

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

UNIT – IV: WAYS OF EMPOWERING WOMEN

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

UNIT – V: CYBER CRIME AGAINST WOMEN

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

REFERENCES:

1. Dr.M.Arumairaj et al., 1999, “Marching towards the Milleniumahead”.
2. Thomas Anjugandam, 1999, “Grow Free Live Free” SalesianPublicaiton.
3. H.C Pretti Nandhini Upretti, jaipur 2000 “Women and problems of GenderDiscrimination”.
4. Thomas B.Jayaseelan, 2002, “Women: Rights and law” Indian Social Institute, NewDelhi.
5. Reni Jacob vol I & II, April- June 2004, ”Vikasimi – The journalofWomen‟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:U15VE4LVB02**

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 (Gen12-18);
- Joseph (Gen 37-40); Moses (Exo4-5);
- Joshua (Joshua1-8)

UNIT – II: JUDGES AND KINGS

- Judges: Deborah (Judges 4); Samson (Judges 6-8); Gideon (Judges13-16)
- Kings**:** David (I Sam 17-31, II Sam 1-12); Solomon (I Kings1-11)

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 (Is1,6,11,36-38,40-42,44,50,53,61)
- Jeremiah (Jer1-3,7-12,18-19,23)
- Ezechial (chapters 1,2,3,5,8,12visions)
- Daniel (Daniel1-6)

UNIT – V: WOMEN IN THE BIBLE

Women in the Old Testament

- Eve (Gen3)
- Ruth (Ruth1-4)
- Hannah (I Sam1:1-28)
- Esther (Esther1-6)

REFERENCES:

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

(For Candidates admitted from June 2015 onwards)

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

LIFE ORIENTED EDUCATION CATECHISM – II: CHURCH AND SACRAMENTS

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

CREDIT:1 **MARKS :100**

OBJECTIVES:

- To enable the students to understand the ways of Christian living with theChurch
- To understand God"s gift of the HolySpirit.
- To understand the methods of building relationship withJesus.
- To learn the life of Sacraments andPrayer
- To enrich our devotion to Mother Mary andSaints.

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 RioS.J. Gujarat Sahitya Prakash, P.O.Box. 70, Gujarat, 388001, India.
2. "The Sacraments The Word of God at the Mercy of the Body" ClaretianPublications, Malleswaram, Bangalore 560055.
3. Documents of Vatican II – St. Paul‟s Publications, Bombay1966.

(For the candidates admitted from June 2015 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS)

TIRUCHIRAPPALLI-620002 DEPARTMENT OF HINDI

SEMESTER – IV

Course Title	**Part – I Language** **Hindi Paper-IV Functional Hindi & Translation**
Total Hours	**75**
Hours/Week	**5Hrs/Wk**
Code	**CODE: U15HN4HIN04**
Course Type	**Theory**
Credits	**3**
Marks	**100**

General Objective : To enable the students to apply translation techniques and evaluate contemporary Hindi Literature.

Course Objectives (CO):

The learner will be able to:

CO No.	**Course Objectives**
CO -1	Apply technical translation in Functional Hindi
CO- 2	Understand and analyze the contemporary Hindi literature in the literary works
CO- 3	Evaluate and create general essays
CO- 4	Apply the formats and create formal and informal letters
CO- 5	Apply translation techniques

Unit 1 **(15 Hours)**

Functional Hindi

Extra Reading (Key Words): Technical Terminology

Unit 2 **(15 Hours)**

History of Hindi literature : adhunic kaal

Extra Reading (Key Words): Prayogavad, Pragativad

Unit 3 **(15 Hours)**

General essays:

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

Extra Reading (Key Words): Computer, Dr. Ambedkar

Unit 4 **(15 Hours)**

Letter writing

Extra Reading (Key Words): Official Letter, Personal letter

Unit 5 **(15 Hours)**

Anuvad abhyas - III

Extra Reading (Key Words): Translation, Technical Terms

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

Course Outcomes:

The learner will be able to:

CO No.	Course Outcomes	Cognitive Level
CO -1	Translate technical terms	Ap
CO- 2	Evaluate Contemporary issues in par with the literary works.	U, An
CO- 3	Instill creative writing	E, C
CO- 4	Communicate in formal situation .	Ap, C
CO- 5	Understand the basic principles of translation	Ap

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

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

(For candidates admitted 2016 onwards)

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

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

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

Course Objectives (CO):

The learner will be able to

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

Unit 1 C'est lafête! **(18 Hours)**

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

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

Unit 2 Vousplaisentez! **(18 Hours)**

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

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

Unit 3 On s'entendbien! **(18 Hours)**

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

Extra Reading (Key Words): les taboos

Unit 4 À vos risqué etpérils! **(18 Hours)**

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

Extra Reading (Key Words):les sportifs français

Unit 5 La vieest dure **(18 Hours)**

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

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

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

TEXT BOOKS :

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

Books for Reference:

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

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

(For candidates admitted from June 2017 onwards)

HOLY CROSS COLLEGE (AUTONOMOUS), Tiruchirapalli – 620002

PG AND RESEARCH DEPARTMENT OF ENGLISH

I YEAR UG – SEMESTER I

PART II – ENGLISH 4 - GENERAL ENGLISH IV

HOURS : 6 **CODE : U15EL4GEN04**

CREDIT : 3 **MARKS: 100**

EMPLOYABILITY SKILLS

OBJECTIVES:

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

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

Listening to identify a person‟s attitude, values, situation and the decision made.

Speaking about one‟s action, expressing opinions, character analysis.

Reading for comprehension(inferring a character‟s method of managing a situation, adaptability and the like).

Writing recommendations.

Grammar – use of appropriate adjectives and adverbs in contexts and reporting speeches

Vocabulary – differentiating shades of meaning, use of idioms and phrases in sentences

Composition – Your thoughts are the architects of your destiny – David O‟ Mckay

Honesty is the first chapter in the book of wisdom – Thomas Jefferson

TEXTS

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

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

Listening to differentiate dutyfrom obligation.

Speaking – Discussing one‟s knowledge about different subjects, learning skills, thirst for knowledge, learning form experiences.

Reading for comprehension exhibiting higher perception of life‟s experiences.

Writingparagraphs with cause and reason, analyzing motives behind people‟s actions and behavior.

Grammar – use of cohesive devices

Vocabulary – figures of speech– simile, metaphor.

Composition –

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

TEXTS

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

UNIT III – Team skills

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

TEXTS

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

UNIT IV – Communication skills for interpersonal relationship

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

TEXTS

1.The Refund by Fritz Karinthy

UNIT V –Presentation skills

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

TEXTS

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

(For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS),
TIRUCHIRAPPALLI – 620 002 PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Second Year - Semester – IV

Course Title	Major core 7 – Java Programming
Total Hours	75
Hours/Week	5 Hrs Wk
Code	U18CA4MCT07
Course Type	Theory
Credits	5
Marks	100

GENERAL OBJECTIVE

To enable the students to learn the syntax, concepts of the language to write the solution for real world problems.

Course Objectives:

CO No.	Course Objectives
CO-1	Understand & analyze the Java features and Program Structure.
CO-2	Apply the concepts of encapsulation in classes and objects.
CO-3	Classify and implement the types of Inheritance & Packages.
CO-4	Differentiate and demonstrate the types in Thread creation and Exception Handling.
CO-5	Create the Applet Program and apply the Collection Framework.

UNIT- I Introduction to Java **15 Hrs**

JAVA EVOLUTION : Java History – Java Features – How Java Differs from C and C++ -- Java and Internet – Java and World Wide Web – Web Browsers – Hardware and Software Requirements – Java Support Systems – Java Environment.

OVERVIEW OF JAVA LANGAGE : Introduction – Simple Java Program – More of Java – An Application with Two Classes – Java Program Structure – Java Tokens – Java Statements – Implementing a Java Program – Java Virtual Machine – Command Line Arguments – Programming Style - TYPE CONVERSION IN EXPRESSION- DECISION MAKING AND BRANCHING : Introduction – Decision Making with If Statement – Simple If Statement – The If ..Else Statement – Nesting of If..Else Statements – The Else If Ladder – The Switch Statement – The ? : Operator.

Extra reading/Key words: ***Netbean, Eclipse***

UNIT- II Classes and Object **15 Hrs**

DECISION MAKING AND LOOPING: Introduction – The While Statement – The do Statement – The for Statement – Jumps in Loops – Labeled Loops. CLASSES, OBJECTS AND METHODS: Introduction – Defining a Class – Fields Declaration – Methods Declaration – Creating Objects – Accessing Class Members – Constructors – Methods Overloading – Static Members – Nesting of Methods – Inheritance: Extending a Class – Overriding Methods– Final Variables and Methods – Final Classes – Finalizer Methods – Abstract Methods and Classes – Methods with Varargs – Visibility Control.

Extra reading/Key words: ***Generalization, Specialization***

UNIT- III Interfaces and Packages **15 Hrs**

INTERFACES: MULTIPLE INHERITANCE: Introduction – Defining Interfaces – Extending Interfaces – Implementing Interfaces – Accessing Interface Variables.

PACKAGES : PUTTING CLASSES TOGETHER : Introduction – Java API Packages – Using System Packages – Naming Conventions – Creating Packages – Accessing a Package – Using a Package – Adding a Class to a Package – Hiding Classes – Static Import.

Extra reading/Key words: *Proxy, JAR Files*

UNIT IV Multithreading and Exception Handling **15Hrs**

MULTITHREADED PROGRAMMING : Introduction – Creating Threads – Extending the Thread Class – Stopping and Blocking a Thread – Life Cycle of a Thread – Using Thread Methods – Thread Exceptions – Thread Priority – Synchronization – Implementing the „Runnable" Interface- Inter thread communication.

MANAGING ERRORS AND EXCEPTIONS : Introduction – Types of Errors – Exceptions – Syntax of Exception Handling Code – Multiple Catch Statements – Using Finally Statement – Throwing Our Own Exceptions – Using Exceptions for Debugging.

Extra reading/Key words: *Deadlock, Synchronization*

UNIT V Applet Programming **15 Hrs**

Introduction – How Applets Differ from Applications – Preparing to Write Applets – Building Applet Code – Applet Life Cycle

– Creating an Executable Applet – Designing a Web Page – Applet Tag – Adding Applet to Html File – Running the Applet – More About Applet Tag – Passing Parameters to Applets – Aligning the Display – More About Html Tags – Displaying Numerical Values – Getting Input from the User-Event Handling-Introduction to AWT package-Introduction to Swings - **JAVA COLLECTIONS:** Overview of Interfaces-Overview of Classes- Overview of Algorithms.

Extra reading/Key words: *HTML5, Servlet*

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	State OOPS and Relate java syntax with C and C++.	PSO 1	R, U
CO-2	Categorize OOPS such as encapsulation, abstraction, polymorphism.	PSO 2	An
CO-3	Applying encapsulation concepts in developing the programs with classes and objects.	PSO 4	Ap
CO-4	Identify different types of inheritance and apply them for reusability of code.	PSO 1, PSO 4	R, Ap
CO-5	Construct the packages by arranging the classes with visibility control.	PSO 2, PSO 5	C, An
CO-6	Develop program using different methods of thread creation and exception handling.	PSO 5	C, Ap
CO-7	Create Internet program using applets.	PSO 5	C,Ap
CO-8	Evaluate java collection with other implementation methods of data structure.	PSO 4	E

PO – Programme Outcomes; CO – Course Outcome; R- Remember; U- Understand; Ap – Apply; An – Analyse; E- Evaluate; C – Create

Reference Text Books:

1. E.Balagurusamy, **"Programming with JAVA"**, 5th Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi.

UNIT I : CHAPTERS 2, 3, 5.13 & 6
UNIT II : CHAPTERS 7,
8 **UNIT III :** CHAPTERS
10,11 **UNIT IV :**
CHAPTERS
12, 13 **UNIT V :**
CHAPTERS
14,17

Reference Books:

1. Herbert Schildt, **"Java The Complete Reference"**, 7th edition, Tata McGraw-Hill Publications Pvt. Ltd., New Delhi

2. Y.Daniel Liang, **"Introduction to Java Programming"** , 10th edition, Pearson Education Ltd

3. David J.Eck, **"Programming :Introduction to programming using Java"**, 6th edition, Createspace Publications

4. Joshua Bloch, **"Effective Java"**, Second Edition, Addison Wesley Publications.

5. Kathy Sierra, Bert Bates, **"Head First Java",** d edition, O"Reilly Publications.

(For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS),
TIRUCHIRAPPALLI – 620 002 PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Second Year - Semester – IV

Course Title	MAJOR ELECTIVE 1: Web Designing and PHP Lab
Total Hours	75
Hours/Week	5 Hrs /Wk
Code	U18CA4MEP01
Course Type	Practical
Credits	5
Marks	100

General Objectives:

To discuss and develop websites using script type, style sheets, jquery, html and php languages.

Course Objectives:

CO NO.	COURSE OBJECTIVES
CO-1	Understand the basic concepts of html and stylesheets.
CO-2	Perform basic operations using CSS
CO-3	Learn how to use jquery for effective website creation
CO-4	Learn various functions of MySQL
CO-5	Understand the Scripting language of website creation

HTML5 & CSS:

1. Create a HTML page that will have the following: Headers, Linking and Images.
2. Create a HTML page that will have the following: Frames, Unordered Lists, Nested and Ordered Lists
3. Create a HTML page that will have the following: Tables and Formatting
4. Create a HTML page that will have the following: Forms, Creating and Using Image Maps, Tags

JAVA SCRIPT:

1. Write a script to generate Random Numbers within 1 to 10 and display the numbers in a Table.
2. Write a script to create an Arithmetic Calculator using Function.
3. Write a script to check the given String is Palindrome or not.

JQUERY:

1. Write a program to display the Week Days.
2. Write a program to generate Date and Time in different format.
3. Write a program to Validate Age and Numeric Value.

PHP & MySQL:

1. Creating a simple PHP program using the concepts: Flow Control, Strings and Arrays, creating Functions.
2. FORM processing using PHP.
3. Connecting to MySQL from PHP, PHP MySQL Connectivity, Creating Databases and Tables with PHP Programs: Storing data and Retrieving data.

(For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS),
TIRUCHIRAPPALLI – 620 002 PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Second Year - Semester – IV

Course Title	MAJOR ELECTIVE 2: Unix and Shell Programming Lab
Total Hours	75
Hours/Week	5 Hrs /Wk
Code	U18CA4ME P02
Course Type	Practical
Credits	5
Marks	100

General Objectives:
To get knowledge and practical skill to create dynamic web applications

Course Objectives:

CO NO.	Course objectives
CO-1	Understand the usage of Unix Shell Command
CO-2	Understand the usage of commands related to inode, I/O redirection and piping, process control commands, mails
CO-3	Develop small shell scripts for conditions and looping
CO-4	Develop small shell scripts for file handling
CO-5	Develop small shell scripts for Logging.

EXERCISES

1. Use of Basic UNIX Shell Commands: ls, mkdir, rmdir, cd, cat, touch, file, wc, sort, cut, grep, dd, dfspace, du, ulimit

2. Commands related to inode, I/O redirection and piping, process control commands, mails.

3. Shell Programming: Shell script exercises based on following:
(i) Interactive shell scripts (ii) Positional parameters (iii) Arithmetic
(iv) if-then-fi, if-then- else-fi, nested if-else (v) Logical operators (vi) else + if equals elif,
case structure (vii) while, until, for loops, use of break

4. Write a shell script to create a file. Follow the instructions
(i) Input a page profile to yourself, copy it into other existing file;
(ii) Start printing file at certain line
(iii) Print all the difference between two file, copy the two files.
(iv) Print lines matching certain word pattern.

5. Write shell script for-
(i) Showing the count of users logged in,
(ii) Printing Column list of files in your home directory
(iii) Listing your job with below normal priority
(IV) Continue running your job after logging out.

6. Write a shell script to change data format. Show the time taken in execution of this script.

7. Write a shell script to print files names in a directory showing date of creation & serial number of the file.

8. Write a shell script to count lines, words and characters in its input (do not use wc).

9. Write a shell script to print end of a Glossary file in reverse order using Array. (Use awk tail)

10. Write a shell script to compute gcd lcm & of two numbers. Use the basic function to find gcd & LCM of N numbers.

(For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS),
TIRUCHIRAPPALLI – 620 002 PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Second Year - Semester – IV

Course Title	Major Elective 1 : Ruby On Rails Lab
Total Hours	75
Hours/Week	5 Hrs Wk
Code	U18CA4MEP03
Course Type	Practical
Credits	5
Marks	100

General Objectives:

To understand and learn the concepts of object oriented programming with developing programming skills in Ruby and develop web applications using Ruby on Rails .

Course Objectives:

CO No.	Course Objectives
CO-1	Understand the basics of Ruby and control statements.
CO-2	Apply the concepts of arrays.
CO-3	Understand the User defined functions and files types.
CO-4	Understand and analyze the computing capabilities in Ruby.
CO-5	Analyze and design algorithms for various applications

EXERCISES

1. Write a program to explain the Class and Object concept in Ruby.

2. Write a program for the various operators in Ruby.

3. Write a program to read the content in the File using File concepts in Ruby.

4. Write a program to create a user defined Function and how to call the Function.

5. Write a program to
   1) Fetch the values from Textbox and Radio Button
   2) Explain the Session and Cookies in Rails.

6. Write a program to retrieve Data from the Database

7. Write a program for create Rails Controllers and Rails Views

8. Write a program to explain the concept of uploading Files

HOLY CROSS COLLEGE (AUTONOMOUS) TIRUCHIRAPALLI – 620 002.

B.Com Regular / Computer Applications (For Candidates admitted from June 2018 onwards)

Second Year - Semester – IV

Course Title	ALLIED 5 - BASICS OF ACCOUNTING (For BCA)
Total Hours	60
Hours/Week	4 Hrs / Wk
Code	U18CO4AO T10
Course Type	Theory
Credits	4
Marks	100

General Objective:

To enable the students to understand the basic principles of Double entry system of Accounting and to provide basic knowledge of accounting procedure for Subsidiary Books Final A/CS, depreciation accounting, Rectification of Errors and ComputerizedAccounting.

Course Objectives:

The learner will be able to

CO No.	Course Objectives
CO-1	Remember and understand the accounting concepts and conventions and the basic principles of Double Entry system of Book-keeping and Accounting.
CO-2	Understand and apply the provisions relating to the preparation of Subsidiary Books and Final Accounts of Companies. Acquire knowledge on single entry system of book keeping
CO-3	Understand the basic methods of providing depreciation
CO-4	Recall the accounting procedures related to Rectification of Errors.
CO-5	Understand the concept of computerized accounting.

UNIT-IINTRODUCTION **12Hrs**

Accounting Concepts – Conventions – Rules of Double Entry – Journal – Ledger – Trial Balance.
Extra reading /Key words :*Chronology, Financial Statement*

UNIT- IIACCOUNTING CYCLE 12Hrs

Trading Account, Profit and Loss Account, Balance Sheet, Subsidiary Books – Purchases Book, Sales Book, Three column Cash Book,
Extra reading /Key words :*Final Accounts, Journal Proper*

UNIT- IIIDEPRECIATIONACCOUNTING 12Hrs

Depreciation Accounting Straight Line Method, Written Down Value Method and Annuity Method.

Extra Reading / Key words :*Devaluation, Emolument, Superannuation.*

UNIT- IV RECTIFICATIONOFERRORS 12Hrs

Rectification of Errors, Basic Principles for Rectification of Errors, Suspense Account, Errors Disclosed by Trial Balance, Guidelines to Locate Errors in the Trial Balance.

Extra Reading / Key words: *Erroneous, Suspense Account*

UNIT- VCOMPUTERACCOUNTING 12Hrs

Computer Accounting and Algorithm – Areas of Application of Computer in Accounting, Features and Advantages of Computers and Computer Accounting – Algorithm, Requisites of an Effective Algorithm – Features of Algorithm.**Extra Reading / Key words:** Data *Processing, Dactylology*

Theory 40% & Problems 60%

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

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Examine the fundamentals of accounting concepts and its implications.	1	U
CO-2	Develop nomenclatures of accounting cycle	1	U
CO-3	Perceive knowledge on depreciation and its various methods.	1	Ap
CO-4	Identify and disclose the errors involved in accounting process	1	Ap
CO-5	Adapt with the global changing competitive era.	1	U
CO-6	Develop accounting skills and employable in business organizations	1	Ap

PRESCRIBED TEXT:

1. T.S. Reddy and A. Murthy, "*Financial Accounting*" , 2014,MarghamPublications.

BOOKS FOR REFERENCE:

1. M.c. Shukla T.S. Grewal & SC Gupta , "Advanced Accountancy",2007, S. Chand andCo.
2. Volume I Pillai and Bagavathy , "Fundamentals of Advanced Accounting",2004,S.Chand &Co.
3. T.S. Reddy and Y. Hari Prasad Reddy, "Financial and ManagementAccounting",2012
4. MargamPublications.

Financial Accounting , " B. Charumathy and L. Vinayagam", 2012,S.Chand

(For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS),
TIRUCHIRAPPALLI – 620 002 PG
DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Second Year - Semester – IV

General Objective:

Course Title	Allied 6 (Optional) Paper III Java Programming Lab
Total Hours	60
Hours/Week	4 Hrs Wk
Code	U18CA4AOP03
Course Type	Practical
Credits	3
Marks	100

To enable the students to learn the syntax, concepts of the language and apply them to write the solution for read world problems.

Course Objectives:

CO No.	Course Objectives
CO-1	Understand & analyze the Java features and Program Structure.
CO-2	Understand the OOPs concepts and apply them in programs.
CO-3	Classify and implement the types of Inheritance & Package concept.
CO-4	Differentiate and apply the types of Thread creation and Debug the programs using Exception Handling.
CO-5	Create the Applet Programs and apply the Collection Framework.

EXERCISES

1. Create a Simple java programs.
2. Create a java program using Control structures
3. Develop a program using Classes & objects and methods
4. Apply Arrays in programs.
5. Implement a program using Interface
6. Develop a program using Inheritance
7. Apply different visibility control in packages.
8. create a Multithreaded program.
9. Debug the program using Exception handling.
10. Design user interface with Applets

11. Apply Collections in java program.

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Develop simple java programs.	PSO 1,3	R, U
CO-2	Categorize OOPS such as encapsulation, abstraction, and polymorphism and apply them in programs.	PSO 2,3	An
CO-3	Applying encapsulation concepts in developing the programs with classes and objects.	PSO 4,3	Ap
CO-4	Identify different types of inheritance and apply them in programs for reusability of code.	PSO 2, PSO 4,3	An, Ap
CO-5	Construct the packages by arranging the classes with visibility control.	PSO 5,3	C, An
CO-6	Develop programs using different methods of thread creation for implementing concurrency.	PSO 5,3	C, Ap
CO-7	Execute the programs without interruption by handling exception.	PSO 4,3	An, Ap
CO-8	Create Internet program using applets.	PSO 5,3	C,Ap
CO-9	Evaluate java collection with other implementation methods of data structure.	PSO 4,3	E

PO – Programme Outcomes; CO – Course Outcome; R- Remember; U- Understand; Ap – Apply;An – Analyse; E- Evaluate; C – Create

(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 CyberCrimes.
- To make the learners understand and appreciate the role of media, in facing the challenges on various lifeissues.
- To enable the learners to understand the ways of empowering women andcybercrime againstwomen

UNIT – I: GENDER ISSUES

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

UNIT – II: SOCIAL ISSUES RELATED TO WOMEN

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

UNIT – III: WOMEN AND MEDIA

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

UNIT – IV: WAYS OF EMPOWERING WOMEN

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

UNIT – V: CYBER CRIME AGAINST WOMEN

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

REFERENCES:

6. Dr.M.Arumairaj et al., 1999, “Marching towards the Milleniumahead”.
7. Thomas Anjugandam, 1999, “Grow Free Live Free” SalesianPublicaiton.
8. H.C Pretti Nandhini Upretti, jaipur 2000 “Women and problems of GenderDiscrimination”.
9. Thomas B.Jayaseelan, 2002, “Women: Rights and law” Indian Social Institute, NewDelhi.
10. Reni Jacob vol I & II, April- June 2004, ”Vikasimi – The journalofWomen‟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:U15VE4LVB02**

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 (Gen12-18);
- Joseph (Gen 37-40); Moses (Exo4-5);
- Joshua (Joshua1-8)

UNIT – II: JUDGES AND KINGS

- Judges: Deborah (Judges 4); Samson (Judges 6-8); Gideon (Judges13-16)
- Kings**:** David (I Sam 17-31, II Sam 1-12); Solomon (I Kings1-11)

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 (Is1,6,11,36-38,40-42,44,50,53,61)
- Jeremiah (Jer1-3,7-12,18-19,23)
- Ezechial (chapters 1,2,3,5,8,12visions)
- Daniel (Daniel1-6)

UNIT – V: WOMEN IN THE BIBLE

Women in the Old Testament

- Eve (Gen3)
- Ruth (Ruth1-4)
- Hannah (I Sam1:1-28)
- Esther (Esther1-6)

REFERENCES:

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

(For Candidates admitted from June 2015 onwards)

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

LIFE ORIENTED EDUCATION
CATECHISM – II: CHURCH AND SACRAMENTS

HRS / WK:1

CODE : U15VE4LVC02

CREDIT:1 **MARKS :100**

OBJECTIVES:

- To enable the students to understand the ways of Christian living with theChurch
- To understand God‟s gift of the HolySpirit.
- To understand the methods of building relationship withJesus.
- To learn the life of Sacraments andPrayer
- To enrich our devotion to Mother MaryandSaints.

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:

4. "Vatican II Revised" Archbishop Angelo Fernandes Published by X.Diax de RioS.J. Gujarat Sahitya Prakash, P.O.Box. 70, Gujarat, 388001, India.
5. "The Sacraments The Word of God at the Mercy of the Body" ClaretianPublications, Malleswaram, Bangalore 560055.
6. Documents of Vatican II – St. Paul‟s Publications, Bombay1966.

(For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002
PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Third Year - Semester – V

Course Title	Major Core 7 – Computer Organization and Architecture
Total Hours	60
Hours/Week	4 Hrs Wk
Code	U17CA5MCT07/U17CSMCT09
Course Type	Theory
Credits	4
Marks	100

General Objectives:

To give Basic Knowledge on Various Building Blocks of a Digital Computer and Architecture.

Course Objectives:

CO No.	Course Objectives
CO-1	Understand and learn the types of computer Instructions.
CO-2	Learn and understand the Machine language and Assembly languages.
CO-3	Know and understand the categories of the peripheral devices and its data transfer.
CO-4	Learn and understand the instruction formats, addressing, modern pipelining and vector processing techniques.
CO-5	Know and understand the main memory, auxiliary memory, associative, cache and virtual memory.

UNIT I **12 Hrs**

BASIC COMPUTER ORGANIZATION AND DESIGN: Computer Instructions: Instruction Set Completeness-Timing And Control-Instruction Cycle: Fetch And Decode- Determine The Type Of Instruction-Register-Reference Instructions-Memory-Reference Instructions– Input-Output And Interrupt: Input-Output Configuration-Input-Output Instructions-Program Interrupt-Interrupt Cycle.

Extra Reading (Key words): Computer Instructions about various Processors.

UNIT II **12 Hrs**

PROGRAMMING THE BASIC COMPUTER: Introduction –Machine Language-Assembly Language: Rules Of The Language-An Example-Translation To Binary-The Assembler: Representation Of Symbolic Program In Memory-First Pass-Second Pass-Program Loops. Micro programmed Control: Control Memory-Addressing Sequencing: Conditional Branching-Mapping Of Instruction-Subroutines.

Extra Reading(Key words): Other translators for program translation.

UNIT III **12 Hrs**

INPUT – OUTPUT ORGANIZATION: Peripheral Devices -- Input Output Interface – Asynchronous Data Transfer – Modes of Transfer – Priority Interrupt – Direct Memory Access.

Key terms: INTEL 8085 & 8086 Instructions.

UNIT IV **12 Hrs**

CENTRAL PROCESSING UNIT: General Register Organization – Stack Organization – Instruction Formats – Addressing Modes – Data Transfer and Manipulation.

PIPELINE AND VECTOR PROCESSING: Parallel Processing – Pipelining – Arithmetic Pipeline – Instruction Pipeline – RISC Pipeline – Vector Processing.

Key terms: Compare and process the real time data with Stack, Pipeline and vector processing.

UNIT V **12 Hrs**

MEMORY ORGANIZATION: Memory Hierarchy – Main Memory – RAM and ROM Chips – Memory Address Map – Memory Connection to CPU – Auxiliary Memory – Magnetic Tape – Associative Memory -- Cache Memory – Virtual Memory – Memory Management Hardware.

Key terms: Acquire knowledge about Memory Organization.

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

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Describe the Computer Instructions	PSO 1	R, U
CO-2	Explain the Instruction Cycle.	PSO 2	U
CO-3	Illustrate the concept of Micro programmed Control	PSO 2	U
CO-4	Ilustrate the concepts of transfer of data.	PSO 3	U
CO-5	Differentiate different types of addressing modes and explain pipeline and vector processing.	PSO 4	An
CO-6	Analyze the various types of Memory and the purpose of Memory Management.	PSO 4	An

PO – Programme Outcomes; CO – Course Outcome; R- Remember; U- Understand; Ap – Apply; An – Analyse; E- Evaluate; C – Create

References

Text Books:

1. M. Morris Mono, **Computer System Architecture**, Third Edition, 2011, Prentice – Pearson, New Delhi.

UNIT I **:** Chapters 5.3 - 5.7
UNIT II **:** Chapters 6.1 – 6.5, 7.1, 7.2
UNIT III **:** Chapters 11
UNIT IV **:** Chapters 8.1 – 8.6, 9.1 – 9.6
UNIT V **:** Chapters 12

Reference Books

1.Thomas C.Bartee, **Digital Computer Fundamental**, 1991,Tata McGraw – Hill Publishing Company, New Delhi.
2. Albert Paul Malvino and Jerald A.Brown, **Digital Computer Electronics** ,1999 , Tata McGraw – Hill Publishing Company, New Delhi.
3. M.Morris Mano, **Digital Logic and Computer Design**,1998, Prentice Hall of India Private Ltd, New Delhi.
4. Kai Hwang, Faye A. Briggs, **Computer Architecture and Parallel Processing**, 1985, McGraw – Hill Book Company, New Delhi.

(For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002
PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Third Year - Semester – V

Course Title	Major Core 8 - Operating Systems
Total Hours	60
Hours/Week	4 Hrs/Wk
Code	U19CA5MCT08
Course Type	Theory
Credits	3
Marks	100

General Objective:
To enable the students learn the concepts of operating systems, CPU and disk scheduling, Memory management, paging, Demand paging, Page replacement algorithms and concluded with file system concepts.

Course Objectives:
The Learner will be able to

CO No.	Course Objectives
CO-1	Understand the structures of Computer system and operating systems.
CO-2	Remember the working process of thread and their types.
CO-3	Analyze the critical section problems and deadlocks.
CO-4	Understand the concept of memory management and virtual memory .
CO-5	Remember the file concepts and its types.

UNIT I **12 Hrs**
Operating System Overview: Operating system objectives and Functions-The evolution of Operating Systems - Developments leading to modern operating systems- Virtual Machines. Process Description and Control: Process-Process states-Process Description- process control .
Extra Reading(Key words): Discussing the work of process state.

UNIT II **12 Hrs**
Threads: Processes and Threads- Types of Threads.
Uniprocessor Scheduling: Types of Processor scheduling-scheduling algorithms. Multiprocessor scheduling and Real Time scheduling: Multiprocessor scheduling.
Extra Reading(Key words): Comparison of thread types.

UNIT III **12 Hrs**

Concurrency: Mutual Exclusion and synchronization: Principles of concurrency-semaphores. Concurrency: Deadlock and starvation: Principles of deadlock- Deadlock Prevention - Deadlock avoidance – Deadlock detection **.**

Extra Reading(Key words): Discussing deadlock handling methods.

UNIT IV **12 Hrs**

Memory management: Memory management requirements – Memory partitioning –Paging-Segmentation. Virtual Memory: Hardware and Control Structure – Operating System Software.

Extra Reading (Key words): Compare the types of disk scheduling methods.

UNIT V **12 Hrs**

I/O management and disk scheduling: I/O devices - Organization of the I/O function - Operating system design issues –I/O buffering – Disk scheduling.

File Management: File organization and Access – File directories – File sharing –Record blocking –Secondary storage management.

Extra Reading (Key words): Discussing the different kinds threat

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

Course Outcomes:
The Learner will be able to

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Recall the different structures of operating systems.	PSO 1	R, U
CO-2	Discuss theory and implementation of processes, resource control, physical and virtual memory, scheduling, I/O and files	PSO 2	A
CO-3	Calculate waiting time, response time, turnaround time and disk seek time in disk scheduling	PSO 2	U
CO-4	Compare the memory allocation methods and differentiate the page replacement algorithms	PSO 3	Ap
CO-5	Summarize on memory organization.	PSO 4	An
CO-6	Conclude with a detailed understanding of Linux kernel	PSO 2	Ap

References

Text Books:

1. William Stallings, "Operating systems Internals and Design Principles", 2011, seventh edition, Prentice Hall Pearson Education,Inc.

UNIT I: Chapter 1(1-2, 4-5)
Chapter 2(1 – 4)

UNIT II: Chapter 3(1-2)
Chapter 8(1-2)
Chapter 9 (1)

UNIT III:
Chapter 4(1, 3)
Chapter 5(1-4)

UNIT IV:
Chapter 6(1-4)
Chapter 7 (1-2)

UNIT V:
Chapters 10(1 - 5)
Chapters 11(1-2, 4-7)

Reference Books:

1. Deitel Harvay M., Operating Systems, 2003, Pearson Education Publications, Singapore.
2. Godbole Achyut S., Operating Systems, 2002, Tata McGraw Hill Publishing Company Limited, New Delhi.
3. Milan Milankovic, Operating System-Concepts and Design, 2005, Tata McGraw Hill Publishing Company Limited, New Delhi.
4. Tanenbaum Andrew S. & Woodhull Albert S., Operating Systems– Design Implementation, 2002, Pearson Education Publications, Singapore.
5. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, "Operating System Concepts",2006, Sixth Edition, John Wiley & Sons Publications Inc., Singapore.

(For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002
PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Third Year - Semester – V

Course Title	Major Core 9 Computer Networks
Total Hours	60
Hours/Week	4 Hrs Wk
Code	U19CA5MCT09
Course Type	Theory
Credits	3
Marks	100

General Objectives:

To impart deep knowledge on different layers of Computer Networks and to know about the various network communications.

Course Objectives:

The Learner will be able to

CO No.	Course Objectives
CO-1	remembers and understands the basic organizations and protocols standards
CO-2	understand the types of Transmission Media and remembers the data link control
CO-3	understand the general techniques of Error control, Flow control in Data Link Protocols.
CO-4	analyse the Routing Algorithms in Network Layer; remember the underlying protocol in Transport Layer.
CO-5	remember the various services of Application Layer; analyze the various techniques in cryptography.

UNIT I **12 Hrs**

OVERVIEW: Data Communications - Networks - Protocol and Standards. ***Network Models***: Layered tasks - OSI Model - TCP / IP Protocol Suite - Addressing.

Extra Reading (Keywords): IoT interoperation across the OSI model.

UNIT II **12 Hrs**

PHYSICAL LAYER AND MEDIA: Transmission Impairment – Performance. ***Transmission Media***: Guided Media – Unguided Media. *Data Link Layer***:** Types of Errors – Redundancy – Detection versus Correction – Block Coding. ***Data Link Control***: Framing – Flow and Error Control – Protocols.

Extra Reading (Keywords): Mobile Telephone System.

UNIT III **12 Hrs**

NETWORK LAYER: IPv4 Addresses - IPv6 Addresses - Unicast Routing Precools – Multicast Routing Protocols.

Extra Reading (Keywords): Internet Routing Protocols

UNIT IV **12 Hrs**

TRANSPORT LAYER: Process-to-Process Delivery – User Datagram Protocol - TCP - Congestion - Congestion Control and Quality of Service: Congestion Control - Quality of Service.

Extra Reading (Keywords): Quality of Service (QoS)

UNIT V **12 Hrs**

APPLICATION LAYER: ***Domain Name System***: Name space - Domain Name Space - Electronic Mail - File Transfer. ***Cryptography***: Introduction - Symmetric key cryptography - Asymmetric key cryptography.

Extra Reading (Keywords): Communication Security and Web Security

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Explain the fundamental knowledge in different network layer models	PSO 2	R, U
CO-2	Describe about the types of Transmission Media and understands the data link controls	PSO 2,6	R, An
CO-3	Relate and illustrate the techniques of Error Detection and Correction, IPv4 Addresses and IPv6 Addresses.	PSO 2	U, A
CO-4	Express the Elementary Data Link Protocols.	PSO 3	R
CO-5	Illustrate and analyse the Routing Algorithms in Network Layer; explain the functions of Transport Layer.	PSO 4	R, An
CO-6	Identify the functionality of Application Layer services.	PSO 4	U
CO-7	Analyze and interpret the network security techniques	PSO 1,6	R, An

TEXT BOOK

Behrouz A. Forouzan, "Data Communications and Networking", Tata McGraw Hill Publications, 4th Ed., New Delhi, 2015.

BOOKS FOR REFERENCE

1. Black Uyless D., **"Data Communication and Distributed Networks"**, 2000, Prentice Hall of India Pvt. Ltd., New Delhi.
2. Forouzan Behrouz A., **"Local Area Networks"**, 2003, Tata McGraw Hill Publishing Limited, New Delhi.
3. Godbole Achyut S., **"Data Communication and Networks"**, 2002, Tata McGraw Hill Publishing Limited, New Delhi.
4. Mansfield Kenneth C., Antonakos James L., **"An Introduction to Computer Networking"**, 2002, Prentice Hall of India, New Delhi.
5. Tanenbaum Andrew S., **"Computer Networks"**, 2003, Pearson Education, Asia.

(For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002
PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Third Year - Semester – V

Course Title	**Major Core 10 - Object Oriented Programming Using C# And .Net**
Total Hours	**60**
Hours/Week	**4 Hours / Week**
Code	**U19CA5MCT10**
Course Type	**Theory**
Credits	**3**
Marks	**100**

GENERAL OBJECTIVE: Learn the web based technologies of the .NET framework and know the object oriented aspects of C#

CO No.	Course Objectives
CO-1	Understand the .NET FRAMEWORK fundamentals
CO-2	Comprehend the Windows controls used with C# Programming aspects
CO-3	Explain & depict the Windows application development in .NET with C# programming
CO-4	Apply and analyze the web application development with web services
CO-5	Comprehend the .NET Framework components related with database objects

UNIT I: **12 Hrs**

Overview of .NET Framework: .NET Framework Architecture - .NET Features – The Common Language Runtime – The .NET Framework Class Library – The Common Type System – Visual Studio .NET IDE 2005 – Windows Programming Fundamentals.

Windows Controls – Category 1: Control Class – Text Boxes – Rich Text Boxes – Labels - Link Labels – Buttons.

Extra Reading: Microsoft Visual Studio Environment

UNIT II: **12 Hrs**

Windows Controls – Category 2: Check Boxes – Radio Buttons – Panels – Group Boxes – List Boxes – Checked List Boxes – Combo Boxes.

Extra Reading: Win GUI Controls used with multiple applications

UNIT III: **12 Hrs**

Windows Controls – Category 3: Picture Boxes – Scroll Bars – Splitters – Track Bars – Pickers – Notify Icons – Tool Tips – Timers.

Extra Reading: GUI applications with Windows control categories

UNIT IV: **12 Hrs**

Windows Controls – Category 4: MenuStrip – Dialog Boxes – Image Lists – Tree Views – List Views – Tool Bars – Status Bars – Progress Bars.

Extra Reading: Multiple Integrated Web page applications

UNIT V: **12 Hrs**

Data Access with ADO.NET: ADO.NET Architecture – Advantages – ADO.NET Objects.
Handling Databases in Code: Connection Class – Command Class – DataAdapter – The DataSet Class – Data Reader Class – DataTable Class – DataRow Class – DataColumn Class – DataRelation Class

Extra Reading: Case Studies with Front and Back ends in Microsoft Visual Studio setting

CO No.	COURSE OUTCOMES	PSOs Addressed	Cognitive Level
CO-1	Realizes the .NET FRAMEWORK fundamentals	PSO - 1	**R**
CO-2	Comprehends the Windows controls used with C# Programming aspects	PSO - 2	**U**
CO-3	Explicates the Windows application development in .NET with C# programming	PSO - 3	**R, U**
CO-4	Applies and analyzes the GUI application development	PSO - 4	**R, U**
CO-5	Exemplifies the windows controls related with database objects	PSO - 5	**Ap, An**

PO – Programme Outcomes; CO – Course Outcome; R- Remember; U- Understand;Ap – Apply; An – Analyse; E- Evaluate; C – Create

REFERENCES

TEXT BOOK

Programming with C#.NET, J.G.R. Sathiaseelan, N. Sasikaladevi, PHI Learning Private Limited, New Delhi

UNIT I: Chapter 1, 3
UNIT II: Chapter 4
UNIT III: Chapter 5
UNIT IV: Chapter 6
UNIT V: Chapter 8, 9

REFERENCE BOOKS:

1. Herbert Schildt, "The Complete Reference: C# 4.0", Tata McGraw Hill, 2012
2. Christian Nagel et al. "Professional C# 2012 with .NET 4.5", Wiley India, 2012
3. Dan Clark, "Beginning C# Object Oriented Programming", 1st Edition, APRESS, 2011
4. Andrew Troelsen , "Pro C# 2010 and the .NET 4 Platform, Fifth edition, A Press, 2010
5. Ian Griffiths, et. al, "Programming C# 4.0", Sixth Edition, O"Reilly, 2010

(For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002
PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Third Year - Semester – V

Course Title	**Major Core 11 - C# And .Net Programming Lab**
Total Hours	**60**
Hours/Week	**4 Hours / Week**
Code	**U17CA5MCP11**
Course Type	**Practical**
Credits	**3**
Marks	**100**

GENERAL OBJECTIVE: Learn the web based technologies of the .NET framework and know the object oriented aspects of C#

CO No.	Course Objectives
CO-1	Depict the various programming structures with relevant OOP in C#
CO-2	Demonstrate the OOPs concepts with C# programs
CO-3	Explain & depict the Windows application development in .NET with C# programming
CO-4	Apply and analyze the applications with back end connectivity through ADO.NET structures
CO-5	Develop C# application programs with components related with database objects through ADO.NET connectivity

EXERCISES in C#:

1. Simple Computations
2. Windows User Interface creation with Window tools
3. Classes and Objects
4. Applications with OOPs concepts
5. Multiple Form creation using GUI tool box controls with Data base connectivity

DOTNET APPLICATIONS:

1. Simple User Interface Programs using Windows tools and Properties
2. Windows Application with Database Connectivity using C# and ADO.NET
3. GUI Application with Database Connectivity using C#and ADO.NET
4. Using MDI and SDI components
5. Creating multiple form applications using Windows tools, structures, properties and Back end tools.

(For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002
PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Third Year - Semester – V

Course Title	Major Elective 2 – Cloud Computing
Total Hours	75
Hours/Week	5Hrs/Wk
Code	U19CA5MET04
Course Type	Theory
Credits	5
Marks	100

GENERAL OBJECTIVES

To impart the knowledge of a series of current cloud computing technologies, including technologies for Infrastructure as a Service, Platform as a Service, and Software as a Service. To enable the students to learn the different layers of the cloud technologies, virtualization mechanisms, data security and scientific applications of cloud.

COURSE OBJECTIVES (CO)

CO No.	Course Objectives
CO-1	remember the deployment and service models
CO-2	understand the various technologies
CO-3	analyze virtualization mechanisms
CO-4	explain the various platforms of cloud in industry
CO-5	evaluate pricing models for cloud based services

UNIT I **15 Hrs**

UNDERSTANDING CLOUD COMPUTING: Origins and Influences - Basic Concepts and Terminology - Goals and Benefits - Risks and Challenges.

FUNDAMENTAL CONCEPTS AND MODELS: Roles and Boundaries - Cloud Characteristics - Cloud Delivery Models - Cloud Deployment Models.

Extra Reading (Keyword): Real time applications.

UNIT II **15 Hrs**

CLOUD-ENABLING TECHNOLOGY: Broadband Networks and Internet Architecture **–** Data Centre Technology – Virtualization Technology-Web Technology – Multitenant Technology – Service Technology.

FUNDAMENTAL CLOUD SECURITY: Basic Terms and concepts –threat agents – cloud Security Threats – Additional Considerations.

Extra Reading (Keyword): Current Technologies, Security Challenges.

UNIT III **15 Hrs**

VIRTUAL MACHINES PROVISIONING AND MIGRATION SERVICES: Introduction and Inspiration –Background and related work – Virtual Machines Provisioning and Manageability – Virtual Machine Migration Services – Provisioning in the Cloud Context.

Extra Reading (Keyword): Virtual Machine Migration in Action.

UNIT IV **15 Hrs**

SECURE DISTRIBUTED DATA STORAGE IN CLOUD COMPUTING: Introduction – Cloud Storage:From LANs To WANs – Technologies for Data Security in Cloud Computing – Open Questions and Challenges.

Extra Reading (Keywords) :Mongo DB, Cosmos DB

UNIT V **15 Hrs**

CLOUD APPLICATIONS : Scientific Applications : Healthcare – Biology – Geoscience – Business and Consumer Applications : CRM and ERP – Productivity – Social Networking – Media Applications – Multiplayer Online Gaming.

Extra Reading (Keywords) :Green Computing Concepts.

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

Course Outcomes

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Discuss the fundamental concepts in cloud.	PSO 1	R, U
CO-2	Analyse the cloud enabling technologies.	PSO 4	U
CO-3	Knowand explain the Virtualization mechanisms.	PSO 4	U
CO-4	Comprehend the Cloud Data Security concepts.	PSO 2	R
CO-5	Know and distinguish the various applications Cloud.	PSO 2	An

PO – Programme Outcomes; CO – Course Outcome; R- Remember; U- Understand; Ap – Apply; An – Analyse; E- Evaluate; C – Create

References

Text Books :

1. Thomas Erl, ZaighamMahmood, and Ricardo Puttini, **"Cloud Computing: Concepts, Technology and Architecture"**, Prentice Hall, U.S.A., 2013.

UNIT I **:** Chapters 3 & 4
UNIT II **:** Chapters 5 & 6

2. RajkumarBuyya, James Broberg, AndrzejGoscinski, **"Cloud Computing : Principles and Paradigms",** John Wiley & Sons, U.S.A. , 2013.

UNIT III **:** Chapter 5 (5.1to 5.4 , 5.6)
UNIT IV **:** Chapter 8 (8.1 – 8.4)

3. RajkumarBuyya, Christian Vecchiola, S. ThamaraiSelvi, "**Mastering Cloud Computing"**, Elsevier Inc., 2013.

UNIT V **:** Chapters 10

Reference Books:

1. Michael J.Kavis, **"Architecting the Cloud: Design Decisions for Cloud Computing ServiceModels (SaaS, PaaS, and IaaS)"**, John Wiley & Sons Inc., Jan 2014.
2. Michael Miller, **"Cloud Computing Web Based Applications That Change The Way You Work And Collaborate Online"**, Pearson Education, 2009.
3. Kris Jamsa, **"Cloud Computing"**, Jones and Bartlett Learning, 2013.
4. Swarup K. Das, **"Cloud Computing"**,Dominant Publishers, 2015.
5. PrasantaPattnaik, ManasKabat**"Fundamentals of Cloud Computing"**, S.Chand (G/L) & Company Ltd; First edition (2014).

(For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002
PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Third Year - Semester – V

Course Title	Major Elective 2 – Green Computing
Total Hours	75
Hours/Week	5 Hrs/Wk
Code	U19CA5MET05
Course Type	Theory
Credits	5
Marks	100

General Objectives:

To acquire knowledge to adopt green computing practices and minimize negative impacts on the environment.

Course Objectives:

CO No.	Course Objectives
CO-1	Understand the dimensions and goals of Green IT.
CO-2	Discuss the green enterprise architecture with environmental intelligence.
CO-3	Analyze the Grid framework with the collaboration of cloud computing.
CO-4	Understand the concept of Green compliance .
CO-5	Apply Green IT strategies and applications of home appliances.

Unit I **15 Hrs**

Green IT: An Overview: Introduction-Environmental Concerns and Sustainable Development- Environmental Impacts of IT- Green IT- Holistic Approach to Greening IT-Greening IT- Applying IT for Enhancing Environmental Sustainability-Green IT Standards and Eco Labelling of IT-Enterprise Green IT Strategy.

Green Devices and Hardware: Introduction-Life Cycle of a Device or Hardware- Reuse, Recycle and Dispose.

Green Software: Introduction-Energy-Saving Software Techniques

Extra Reading(Key words): **Real time applications of material recycling.**

Unit II **15 Hrs**

Sustainable Software Development: Introduction - Current Practices - Sustainable Software-Software Sustainability Attributes-Software Sustainability Metrics- Sustainable Software Methodology- Defining Actions.

Green Data Centres: Data Centres and Associated Energy Challenges-Data Centre IT Infrastructure-Data Centre Facility Infrastructure-Implications for Energy Efficiency-IT Infrastructure Management-Green Data Centre Metrics-Data Centre Management Strategies.

Extra Reading(Key words): **Energy challenges and benefits of a green data centres.**

Unit III **15 Hrs**

Green Cloud Computing and Environmental Sustainability: Introduction-What is Cloud Computing? - Cloud Computing and Energy Usage Model-Features of Clouds Enabling Green Computing-Towards Energy Efficiency of Cloud Computing-Green Cloud Architecture.

Enterprise Green IT Strategy: Introduction-Approaching Green IT Strategies-Business Drivers of Green IT Strategy-Business Dimensions for Green IT Transformation-Organizational Considerations in a Green IT Strategy-Steps in Developing a Green IT Strategy-Metrics and Measurements in Green Strategies.

Extra Reading(Key words): **Green Enterprises Architecture**

Unit IV **15 Hrs**

Sustainable Information Systems and Green Metrics: Introduction-Multilevel Sustainable Information- Sustainability Hierarchy Models-Product Level Information-Individual Level Information-Functional Level Information-Organizational Level Information.

Sustainable IT Services: Creating a Framework for Service Innovation: Introduction-Factors Driving the Development of Sustainable IT- Sustainable IT Services (SITS)- SITS Strategic Framework- Sustainable IT Roadmap- SITS Leadership and Best Practices.

Extra Reading(Key word): **Sustainability Tools and Standards**

Unit V **15 Hrs**

Green Enterprises and the Role of IT: Introduction-Organizational and Enterprise Greening-Information Systems in Greening Enterprises-Greening the Enterprise-IT Usage and Hardware-Inter-organizational Enterprise Activities and Green Issues-Enablers and Making the Case for IT and the Green Enterprise.

Managing Green IT: Introduction-Strategizing Green Initiatives-Implementation of Green IT-Information Assurance-Communication and Social Media.

Harnessing Semantic Web Technologies for the Environmental Sustainability of Production Systems: Introduction-Information Management for Environmental Sustainability- Examples of Managing Data

***Extra Reading(Key word*): Regulating Green IT: Laws, Standards and Protocols**

Note: Texts given in the Extra reading /Key wordsmust be tested only through Assignment and Seminar.

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Recall the Concept of Green IT.	PSO 1	R, U
CO-2	Discuss Green IT in relation to technology.	PSO 2	A
CO-3	Evaluate IT use in relation to environmental perspectives.	PSO 2	U
CO-4	Discuss the methods and tools to measure energy consumption.	PSO 3	Ap
CO-5	Conclude with a Green It to sustainable development	PSO 4	An

PO – Programme Outcomes; CO – Course Outcome; R- Remember; U- Understand; Ap – Apply; An – Analyse; E- Evaluate; C – Create

References:

Text books

1. San Murugesan, G.R. Gangadharan-Harnessing Green It Principles And Practices, A John Wiley & Sons, Ltd., Publication,2012

Unit I : Chapter-1(1.1 – 1.9), Chapter-2(2.1 – 2.3), Chapter-3(3.1-3.2)
Unit II : Chapter- 4,5(4.1-4.7),(5.1-5.6)
Unit III : Chapter-16, 10(16.1 – 16.6)
Unit IV : Chapters - 9, 11(9.1-9.7), (11.1-11.6)
Unit V : Chapters - 12, 14, 17(12.1-12.5), (14.1- 14.5),(17.1 – 17.4)

REFERENCE BOOKS

1. John Lamb, **"The Greening of IT"**, Pearson Education, 2009.
2. Jason Harris, **"Green Computing and Green IT– Best Practices on Regulations &Industry"**, Lulu.com, 2008.
3. Woody Leonhard, Katherrine Murray, **"Green Home Computing For Dummies"**, August 2009.
4. Swarup K. Das, **"Cloud Computing"**,Dominant Publishers, 2015.
5. PrasantaPattnaik, ManasKabat,**"Fundamentals of Cloud Computing"**, S.Chand (G/L) & Company Ltd; First edition (2014).

(For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002
PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Third Year - Semester – V

Course Title	Major Elective 2 – Fog Computing
Total Hours	75
Hours/Week	5 Hrs/Wk
Code	U19CA5MET06
Course Type	Theory
Credits	5
Marks	100

General Objectives:
To impart the Basic Concepts of Cloud Computing and understand the Technologies and Architectures of Cloud Computing.

Course Objectives:

CO No.	Course Objectives
CO-1	remember the fundamental concepts of Fog.
CO-2	understand the architecture and components of Fog.
CO-3	analyze the protocols of Fog.
CO-4	understand the data management and Fog security principles.
CO-5	apply the case studies related to Fog Computing.

UNIT I **15 Hrs**

INTRODUCTION TO FOG COMPUTING: Fog Computing-Definition-Characteristics-Application Scenarios - Issues -Fog Computing and Internet of Things–Fog Computing Components - Fog Computing and Cloud Computing- Simple Case Studies (STLS and Wind Farm) -High-Level and Software Architecture.
Extra Reading (Keyword): Distinguishing Fog with Cloud Computing.

UNIT II **15 Hrs**

Fog Computing Fundamentals: Introduction – Background and Motivation of Fog Computing – Fog Computing Basics – Fog Computing Services.
IoT Resource Estimation Challenges and Modeling in Fog: Fog Resource estimation and its challenges.
Extra Reading (Keyword): Designing Framework.

UNIT III **15 Hrs**
Tackling IoT Ultra Large Scale Systems: Fog Computing in Support of Hierarchical Emergent Behaviors : Introduction – Fog Computing – Hierarchical Emergent Behaviors, a Fresh Approach for ULSS - Two Autonomous Vehicles Primitives Case Study.
The Present and Future of Privacy-Preserving Computation in Fog Computing: Introduction – Block Chain – Multi-Party Computation – Multi-Party Computation and Block Chain.

Extra Reading (Keyword): Protocol usage.

UNIT IV **15 Hrs**

Self-aware Fog Computing in Private and Secure Sphere: Cloud, Fog and Mist Computing Networks- Self-aware Data Processing - **Case study:** Health monitoring – Patient Safety monitoring and training support – Smart house.
Urban IoT Edge Analytics : Design challenges – Edge-assisted Architecture – Information Acquisition and Compression – Content-aware wireless networking – Information availability.

Extra Reading (Keyword): Implementation of Security principles.

UNIT V **15 Hrs**

Control-as-a-Service in Cyber-Physical Energy Systems over Fog Computing: Power Grid and Energy Management - Energy Management Methodologies - Cyber-Physical Energy Systems - Internet-of-Things and Fog Computing - Control-as-a-Service - Residential Cyber-Physical Energy System.
Leveraging Fog Computing for Healthcare IoT: Introduction – Healthcare Services in the Fog Layer – Data management – Event Management – Resource Efficiency – Device management – Personalization – Privacy and Security – System Architecture of Healthcare IoT.

Extra Reading (Keyword): Implementation of real time applications as services.

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

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Discuss the fundamental concepts in Fog.	PSO 1	R, U
CO-2	Analyze the architectures available in Fog.	PSO 2	R,U
CO-3	Know and explain the Protocols related to Fog.	PSO 2	U
CO-4	Comprehend the Data Management and Security Principles.	PSO 3	Ap
CO-5	Examine the case studies of Fog.	PSO 4	U

PO – Programme Outcomes; CO – Course Outcome; R- Remember; U- Understand; Ap – Apply; An – Analyse; E- Evaluate; C – Create

References:

Text Books

For UNIT I

1. Amir Vahid Dastjerdi and Rajkumar Buyya, "**Fog Computing: Helping the Internet of Things Realize its Potential**", University of Melbourne.

2. FlavioBonomi, Rodolfo Milito, PreethiNatarajan and Jiang Zhu, "**Fog Computing: A Platform for Internet of Things and Analytics**", Big Data and Internet of Things: A Roadmap for Smart Environments, Studies in Computational Intelligence 546, DOI: 10.1007/978-3-319-05029-4_7, © Springer International Publishing Switzerland 2014.

3. FlavioBonomi, Rodolfo Milito, Jiang Zhu, SateeshAddepalli, "**Fog Computing and Its Role in the Internet of Things**", MCC"12, August 17, 2012, Helsinki, Finland. Copyright 2012 ACM 978-1-4503-1519-7/12/08... $15.00.

4. Shanhe Yi, Cheng Li, Qun Li, "**A Survey of Fog Computing: Concepts, Applications and Issues**", Mobidata"15, ACM 978-1-4503-3524-9/15/06, DOI: 10.1145/2757384.2757397, June 21, 2015, Hangzhou, China..

For UNITS II, III, IV, V

5. Amir M. Rahmani ,PasiLiljeberg, Preden, Axel Jantsch, "**Fog Computing in the Internet of Things - Intelligence at the Edge**", Springer International Publishing, 2018.

Reference Books:

1. Ivan Stojmenovic, Sheng Wen, **"The Fog Computing Paradigm: Scenarios andSecurity Issues",** Proceedings, Federated Conference on Computer Science and Information Systems, pp. 1–8, 2014.
2. Hazar, Yanru Zhang, Nguyen H. Tran, DusitNiyato, and Zhu Han, **"Multi – Dimensional payment Plan in Fog Computing with Moral",** IEEE, 2016.
3. Farhoud Hosseinpour, Juha Plosila, Hannu Tenhunen, **"An Approach for Smart management of Big Data in the Fog Computing Context",** IEEE 8th International Conference on Cloud Computing Technology and Science, 2016.

(For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002
PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Third Year - Semester – V

Course Title	Non Major Elective 1: Desktop Publishing Lab
Total Hours	26
Hours/Week	2 Hrs Wk
Code	U15CA5NMP01
Course Type	Lab
Credits	2
Marks	100

General Objectives:

To learn use the basic tools found in Adobe Photoshop to create and edit images.

Course Objectives:

CO No.	Course Objectives
CO-1	Demonstrate the techniques of photo editing.
CO-2	Apply layer masks, filters and blending modes , share and save your images in various formats.
CO-3	Learn various retouching and repairing techniques to correct images.
CO-4	Demonstrate the techniques for resize and crop images.
CO-5	Demonstrate how to Remove or repair unwanted image areas.

1. Using various selection tools.
2. Using image adjustment tools to enhance an image.
3. Create scenery using Photoshop brushes.
4. Demonstrate the use of layer effects.
5. Create a text with picture inside.
6. Demonstrate the use of ripple effect and lens flare.
7. Create a snapshot inside a photo.
8. Photo retouching.
9. Coloring a BW photo.
10. Create slide mount template.
11. Create Photo mount template.
12. Create photo frame effect.
13. Create photo film effect.
14. Create a 3D Photo effect.
15. Create 2D and 3D logos.
16. Animate text using Image Ready.
17. Create three frames with Lens flare effect and different background colors and animate using
Image Ready
18. Create a Christmas Tree with Blinking Lights.
19. Animate a candle flame using Liquify filter.
20. Design an attractive Greeting Card, Invitation, Wallpaper

(For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002
PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Third Year - Semester – VI

Course Title	Major Core 12- Software Engineering Concepts
Total Hours	75
Hours/Week	5 Hrs/Wk
Code	U19CA6MCT12
Course Type	Theory
Credits	4
Marks	100

General Objective:
To learn the software engineering concepts through analysis, design, implementation, testing and maintenance and to develop a good software.

Course Objectives:
The Learner will be able to

CO No.	Course Objectives
CO-1	Understand the basic concepts of software engineering and software development life cycle models.
CO-2	Comprehend the concepts of requirement analysis and specification and software design.
CO-3	Learn Function-oriented software design and Object Oriented software development and to draw various Diagrams using UML.
CO-4	Understand User interface design and various testing.
CO-5	Recognize Software Quality, Reliability Management, Software Maintenance and CASE tools.

UNIT I **15 Hrs**

INTRODUCTION: Evolution: Engineering Discipline – Software Development Projects – Exploratory Style of Software Development -Emergence of Software Engineering – Changes in Software Development Practices – Computer Systems Engineering. **SOFTWARE LIFE CYCLE MODELS:** Basic Concepts - Waterfall Model and its Extensions- RAD Model– Spiral Model. **SOFTWARE PROJECT MANAGEMENT:** Responsibilities of a Software Project Manger – Project Planning – Metrics for Project Size Estimation – Project Estimation Techniques – COCOMO - A Heuristic Estimation Technique.

Extra Reading (Key words): Additional Process Models.

UNIT II **15 Hrs**

REQUIREMENTS ANALYSIS AND SPECIFICATION: Requirements Gathering and Analysis – Software Requirements Specification (SRS) – Formal System Specification. **SOFTWARE DESIGN**: Characteristics of a Good Software Design – Cohesion and Coupling – Layered Arrangement – Approaches of Software Design.

Extra Reading (Key words): Other design techniques.

UNIT III **15 Hrs**

FUNCTION-ORIENTED SOFTWARE DESIGN: Overview of SA/SD Methodology – Structured Analysis – Developing the DFD model as a System – Structured Design - Detailed Design – Design Overview. **OBJECT MODELING USING UML**: Basic Object-Orientation Concepts - UML – UML Diagrams – Use Case Model – Class Diagrams – Interaction Diagrams – Activity Diagrams – State Chart Diagram. **OBJECT-ORIENTED SOFTWARE DEVELOPMENT**: Design Patterns – An OOAD Methodology: Unified Process, Overview of the OOAD Methiodology, Domain Modelling, Identification of Entity Objects, Interaction Modelling.

Extra Reading (Key words): Other architectural designs.

UNIT IV **15 Hrs**

USER INTERFACE DESIGN: Characteristics of a User Interface – Basic Concepts – Types of User Interfaces – Component-Based GUI Development – User Interface Design Methodology. **CODING AND TESTING**: Coding – Code Review – Testing – Unit Testing – Black-Box Testing – White-Box Testing – Debugging – Program Analysis Tools – Integration Testing – System Testing.

Extra Reading(Key words): Latest User Interface designs and Testing Tools.

UNIT V **15 Hrs**

SOFTWARE RELIABILITY AND QUALITY MANAGEMENT: Software Reliability– Software Quality – Software Quality Management System – ISO 9000 – SEI Capability Maturity Model. **COMPUTER AIDED SOFTWARE ENGINEERING**: CASE Environment – CASE support in Software Life Cycle – Characteristics of CASE Tools – Second Generation CASE Tool – Architecture of a CASE Environment**. SOFTWARE MAINTENANCE**: Characteristics of Software Maintenance. **SOFTWARE REUSE**: Issues in any Reuse Program – Reuse Approach – Reuse at Organization Level.

Extra Reading (Key words): Other Software Quality Assurance methods.

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

Course Outcomes:

The Learner will be able to

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Recall and compare the various Software Life Cycle Models and Project Estimation Techniques.	PSO 1	R, U
CO-2	Explain the Specifications of Requirements Analysis and Software design.	PSO 2	A
CO-3	Illustrate the concepts of Function-Oriented Software Design, Object Modeling Using UML.	PSO 2	U
CO-4	Explore User Interface Design and Coding And Testing.	PSO 3	Ap
CO-5	Acquire the knowledge of Software Maintenance And Software Reuse	PSO 4	An
CO-6	Acquire the knowledge of working principles in developing a good software.	PSO 2	A

PO – Programme Outcomes; CO – Course Outcome; R- Remember; U- Understand; Ap – Apply; An – Analyse; E- Evaluate; C – Create

TEXT BOOK:

1. Rajib Mall, Fundamentals of Software Engineering, Prentice Hall of India Private Limited, 4th Ed., 2014.

REFERENCE BOOKS:

1. Ian Sommerville, “Software Engineering”, Addition Wesely, 10th ed., Singapore, 2015.

2. K.K.Agarwal&Yogesh Singh, “Software Engineering”, New Age Intl. Publishers, Revised Ed., 2007.

3. Roger S. Pressman, “Software Engineering – A Practitioner‟s Approach”, McGraw Hill International, 9th Ed., 2008.

4. Shari Lawrence Fleeger,” Software Engineering: Theory and Practice”, Pearson Education Asia, New Delhi, 2007.

5. Carlo Ghezzi, Mehdi Jazayeri and Dimo Mandrioli, “Fundamentals of Software Engineering”, 2001, Prentice-Hall of India Private Ltd., New Delhi.

(For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002
PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Third Year - Semester – VI

Course Title	**Major Core 13 – Computer Graphics**
Total Hours	**75**
Hours/Week	**5 Hours / Week**
Code	**U18CA6MCT13**
Course Type	**Theory**
Credits	**4**
Marks	**100**

GENERAL OBJECTIVE:

To introduce students with fundamental concepts and theory of Computer Graphics

CO No.	Course Objectives
CO-1	Demonstrate the working principle of various video display devices such as CRT, LCD and LED systems and categorize the input and output devices used in graphics systems.
CO-2	Examine the specification of basic geometric structures such as Points, Lines, Circles & curves.
CO-3	Apply the various attributes that control the appearance of the displayed Primitives.
CO-4	Apply two dimensional transformations and clipping techniques in 2D scenes.
CO-5	Recognize the three dimensional display methods and compare parallel and perspective projections.

UNIT I **15 Hrs**

OVERVIEW OF GRAPHICS SYSTEMS: Video display devices: Refresh cathode-ray tubes - Raster-Scan Displays - Random-Scan Displays - Color CRT Monitors - Direct-View Storage Tubes - Flat-Panel Displays - Three-Dimensional Viewing Devices - Stereoscopic and Virtual-Reality Systems - Raster-Scan Systems: Video Controller - Raster-Scan Display Processor - Random-Scan Systems - Graphics Monitors and Workstations - Input Devices: Keyboards-Mouse - Trackball and space ball - Joysticks - Data Glove - Digitizers - Image Scanners - Touch Panels - Light Pens - Voice Systems- Hard Copy Devices.

Extra Reading (Keywords): CRT,LCD, LED.

UNIT II **15 Hrs**

OUTPUT PRIMITIVES: Points and Lines - Line-Drawing Algorithms: DDA Algorithm-Bresenham's Line Algorithm - Loading the Frame Buffer - Line Function - Circle-Generating Algorithms: Properties of Circles - Midpoint Circle Algorithm - Curve Functions – Fill-Area Functions – Character Generation.

Extra Reading (Keywords): Ellipse Algorithm, Spline Curves.

UNIT III **15 Hrs**

ATTRIBUTES OF OUTPUT PRIMITIVES: Line Attributes: Line Type - Line width - Pen and Brush Options - Line color - Curve Attributes - Color and Grayscale Levels: Color Tables-Grayscale - Area-Fill Attributes: Fill Styles - Pattern Fill - Soft Fill - Character Attributes: Text Attributes - Marker Attributes - Bundled Attributes: Bundled Line Attributes - Bundled Area-Fill Attributes - Bundled Text Attributes - Bundled Marker Attributes -Inquiry Functions.

Extra Reading (Keywords): Color table, Fill Styles.

UNIT IV **15 Hrs**

TWO - DIMENSIONAL GEOMETRIC TRANSFORMATIONS: Basic Transformations: Translation – Rotation – Scaling – Matrix Representations and Homogeneous Coordinates - Composite Transformations: Translations – Rotations -- Scaling. Other Transformations: Reflection -- Shear - Transformations between Coordinate systems - Affine Transformations - Transformation functions - Raster Methods for transformations.

TWO – DIMENSIONAL VIEWING: Window to View port Coordinate Transformations - Clipping Operations - Point Clipping - Line Clipping: Cohen Sutherland Line Clipping – Polygon Clipping: Sutherland-Hodgeman Polygon Clipping.

Extra Reading (Keywords): Shear, Window, Viewport.

UNIT V **15 Hrs**

THREE DIMENSIONAL CONCEPTS: Three - Dimensional Display Methods: Parallel projection -- Perspective Projection -- Depth Cueing -- Visible Line and Surface – Identification -- Surface Rendering -- Exploded and Cutaway Views -- Three-dimensional and Stereoscopic views -- Three-Dimensional Graphics Packages.

THREE – DIMENSIONAL VIEWING: Viewing Coordinates: Specifying the View Plane-- Transformation from World to Viewing Coordinates -- Projections: Parallel projection -- Perspective Projection.

Extra Reading (Keywords): Depth Cue, Convergence.

CO No.	COURSE OUTCOMES	PSOs Addressed	Cognitive Level
CO-1	Acquire the concept of Raster Scan & Random Scan System Architectures with relevant equations of computer graphics	PSO - 1	**R**
CO-2	Understood and analyze the basic graphics algorithms for drawing and clipping the geometric objects.	PSO - 2	**U**
CO-3	Able to recognize the coordinate elements to display graphic images to given specifications	PSO - 3	**R, U**
CO-4	Describes the standard graphic projections of lines, planes and solids	PSO - 4	**R, U**
CO-5	Obtain development of surfaces and filling attributes with geometric object with various projections	PSO - 5	**Ap, An**
CO-6	Classifies the 2D and 3D views and coordinate systems with graphical techniques	PSO - 5	**An, Ev**

PO – Programme Outcomes; CO – Course Outcome; R- Remember; U- Understand; Ap – Apply; An – Analyse; E- Evaluate; C – Create

REFERENCES

TEXT BOOKS

Donald Hearn & M.Pauline Baker **"Computer Graphics"** , 2006,Prentice Hall of India, New Delhi.

UNIT I : Chapter-2 (2.1-2.6)
UNIT II : Chapter-3 (3.1-3.5, 3.9, 3.12, 3.14)
UNIT III : Chapter-4 (4.1- 4.7)
UNIT IV : Chapters 5(5.1 - 5.8), 6(6.3, 6.5-6.7, 6.8)
UNIT V : Chapters 9(9.1 – 9.2), 12(12.2 - 12.3)

REFERENCE BOOKS

1. Asthana R.G.S , Sinha .N.K, **"Computer Graphics"**, 2002 , New Age International Publishers, New Delhi.
2. Foley, Van Dam, Feiner Hugher, **"Computer Graphics – Principles & Practice"**, 2004, Pearson Education, New Delhi.
3. Krishnamurthy N., **"Introduction to Computer Graphics"**, 2002, Tata McGraw Hill Publishing Company Limited, New Delhi.
4. David Hillman, **"Multimedia Technology and Applications"** ,2003,Galgotia Publications Private Ltd, New Delhi.
5. Judith Jeffcoale, **"Multimedia in Practice Technology and Applications"**, 2003, Prentice Hall of India Private Ltd, New Delhi.

(For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002
PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Third Year - Semester – VI

Course Title	Major Core 14 – Internet of Things
Total Hours	60
Hours/Week	4 Hrs/Wk
Code	U19CA6MCT14
Course Type	Theory
Credits	4
Marks	100

General Objective:
To understand the Fundamentals, Architecture and Protocols of Internet of Things and its application in various domain.

Course Objectives:

CO No.	Course Objectives
CO-1	Understand the Internet of computer and Internet of things.
CO-2	Compare M2M and IoT communication.
CO-3	Understand and analyze the architecture in various IoT Layer
CO-4	Analyze various protocols and its usage in communication.
CO-5	Create Program to implement IoT applications

UNIT- I Introduction To IoT **15Hrs**

Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs, IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems. Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle .
Extra Reading/Keywords: ***Bio sensors, Nano sensors***

UNIT- II IoT and M2M **15Hrs**

IoT and M2M – Software defined networks, network function virtualization, difference between SDN and NFV for IoT -Basics of IoT System Management with NETCOZF, YANG-NETCONF, YANG, and SNMP NETOPEER
Extra Reading/Keywords: ***5G technology, Ambient intelligence***

UNIT- III IoT Architecture **15Hrs**
Architecture Reference Model- Introduction-Reference model and architecture-IoT reference model-IoT Reference Architecture-Introduction-Functional View-Information view-Deployment and operational view-Other relevant architectural views
Extra Reading/Keywords: ***Security and Context Aware architecture***

UNIT- IV IoT Protocols **15Hrs**

Protocol Standardization for IoT – M2M Protocols for legacy Systems: BACNet Protocol – Modbus– Zigbee Architecture – IP based Protocol – 6LowPAN -RPL

Extra Reading/Keywords: ***Physical Web, mDNS***

UNIT-V Building IoT With Raspberry Pi & Arduino **15Hrs**

Building IOT with RASPERRY PI- IoT Systems - Logical Design using Python – IoT Physical Devices & Endpoints - IoT Device -Building blocks -Raspberry Pi -Board - Linux on Raspberry Pi – Raspberry Pi Interfaces -Programming Raspberry Piwith Python .

Extra Reading/Keywords: ***Simulator-Proteus***

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Recognize and describe the Internet of computer and Internet of Things	PSO 1	R, U
CO-2	Classify IoT architecture based on their applicability.	PSO 2	An
CO-3	Identify the different protocols used in different layer.	PSO 2	R
CO-4	Classify models in IoT Architecture and relate it with real time implementation	PSO 2, PSO 3	An
CO-5	Implement Python Program in Raspberry PI board using python.	PSO 4 PSO 5	Ap
CO-6	Express the IoT application in various real time problems	PSO 4	U

PO – Programme Outcomes; CO – Course Outcome; R- Remember; U- Understand; Ap – Apply;
An – Analyse; E- Evaluate; C – Create

References

Text Books:

Arshdeep Bahga, Vijay Madisetti, “Internet of Things – A hands-on approach”, Universities Press, 2015.

UNIT I: CHAPTER 1

UNIT II: CHAPTER 5

UNIT V: CHAPTER 6

Jan Holler, Vlasios Tsiatsis , Catherine Mulligan, Stamatis , Karnouskos, Stefan Avesand. David Boyle, "From Machine-to-Machine to the Internet of Things - Introduction to a New Age of Intelligence", Elsevier, 2014

UNIT III: CHAPTER 7,8

Olivier Hersent, David Boswarthick, Omar Elloumi , “The Internet of Things – Key applications and Protocols”, Wiley, 2012

UNIT IV: CHAPTERS 1,3,5,7,12

Reference Books:

1. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), "Architecting the " Internet of Things", Springer, 2011.
2. Pethuru Raj and Anupama C. Raman, "The Internet of Things Enabling Technologies, Platforms and Use Cases", Taylor & Francis, CRC Press, 2017.
3. Honbo Zhou, "The Internet of Things in the Cloud: A Middleware Perspective", CRC Press, 2012.
4. Ovidiu Vermesan,Peter Friess, "Internet of Things-From Research and Innovation to Market deployment",Rivers publisher.
5. Adrian McEWen and Hakim Cassimally, "Designing the Internet of Things", John Wiely and Sons private Ltd, 2014.

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HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002
PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Third Year - Semester – VI

Course Title	Major Core 15: Graphics and Animation Lab
Total Hours	26
Hours/Week	4 Hrs Wk
Code	U18CA6NMCP15
Course Type	Lab
Credits	3
Marks	100

General Objectives:

To learn use the basic tools found in Adobe Photoshop to create and edit images.

Course Objectives:

CO No.	Course Objectives
CO-1	Demonstrate the techniques of photo editing.
CO-2	Apply layer masks, filters and blending modes , share and save your images in various formats.
CO-3	Learn various retouching and repairing techniques to correct images.
CO-4	Demonstrate the techniques for resize and crop images.
CO-5	Demonstrate how to Remove or repair unwanted image areas.

PHOTOSHOP

1. (i) Handling different file formats and interchanging them, changing the resolution, color, grayscales and size of the images

(ii) Using brushes and creating multicolor real life images

2. Cropping, rotating, overlapping, superimposing, pasting photos on a page

3. Creation of a single image from selected portions of many

4. Developing a commercial brochure with background tints

5. Creating an image with multi-layers of images and texts.

6. Applying masks and filtering on images.

FLASH

Develop an image(s) and do the following.

1. Basic Drawing and Painting.

2. Working with Strokes and Fills

3. Creating Custom Colors, Gradients, and Line Styles Transforming and Grouping Objects

4. Creating and Managing Multiple Layers

5. Converting Text into Shapes

6. Animate using motion, shape, Tweening, and actions

(For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002
PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Third Year - Semester – VI

Course Title	Major Elective 3 - Data Mining
Total Hours	75
Hours/Week	5 Hrs/Wk
Code	U19CA6MET07
Course Type	Theory
Credits	5
Marks	100

General Objective

To provide an understanding of the Data Warehousing and Data Mining Concepts with various Data Mining methods, clustering and Association rules.

Course Objectives:

CO No.	Course Objectives
CO-1	Understands the Data mining concepts and functionalities & applies the Preprocessing techniques.
CO-2	Understands and comprehends the Overview of Data warehouse modeling schemas
CO-3	Applies the classification and prediction algorithms on mining patterns
CO-4	Comprehends the various methods of data clustering approaches
CO-5	Applies the mining of data in different kinds of constructional data object models

UNIT I **15 Hrs**

INTRODUCTION: Data Mining – Motivation and Importance - Kind of Data - Data Mining Functionalities – Kind of Patterns - Classification of Data mining systems – Data mining task primitives – Major issues of Data mining

DATA PREPROCESSING: Preprocessing the data - Descriptive Data Summarization - Data Cleaning - Data Integration and Transformation - Data Reduction.

Extra Reading: Survey on Data Mining Software's.

UNITII **15 Hrs**

DATA WAREHOUSE AND OLAP TECHNOLOGY: AN OVERVIEW: Data Warehouse –A Multidimensional Data Model - Data Warehouse Architecture: Steps for the design and construction of data warehouses - A Three-Tier Data warehouse architecture - Data warehouse back-end tools and utilities-Metadata repository - types of OLAP Servers: ROLAP versus MOLAP versus HOLAP – Data Warehouse Implementation – Data warehousing to Data mining.

Extra Reading: Preparing a model by applying various preprocessing steps on a real time data.

UNIT III **15 Hrs**

MINING FREQUENT PATTERNS, ASSOCIATIONS, AND CORRELATIONS
Efficient and Scalable Frequent Item set Mining Methods: The Apriori Algorithm: Finding Frequent Item sets Using Candidate Generation - Generating Association Rules from Frequent Itemsets. Mining Various Kinds Of Association Rules - **CLASSIFICATION AND PREDICTION:** Classification and prediction – Issues - Classification by Decision Tree Induction.
Extra Reading: Descriptive study on various Data warehousing models with case studies.

UNITIV **15 Hrs**

CLUSTER ANALYSIS: Cluster Analysis - Types of Data in Cluster Analysis - A Categorization of Major Clustering Methods - Partitioning Methods - Hierarchical Methods - Grid-Based Methods.
Extra Reading: Compare and rate the Algorithms in Data mining concepts with relevant to different scenario.

UNITV **15 Hrs**

MINING OBJECT, SPATIAL, MULTIMEDIA, TEXT AND WEB DATA: Spatial Data Mining - Multimedia Data Mining - Text Mining. **APPLICATIONS AND TRENDS IN DATA MINING:** Data Mining Applications - Social Impacts of Data Mining - Trends in Data Mining
Extra Reading: Preparing a Survey chart on Data mining applications.

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

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Realize the basic terminologies of Data mining principles and techniques	PSO 1	R, U
CO-2	Preprocess the data by using various Techniques and algorithms	PSO 2	R,U
CO-3	Understand the Data warehousing Models and Architecture	PSO 2	U
CO-4	Analyzes the various algorithms in Data Mining	PSO 3	Ap
CO-5	Identifies different applications involved in Data Mining	PSO 4	U

PO – Programme Outcomes; CO – Course Outcome; R- Remember; U- Understand; Ap – Apply; An – Analyse; E- Evaluate; C – Create

References :

Text Books

1. Jiawei Han and MichelineKamber, **"Data Mining Concepts and Techniques"**, 2nd Edition Morgan Kaufmann, 2006.

UNIT I	**:**	Chapter 1 (1.1, 1.2, 1.3, 1.4, 1.6, 1.7, 1.9)
		Chapter 2 (2.1, 2.2, 2.3, 2.4, 2.5)
UNITII	**:**	Chapter 3 (3.1(3.1.1), 3.2, 3.3)
UNITIII	**:**	Chapter 5 (5.2(5.2.1, 5.2.2), 5.3)
		Chapter 6 (6.1, 6.3, 6.5, 6.6)
UNIT IV	**:**	Chapter 7 (7.1, 7.2, 7.3, 7.4, 7.5, 7.7)
UNITV	**:**	Chapter 10 (10.2, 10.3, 10.4)
		Chapter 11(11.1, 11.4, 11.5)

Reference Books:

1. Margaret H.Dunham, **"Data Mining: Introductory and Advanced Topics"**, 2003, pearson Education.
2. ArunK.Pujari, **"Data Mining Techniques"**, 2001,University Press.
3. Alex Berson, Stephen J.Smith, **" Data Warehousing, Datan Mining,& OLAP"**, 2004, Tata McGraw – Hill.
4. Berry J.A.Michael, **"Data Mining Techniques"**, 2004, Gordon S.Linoff, 2nd Edition, Wiley Dreamtech India Pvt, Ltd.
5. Sam Anahory, Dennis Murray, **"Data Warehousing in the Real World"**, 2006, Pearson Education, First Edition.

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HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002
PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Third Year - Semester – VI

Course Title	Major Elective 3 - Principles Of Data Science
Total Hours	75
Hours/Week	5 Hrs/Wk
Code	U19CA6MET08
Course Type	Theory
Credits	5
Marks	100

General Objectives:

To provide strong foundation for data science and application area related to it, and understand the underlying core concepts and emerging technologies in data science.

Course Objectives:

CO No.	Course Objectives
CO-1	explore the fundamental concepts of data science.
CO-2	discuss data analysis techniques for various applications.
CO-3	explain various algorithms used in data science.
CO-4	analyse the difference between various database systems with NOSQL.
CO-5	create an interactive dashboard.

UNIT I **15 Hrs**

INTRODUCTION TO DATA SCIENCE : Definition – Big Data and Data Science Hype– Why data science – Getting Past the Hype – The Current Landscape – Who is Data Scientist?

Extra reading(Keywords):Skills needed in doing data science

UNIT II **15 Hrs**

DATA SCIENCE PROCESS : Overview – Defining goals – Retrieving data – Data preparation – Data exploration – Data modeling – Presentation and automation.

Extra reading(Keywords):Vectors, Data models and data frames

UNIT III **15 Hrs**

MACHINE LEARNING AND BIG DATA : Machine learning – Modeling Process – Types of machine learning – Handling large data – Handling big data – Distributing data storage and processing withFrameworks – Case study.

Extra reading(Keywords): supervised learning, unsupervised learning.

UNIT IV **15 Hrs**

NOSQL and Data Science :NOSQL movement – Introduction – ACID principles – CAPS theorem – BASE principle – Types of NoSQL – Case study – graph database – text mining and text analytics.

Extra reading(Keywords):MongoDB, Redis, Couch DB, Riak, Neo4j,HBASE

UNIT V **15 Hrs**

DATA VISUALIZATION : Introduction to data visualization – Data visualization options – Filters – Mapreduce – Dashboard development tools – Creating an interactive dashboard with dc.js – summary.

Extra reading(Keywords): visualization libraries (matplotlib, seaborn, D3.js, bokeh, ggplot)

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

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	To understand the basics of AdHoc & Sensor Networks.	PSO 1	R, U
CO-2	To learn various fundamental and emerging protocols of all layers in AdHoc Network.	PSO 2	Ap
CO-3	To study about the issues pertaining to major obstacles in establishment and efficient management of AdHoc and Sensor Networks.	PSO 2	U
CO-4	To understand the nature and applications of AdHoc and Sensor Networks.	PSO 3	U
CO-5	To understand various security practices and protocols of AdHoc and Sensor Networks.	PSO 4	Ap

PO – Programme Outcomes; CO – Course Outcome; R- Remember; U- Understand; Ap – Apply; An – Analyse; E- Evaluate; C – Create

References :

Text Book

1. Davy Cielen, Arno D. B. Meysman and Mohamed Ali, **"Introducing Data Science"**, Manning Publications Co., 2016.

Reference Books:

1. Joel Grus, 2015 **"Data Science from Scratch using Python"**,. O"Reilly.
2. Cathy O'Neil and Rachel Schutt, 2014. **"Doing Data Science"**, Straight Talk From The Frontline, O'Reilly,
3. ShashankTiwari, 2013 **"Professional NoSQL"**, Wrox, Second Edition,.
4. ValliappaLakshmanan, ,2016**"Data Science on the Google Platform"**, O"Reilly Media Inc, USA.
5. SinanOzdemir, 2016**"Principles of Data Science"**, Packt Publishing Ltd,.

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HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002
PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Third Year - Semester – VI

Course Title	**Major Elective 3 – Big Data Analytics**
Total Hours	**75**
Hours/Week	**5 Hours / Week**
Code	**U18CA6MET09**
Course Type	**Theory**
Credits	**5**
Marks	**100**

GENERAL OBJECTIVE:
To impart knowledge in Fundamental of Big Data Analytics and Map Reduce Fundamentals and to recognize the key concepts of Hadoop framework, MapReduce

CO No.	Course Objectives
CO-1	Understand the fundamental concepts of Big data
CO-2	Analyze the usage and extraction techniques of Big data Analytical framework
CO-3	Specify the importance of distributed computing and Cloud environment for Big Data
CO-4	Determines the Operational Data bases and the HADOOP & MapReduce techniques
CO-5	Apply and analyze the analytical platforms of data distribution sources

UNIT I **15 Hours**

GRASPING THE FUNDAMENTALS OF BIG DATA: The Evolution of Data Management – Understanding the Waves of Managing Data – Defining Big Data – Building a successful Big Data Management Architecture – The Big Data Journey

EXAMINING BIG DATA TYPES: Defining Structured Data – Defining Unstructured Data – Looking at Real time and Non-Real time Requirements – Putting Big Data together.

Extra Reading: Big data & Importance, examples of Real and non-real time requirements

UNIT II **15 Hours**

OLD MEETS NEW: DISTRIBUTED COMPUTING: Distributed Computing – Understanding the Basics of Distributed Computing – Getting Performance Right.

DIGGING INTO BIG DATA TECHNOLOGY COMPONENTS: Exploring the Big Data Stack – Layer 0: Redundant Physical Infrastructure – Layer 1: Security Infrastructure – Interfaces and Feeds to and from Applications and the Internet – Layer 2: Operational Databases – Layer 3: Organizing Data Services and Tools – Layer 4: Analytical Data Warehouses – Big Data Analytics – Big Data Applications.

Extra Reading: Importance of Distributed system in Big Data and its components

UNIT III **15 Hours**

VIRTUALIZATION AND ITS SUPPORT TO DISTRIBUTED COMPUTING: Understanding the Basics of Virtualization – Managing Virtualization with the Hypervisor – Abstraction and Virtualization Implementing Virtualization to work with Big Data.

EXAMINING THE CLOUD AND BIG DATA: Defining the cloud in the context of Big Data – Understanding Cloud Deployment and Delivery Models – The Cloud as an Imperative for Big Data – Making use of the Cloud for Big Data Providers in the Big Data Cloud Market

Extra Reading: Usage of cloud for Big Data Cloud Market

UNIT IV **15 Hours**

OPERATIONAL DATABASES: RDBMSs are Important in a Big Data Environment – Non-relational databases – Key Value Pair Databases – Document Databases – Columnar Databases – Graph Databases – Spatial Databases – Polyglot Persistence.

MAPREDUCE FUNDAMENTALS: Tracing the origins of MapReduce – Understanding the Map Function – Adding the Reduce Function – Putting Map and Reduce Together – Optimizing Map Reduce Tasks.

EXPLORING THE WORLD OF HADOOP: Explaining Hadoop – Understanding the Hadoop Distributed File System (HDFS) – Hadoop MapReduce

Extra Reading: Analyzing the examples of Big Data Operational Databases with Apps.

UNIT V **15 Hours**

DEFINING BIG DATA ANALYTICS: Using Big Data for Results – Modifying Business Intelligence Products to Handle Big Data – Studying Big Data Analytics Examples.

UNDERSTANDING TEXT ANALYTICS & BIG DATA: Exploring Unstructured Data – Understanding Text Analytics – Analysis and Extraction Techniques – Putting your results together with Structured Data – Putting Big Data to use – Text Analytics Tools for Big Data.

CUSTOMIZED APPROACHES FOR ANALYSIS OF BIG DATA: Building New Models and Approaches to support Big Data – Understanding Different Approaches to Big Data Analysis – Characteristics of a Big Data Analysis Framework – Big to Small – Big Data Paradox

Extra Reading: Future enhancements of Big Data Analytics

CO No.	COURSE OUTCOMES	PSOs Addressed	Cognitive Level
CO-1	Explains the fundamentals of Big Data and categorizes Big Data and its importance	PSO - 1	**R**
CO-2	Identifies the distributed Computing with Big Data and the various layers of the Stack	PSO - 2	**U**
CO-3	Describes the virtualization approaches and models with cloud environment in big data	PSO - 3	**R, U**
CO-4	Explores the various operational databases and technologies like Hadoop & MapReduce	PSO - 4	**R, U**
CO-5	Summarizes the big data analytics in various environments	PSO - 5	**Ap, An**
CO-6	Integrates the Text data analytics with Customized approaches	PSO - 5	**Ap, An**

REFERENCES

TEXT BOOK

Judith Hurwitz, Alan Nugent, Dr. Fern Halper and Marcia Kaufman, "**Big Data for Dummies**", A Wiley Brand - Wiley Publications, 2013.

UNIT I: Chapters 1, 2
UNIT II: Chapters 3, 4
UNIT III: Chapters 5, 6
UNIT IV: Chapters 7, 8, 9
UNIT V: Chapters 12, 13, 14

REFERENCE BOOKS

1. Bill Franks, **"Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics"**, 1st Edition, Wiley and SAS Business Series, 2012.
2. DT Editorial Services, " Big Data Black Book", DreamTech Press, 2015.
3. Seema Acharya, Subhashini Chellappan, "**Big Data and Analytics**", Wiley Publication, First Edition, Reprint in 2016.
4. O"Reilly Media, "**Big Data Now: Current Perspective"** O"Reilly Media, 2013 Edition.
5. Mike Barlow, "**Real-Time Big Data Analytics: Emerging Architecture**", O'Reilly Media Inc., 2013.

(For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002
PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Third Year - Semester – VI

Course Title	Non Major Elective 2: Multimedia Lab
Total Hours	26
Hours/Week	2 Hrs Wk
Code	U18CA6NMP02
Course Type	Lab
Credits	2
Marks	100

General Objectives:

To learn use the basic tools found in Adobe Photoshop to create and edit images.

Course Objectives:

CO No.	Course Objectives
CO-1	Demonstrate the techniques of photo editing.
CO-2	Apply layer masks, filters and blending modes , share and save your images in various formats.
CO-3	Learn various retouching and repairing techniques to correct images.
CO-4	Demonstrate the techniques for resize and crop images.
CO-5	Demonstrate how to Remove or repair unwanted image areas.

1. Using various selection tools.
2. Using image adjustment tools to enhance an image.
3. Create scenery using Photoshop brushes.
4. Demonstrate the use of layer effects.
5. Create a text with picture inside.
6. Demonstrate the use of ripple effect and lens flare.
7. Create a snapshot inside a photo.
8. Photo retouching.
9. Coloring a BW photo.
10. Create slide mount template.
11. Create Photo mount template.
12. Create photo frame effect.
13. Create photo film effect.
14. Create a 3D Photo effect.
15. Create 2D and 3D logos.
16. Animate text using Image Ready.

17. Create three frames with Lens flare effect and different background colors and animate using Image Ready
18. Create a Christmas Tree with Blinking Lights.
19. Animate a candle flame using Liquify filter.
20. Design an attractive Greeting Card, Invitation, Wallpaper

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PG DEPARTMENT OF COMPUTER SCIENCE
B.C.A. Third Year - Semester – VI

Course Title	Skill Based Elective -5 : Python Programming Lab
Total Hours	30
Hours/Week	2 Hrs/Wk
Code	U19CA6SBP05
Course Type	Practical
Credits	2
Marks	100

General Objectives:

To understand and learn the concepts of object oriented programming with developing programming skills in Python.

Course Objectives:

CO No.	Course Objectives
CO-1	Understand the basics of Python programming and control statements.
CO-2	Apply the concepts of arrays.
CO-3	Understand the User defined functions and files types.
CO-4	Understand and analyze the computing capabilities in Python.
CO-5	Analyze and design algorithms for various applications

EXERCISES

1. Compute the GCD of two numbers.
2. Find the square root of a number (Newton‟s method)
3. Exponentiation (power of a number)
4. Find the maximum of a list of numbers
5. Linear search and Binary Search
6. Selection sort, Insertion Sort
7. Merge Sort
8. First n Prime Numbers
9. Multiply Matrices
10. Programs that take Command Line Arguments (word count)
11. Find the most frequent words in a text read from a File
12. Simulate Elliptical Orbits in Pygame
13. Simulate Bouncing Ball using Pygame

(For Candidates admitted from June 2019 onwards)
HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002
PG DEPARTMENT OF COMPUTER SCIENCE
B.COM. Third Year - Semester – V

Course Title	Major Core 10: Fundamentals of Programming
Total Hours	75
Hours/Week	5 Hrs/Wk
Code	U19CO5MCT15
Course Type	(Theory Cum Lab)
Credits	4
Marks	100

General Objective:

To enable the students to learn the history of programming languages, features of C and to develop programming skills.

Course Objectives:

CO No.	Course Objectives
CO-1	Understand the common computer languages, which are used for writing computer program
CO-2	Know the purpose of Program Planning, System Implementation and Operation
CO-3	Learn the data types and how constants, variables are used in a program
CO-4	Develop C program using I/O, Decision making and looping statements
CO-5	Implement the concepts of user defined function, Array and Structures

UNIT I **15 Hrs**

COMPUTER LANGUAGES: Analogy with Natural Languages - Machine Language - Assembly Language - High Level Language - Object Oriented Programming Languages - Some High Languages - Some More High Languages - Characteristics of a Good Programming Language - Selecting a Language for Coding an Application - Subprogram.

Extra reading (Keywords): Type of Programming Language

UNIT II **15 Hrs**

PLANNING THE COMPUTER PROGRAM: Purpose of Program Planning – Algorithm – Flowchart – Pseudocodes. **SYSTEM IMPLEMENTATION AND OPERATION**: Testing and Debugging – Documentation - Changeover to the New System - System Evaluation - System maintenance.

Extra reading (Keywords): Important Algorithmic Paradigms and Methods of Analysis.

UNIT III **15 Hrs**

Introduction – Importance of C - Basic Structure of C programs - Programming Style - Executing a C program - Constants, Variables and Data Types - Operators and Expression.

Extra reading (Keywords): Some Simple C Programs in real time.

UNIT IV **15 Hrs**

Managing Input and Output Operators - Decision making and branching - Decision making and looping.

Extra reading (Keywords): Modes of operation, Bitwise Operation.

UNIT V **15 Hrs**

C FUNCTION: Character Arrays and String – User defined functions. **ARRAY**: Introduction - One-dimensional arrays - Two-dimensional arrays - Multidimensional arrays. **STRUCTURE:** Structure definition - giving values to members - structure initialization - using structures - arrays of structures.

Extra reading (Keywords): More about Library Function, Enumeration.

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Know the characteristic features and types of computer languages	PSO 1, PSO 2	U
CO-2	Formulate the various ways to represent algorithm for the simple applications	PSO 2	An
CO-3	Learn the fundamentals of C and write simple program	PSO 2	U, Ap
CO-4	Illustrate simple C program using input and output operators, decision making and looping statement	PSO 2, PSO 5	U, An, Ap
CO-5	Understand the concept of arrays, functions and structures	PSO 1	U
CO-6	Illustrate simple applications using arrays, functions and structures	PSO 2, PSO 5	E

PO – Programme Outcomes; CO – Course Outcome; R- Remember; U- Understand; Ap – Apply;
An – Analyse; E- Evaluate; C – Create

TEXT BOOKS

1.Pradeep K.Sinha , Priti Sinha, "**Computer Fundamentals**", BPB publications,2003

UNIT I : Chapter 12.

UNIT II : Chapter 11, 13.

2. E.Balagurusamy, "**Programming In ANSI C**", 7th Edition.

UNIT III : Chapter 1,2,3.

UNIT IV : Chapter 4,5,6.

UNIT V : Chapter 7(7.1,7.2,7.5,7.7),8,9,10(10.2,10.2,10.3,10.4,10.9)

BOOKS FOR REFERENCE

1. Herbert Schildt,"**C Made Easy**", Computer Science Series, Tata McGraw Hill International Editions, 1987.
2. Herbert Schildt.,"**The Complete Reference C**", Tata McGraw Hill, Fourth Edition 1995.
3. E. BalaGurusamy, " **Programming in ANSI C**", Third Edition, Tata McGraw Hill, New Delhi.
4. C. Xavier,"**C Language and Numerical Methods** ", New Age International (P) Ltd.
5. Yahswant Kanethkar, "**Let Us** C", Tata McGraw Hill Publications, New Delhi.

PRACTICAL

1. Simple program.
2. Program to check whether a number is positive or negative or zero using if statement.
3. Program to check vowel or consonant using switch case statement.
4. Program to check whether a number is prime or not using while statement.
5. Program to generate multiplication table using do…while statement.
6. Program to check the given string is palindrome or not using for statement.
7. Program to display Fibonacci series.
8. Program to find the smallest and largest number among „n" numbers.
9. Program to add two matrices.
10. Program to find the sum of „n" numbers by making function.
11. Program to calculate factorial of a number using recursion.
12. Program to generate the mark sheet of the student using structure.

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HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI – 620 002
PG DEPARTMENT OF COMPUTER SCIENCE
B.COM. Third Year - Semester – V

Course Title	**Major Elective 2- Introduction To Database Systems**
Total Hours	**75**
Hours/Week	**5 Hrs Wk**
Code	**U19CO5MET06**
Course Type	**Theory**
Credits	**5**
Marks	**100**

General Objective:
To impart the fundamental aspects of database design, database languages and database-system implementation.

Course Objectives:

The Learner will be able to

CO No.	Course Objectives
CO-1	Understand the basic concepts of database systems.
CO-2	Illustrate relational algebra notation to access data from database.
CO-3	Examine and apply normalization techniques to normalize a database.
CO-4	Write simple and complex queries using SQL commands.
CO-5	Apply the concepts of forms and reports to create forms and reports.

UNIT I: 15 Hrs
INTRODUCTION : Database System Applications – Purpose of Database Systems – View of Data – Database Languages – Relational Databases – Database Design – Data Storage and Querying – Transaction Management – Database Architecture - Data Mining and Information Retrieval – Specialty Databases – Database Users and Administrators – History of Database Systems.
Extra Reading (Key Words): DB Software, Data Mining

UNIT II: 15 Hrs
RELATIONAL MODEL: Structure of Relational Databases - Database Schema – Keys - Schema Diagrams - Relational Query Languages - Relational Operations.
Extra Reading (Key Words): Tuple and Domain Calculus

UNIT III:

DATABASE DESIGN **15 Hrs**

NORMALIZATION: The Purpose of Normalization – How Normalization Supports Database Design – Data Redundancy and Update Anomalies – Functional Dependencies – The Process of Normalization – First Normal Form - Second Normal Form - Third Normal Form.

Extra Reading (Key Words):4NF, 5 NF

UNIT IV: **15 Hrs**

INTRODUCTION TO SQL : Overview of the SQL Query – Language - SQL Data Definition - Basic Structure of SQL Queries - Additional Basic Operations - Set Operations - Null Values - Aggregate Functions - Nested Subqueries - Modification of the Database

Extra Reading (Key Words): PostgreSQL, Embedded SQL

UNIT V: **15 Hrs**

FORMS: Working with Forms: Basic Concepts_ Application development in Form 5.0_ FORM Module_ Using FORMS Builder_ FORMS Wizards_ Creating a FORM_ Generating and Running a FORM.

REPORTS: Working with Reports: Features_ Basic concepts_ Creating a Report using Oracle Report Builder_ Defining a data module for a Report_ Specify the layout for the report_ Specify a runtime parameter form for report_ Using Oracle Reports interface_ Creating a default tabular report_ Creating Computed Columns_ Customizing Report Layout.

Extra Reading (Key Words): Creative Form Designing, Creative Report Designing

Course Outcomes:

CO No.	Course Outcomes	PSOs Addressed	Cognitive Level
CO-1	Understand the basic concepts of Database systems, database languages such as DDL, DML, database architectures and database users.	PSO 1	U
CO-2	Analyze the structure of relational databases, database schema, keys, schema diagrams ,query languages and relational operations.	PSO 4	A
CO-3	Understand the Normal forms and apply the normal forms concept to the various applications.	PSO 1	U
CO-4	Understand the basic structure of SQL queries, nested subqueries and apply the queries for various applications.	PSO 4	A
CO-5	Understand the basic concepts of Forms and Reports and apply them for creating forms and reports for the given applications.	PSO 4	A

PO – Programme Outcomes; CO – Course Outcome; R- Remember; U- Understand;

Ap – Apply; An – Analyse; E- Evaluate; C – Create

References

TEXT BOOKS

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, "**Database System Concepts**", 2010, Sixth Edition, McGraw-Hill Publications.(UNIT I, UNIT II, UNIT IV)
2. Thomas Connolly, Carolyn Begg, "**Database Systems**" ,2009, Fourth Edition, Pearson Eduction Ltd.,New Delhi.(UNIT III)
3. Ivan Bayross, " **Commercial Application Development Using Oracle Developer 2000**",BPB Publications, New Delhi. (UNIT V)

REFERENCE BOOKS

1. Ramez Elmasri, Shamkant B. Navathe, "**Fundamentals of Database Systems",** 2006, Addison Wesley Publishing Company
2. Seema kedar, "**Database Management System",** 2011, Technical Publications.
3. Elmasri & Navathe, "**Fundamentals of Database Systems"**, 2006, Pearson Education Publications, New Delhi.
4. P.K. Yadav,"**Database Management System"**, 2013, Tata McGraw Hill Publications Company Limited, New Delhi.
5. G.K.Gupta **,"Database Management System",** 2011, Tata McGraw Hill Publications Company Limited, New Delhi.