# DEPARTMENT OF
# B. Voc. SOFTWARE DEVELOPMENT
# (2022-23)

**HOLY CROSS COLLEGE (AUTONOMOUS)**
**TIRUCHIRAPPALLI-620 002**
**SCHOOL OF MATHEMATICAL COMPUTATION SCIENCES**
**DEPARTMENT OF B. Voc. (SOFTWARE DEVELOPMENT)**
**CHOICE BASED CREDIT SYSTEM**
**LEARNING OUTCOME-BASED CURRICULUM FRAMEWORK (LOCF)**

### Programme Outcomes (POs)

**PO 1** - Demonstrate ability and attitude to acquire knowledge and skills in the advancing global scenario to apply them effectively and ethically for professional and social development.

**PO 2**- Involve in research and innovative endeavors and share their findings for the wellbeing of the society.

**PO 3**- Work effectively in teams and take up leadership in multi-cultural milieu.

**PO 4**- Act with moral, ethical and social values in any situation.

**PO 5**- Excel as empowered woman to empower women

**PO 6-** Participate in activities towards environmental sustainability goals as responsible citizens.

**PO 7-** Promote Analytical and logical skill to make them to work effectively in IT industry as a task manager.

**PO 8**- Inculcate innovative techniques and computational knowledge for industrial needs and societal empowerment.

**PO 9** - Bring forth the holistic personality with critical, cognitive and inclusive thinking.


### Programme Specific Outcomes (PSOs)

**PSO 1** – Apply the acquired knowledge in diverse areas of software development to provide creative solutions for real-time computational problems.

**PSO 2** – Create innovative software applications for Web, Mobile, Virtual, Cloud and Smart environments by adapting emerging technologies.

**PSO 3** – Develop practical competency and potential in software development to meet the demand of software industries.

**(For Candidates admitted in the academic year 2022-2023)**
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**CHOICE BASED CREDIT SYSTEM**
**LEARNING OUTCOME-BASED CURRICULUM FRAMEWORK (LOCF)**
**COURSE PATTERN**

| Sem | Part | Course | Title of the Course | Code | Hrs/ Wk | Credits | Marks |
|---|---|---|---|---|---|---|---|
| **I** | I | Language | Tamil Paper- I / Hindi Paper- I / French Paper- I | U22TL1GEN01/ U22HN1HIN01/ U22FR1FRE01 | 3 | 3 | 100 |
| | II | English | Practical English-I | U22SD1ENT01 | 3 | 3 | 100 |
| | III | Major Core - 1 | Computing Fundamentals and C Programming | U22SD1MCT01 | 5 | 5 | 100 |
| | | Major Core -2 | Programming inC- Lab | U22SD1MCP02 | 4 | 4 | 100 |
| | | Major Core - 3 | MS-OFFICE and UNIX- Lab | U22SD1MCP03 | 4 | 4 | 100 |
| | | Allied -1 | Basic Mathematics | U22MA1ALT04 | 4 | 2 | 100 |
| | | Allied -2 | Basics of Accounting | U22CO1ALT02 | 4 | 2 | 100 |
| | IV | Environmental Studies | Environmental Studies | U22ES1EVS01 | 2 | 1 | 100 |
| | | Value Education | Ethics- I/ Bible Studies- I/ Catechism-4 I | | 1 | - | - |
| | VI | Service Oriented Course | | - | - | - | - |
| | III | Internship in SD-1 | | U22SD1INT01 | | 6 | 100 |
| | | | TOTAL | | 30 | 30 | 900 |
| **II** | I | Language | Tamil Paper-II/ Hindi Paper-II/ French Paper-II | U22TL2GEN02/ U22HN2HIN02/ U22FR2FRE02 | 3 | 3 | 100 |
| | II | English | Practical English-II | U22SD2ENT02 | 3 | 3 | 100 |
| | III | Major Core - 4 | Data Structures and Algorithms | U22SD2MCT04 | 5 | 5 | 100 |
| | | Major Core - 5 | Data Structures and Algorithms -Lab | U22SD2MCP05 | 4 | 3 | 100 |
| | | Major Core - 6 | Web Development Tools-Lab | U22SD2MCP06 | 5 | 4 | 100 |
| | | Allied -3 | Statistics for Data Analytics | U22SD2ALT03 | 4 | 2 | 100 |
| | IV | Skill Based Course - 1 | Soft Skills Development | U22SS2SBC01 | 2 | 1 | 100 |
| | | Skill Based Course- 2 | Sustainable Rural Development and Student Social Responsibility | U22RE2SBC02 | 2 | 1 | 100 |
| | | Industrial Relations | Java Script Programming | U22SD2IRT01 | 1 | 1 | 100 |
| | | Value Education | Ethics-I/ Bible Studies-I/ Catechism-I | U22VE2LVE01/ U22VE2LVB01/ U22VE2LVC01 | 1 | 1 | 100 |
| | V | Extension activities | RESCAPES | U22EX2RES01 | - | 1(EC) | - |
| | VI | Service Oriented Course | | - | - | - | - |
| | | Online Course | | U22EX2ONC01 | - | 1(EC) | 100 |
| | III | Internship in SD-2 | | U22SD2INT02 | - | 6 | 100 |
| | | | Total | | 30 | 30+2(EC) | 1200 |

| Sem | Part | Course | Title of the Course | Code | Hrs/Wk | Credits | Marks |
|---|---|---|---|---|---|---|---|
| III | I | Language | Tamil Paper-III/ Hindi Paper-III/ French Paper-III | U22TL3GEN03/ U22HN3HIN03/ U22FR3FRE03 | 3 | 3 | 100 |
| | II | English | Practical English-III | U22SD3ENT03 | 3 | 3 | 100 |
| | III | Major Core-7 | Java programming | U22SD3MCT07 | 5 | 4 | 100 |
| | | Major Core-8 | Computer Networks | U22SD3MCT08 | 5 | 5 | 100 |
| | | Allied-4 | Digital Electronics and Microprocessors | U22PH3ALT06 | 4 | 2 | 100 |
| | | Major Elective-1 | Java programming-Lab | U22SD3MEP01 | 4 | 3 | 100 |
| | IV | Major Skill Based Elective - 1 | Animation- Lab | U22SD3SBP01 | 2 | 1 | 100 |
| | | Non-Major Elective-1 | Non-Major Elective-1 | - | 2 | 2 | 100 |
| | | Gender Studies | Gender Studies | U22WS3GST01 | 1 | 1 | 100 |
| | | Value Education | Ethics / Bible Studies / Catechism | | 1 | - | - |
| | VI | Service Oriented Course | | - | - | - | - |
| | | Online Course | | U22EX3ONC02 | - | 1(EC) | 100 |
| | III | Internship in SD-3 | | U22SD3INT03 | - | 6 | 100 |
| **TOTAL** | | | | | 30 | 30+1(EC) | 1100 |
| IV | I | Language | Tamil Paper- IV/Hindi Paper- IV/French Paper-IV | U22TL4GEN04/ U22HN4HIN04/ U22FR4FRE04 | 3 | 3 | 100 |
| | II | English | Practical English-IV | U22SD4ENT04 | 3 | 3 | 100 |
| | III | Major Core-9 | Database Systems | U22SD4MCT09 | 5 | 5 | 100 |
| | | Major Core-10 | Database Systems-Lab | U22SD4MCP10 | 4 | 3 | 100 |
| | | Major Elective -2 | Augmented and Virtual Reality-Lab | U22SD4MEP02 | 4 | 3 | 100 |
| | | Allied -5 | Business Software Tally-Lab | U22BV4ALP05 | 4 | 2 | 100 |
| | | Allied -6 | Fundamental of Entrepreneurship | U22EC4ALT07 | 4 | 2 | 100 |
| | IV | Non-Major Elective-2 | Non-Major Elective-2 | - | 2 | 2 | 100 |
| | | Value Education | Ethics-II/ Bible Studies-II/ Catechism-II | U22VE4LVE02/ U22VE4LVB02 U22VE4LVC02 | 1 | 1 | 100 |
| | V | Extension Activities | RESCAPES | U22EX4RES02 | - | 1(EC) | 100 |
| | VI | Service Oriented Course | | U22EX4SOC01 | - | 2(EC) | 100 |
| | III | Internship in SD-4 | | U22SD4INT04 | | 6 | |
| **TOTAL** | | | | | 30 | 30+3(EC) | 1100 |

| Sem | Part | Course | Title of theCourse | Code | Hrs/Wk | Credits | Marks |
|---|---|---|---|---|---|---|---|
| V | III | Major Core-11 | Software Engineering | U22SD5MCT11 | 4 | 4 | 100 |
| | | Major Core-12 | Programming whPython | U22SD5MCT12 | 4 | 3 | 100 |
| | | Major Core-13 | Python Programming | U22SD5MCP13 | 5 | 3 | 100 |
| | | Major Core-14 | Operating Systems | U22SD5MCT14 | 4 | 4 | 100 |
| | | Major Core-15 | Cloud Computing | U22SD5MCP15 | 4 | 4 | 100 |
| | | Major Elective-3 | C# and .Net Programming Lab | U22SD5MEP03 | 4 | 3 | 100 |
| | IV | Non-Major Elective – 3 | Non-Major Elective – 3 | | 2 | 2 | 100 |
| | | Major Skill Based Elective -2 | Software Testing-Lab | U22SD5SBP02 | 2 | 1 | 100 |
| | | Value Education | Ethics III / Bible Studies III/ Catechism III | | 1 | - | - |
| | VI | Online Course | | U22EX5ONC03 | - | 1(EC) | 100 |
| | III | Internship in SD-5 | | U22SD5INT05 | - | 6 | 100 |
| | | **TOTAL** | | | **30** | **30+1**(EC) | 1000 |
| VI | III | Major Core-16 | Software Testing | U22SD6MCT16 | 5 | 5 | 100 |
| | | Major Core-17 | Internet of Things | U22SD6MCT17 | 5 | 4 | 100 |
| | | Major Core-18 | Software Testing-Lab | U22SD6MCP18 | 5 | 4 | 100 |
| | | Major Core-19 | Internet of Things- Lab | U22SD6MCP19 | 6 | 5 | 100 |
| | | Major Elective-4 | Information and Cyber Security | U22SD6MET04 | 4 | 3 | 100 |
| | IV | Non-Major Elective-4 | Non-Major Elective-4 | | 2 | 2 | 100 |
| | | Skill Based Course-3 | Research Methodology | U22DS6SBC03 | 2 | 1 | 100 |
| | | Value Education | Ethics / Bible Studies/ Catechism | U22VE6LVE03/ U22VE6LVB03/ U22VE6LVC03 | 1 | | 100 |
| | V | Extension Activities | RESCAPES- Impact Study of Project | U22EX6RES03 | - | 1(EC) | 100 |
| | III | Internship in SD-6 | | U22SD6INT06 | - | 6 | 100 |
| | | **TOTAL** | | | 30 | 30+1 | 1000 |
| | | **GRAND TOTAL** | | | 180 | 180+8(EC) | 6300 |

## List of Non-Major Elective Courses
### (For Candidates admitted in the academic year 2022-2023)

**Non-Major Elective Courses offered by department**

| Sem | Part | Course | Title of the Course | Code | Hrs/ Wk | Credits | Marks |
|-----|------|--------|---------------------|------|---------|---------|-------|
| III | IV | Non-Major Elective-1 | Introduction of Information Technology | U22SD3NMT01 | 2 | 2 | 100 |
| IV | IV | Non-Major Elective-2 | Graphics and Animation- Lab | U22SD4NMP02 | 2 | 2 | 100 |
| V | IV | Non-Major Elective-3 | Fundamentals of Web Technologies | U22SD5NMT03 | 2 | 2 | 100 |
| VI | IV | Non-Major Elective-4 | Basics of Information Security | U22SD6NMT04 | 2 | 2 | 100 |

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**B. Voc. (Software Development)-First Year-Semester-1**

| Course Title | PRACTICAL ENGLISH- I |
|---|---|
| Total Hours | 45 |
| Hours/Week | 3 |
| Code | U22SD1ENT01 |
| Course Type | Theory |
| Credits | 3 |

**CONSPECTUS**

To understand the communication process and basics skills of Listening, Speaking, Reading & Writing and applythem in the workplace scenarios and day-to-day lives

**COURSE OBJECTIVES**

1. To learn the fundamentals of the communication process and to be able to communicate effectively in bothformal and informal situations
2. To develop effective listening skills and apply them to communicate better.
3. To identify those aspects of self and to build a better profile of the self to become employable
4. To discover and comprehend different kinds of texts to build better vocabulary and language
5. To build effective writing skills and to demonstrate writing official mails and writing for pleasure

**UNIT I**             **9Hrs**
**The Communication Process**
Definition of Communication – The communication process – Internal and External Communication – Vertical & Grapevine Communication – Roles- Message-Medium- Environment/Context- Style and Tone-Verbal and Non–Verbal Communication–Body Language
**Extra Reading/KeyWords:** *Types of Corporate Communication*

**UNIT II**             **9Hrs**
**Listening**
Pre Listening– knowing the content and context – predicting the text – Listening to a Conversation- Listening toInstructions-Listening to description
**Extra Reading/Keywords:** *Active Listening*

**UNIT III**             **9Hrs**
**Speaking**
I, Me, Myself–Introducing self, the place I belong to, etc.-My Family
My Favorite things (Food, Movies, School, Friends)-My Aim (Goal Setting)
**Extra Reading/Keywords:** *Positive Self-image and Self Esteem*

**UNIT IV**                                                       **9Hrs**
**Reading**

Understanding what I read right – Spelling and Grammar –Reading Instructions Reading Newspapers–SPELTTechnique-Reading Magazines–Reports –Manuals

**ExtraReading/KeyWords:** *Different types of Texts-Templates on reports, agreements & documents*

**UNIT V**                                                       **9Hrs**
**Writing**

From complex to simple writing–principle of good Writing-Asking permission
Inviting – Writing for pleasure (blogs, poems, articles) a page from my autobiography, If I were the PM,Favorite things

**Extra Reading/Keywords:** *Effective Letter writing*

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

**COURSE OUTCOMES:**

| CO. No. | Course Outcomes | Cognitive Level (K1-K4) |
|---------|-----------------|-------------------------|
| CO-1 | Overview of communication process and introduction to Corporate communication | K1 |
| CO-2 | Listening skills–pre, while and post listening | K2 |
| CO-3 | Self-Introduction skills | K3 |
| CO-4 | The learners become effective in reading and understanding Spelling and grammar | K4 |

**(K1=Remember, K2=Understand, K3=Apply, K4=Analyze)**

## TEXTBOOKS

1. Courtl and L. Bovee &Jhon V. Thill, Business Communication Today, 14<sup>th</sup> Edition. Pearsons
2. Shalini Varma, Body Language, Your Success Mantra, Second Edition, Books33

## SUGGESTED READINGS

1. Norman Lewis, Word power Made Easy,2015Edition
2. Meenakshi Raman and Sangeets Sharma, Technical Communication, 2015 Edition
3. Wren and Martin, High School English Grammar
4. The Hindu and The New Indian Express

## WEBREFERENCES

1. https://www.cambridgeenglish.org/learning-english
2. https://www.businessballs.com/
3. https://www.thoughtco.com/
4. https://ed.ted.com/

*Note: Learners are advised to use latest edition of books.*

## PO–CO MAPPING

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| **CO-1** | H | L | H | H | M | M | H | H | L |
| **CO-2** | H | M | H | H | M | M | H | H | L |
| **CO-3** | H | M | H | H | M | M | H | H | L |
| **CO-4** | H | M | H | H | M | M | H | H | L |

## PSO–CO MAPPING

| CO/PSO | PSO1 | PSO2 | PSO3 |
|--------|------|------|------|
| **CO-1** | M | M | M |
| **CO-2** | H | M | M |
| **CO-3** | H | H | M |
| **CO-4** | M | M | M |

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**B. Voc. (Software Development)-First Year-Semester-1**

| Course Title | MAJOR CORE 1-COMPUTING FUNDAMENTALS AND C PROGRAMMING |
|---|---|
| Total Hours | 75 |
| Hours/Week | 5 |
| Code | U22SD1MCT01 |
| Course Type | Theory |
| Credits | 5 |

**CONSPECTUS**
To understand the concepts of problem solving approaches and to develop programming skillsusing C language

**COURSE OBJECTIVES**
1. To understand the concepts of algorithms and create flowcharts for a given problem
2. To apply the basic concepts of C in real-time applications
3. To analyze the control constructs, different types of arrays and apply the concepts for problemsolving in real time
4. To understand the concepts of strings, user defined functions, structures and union in C
5. To understand the basics of pointers and create files using C

**UNIT I**                                                                                              **15Hrs**

**UNDERSTANDING FUNDAMENTALS OF THE COMPUTER**: Introduction – Generations of Computers – Classification of Computers-Basic Anatomy of a Computer System- Input Devices – Processor-Output Devices-Memory Management – Types of Computer Software- Overview of Operating System.
**COMPUTING CONCEPTS**: Programming Languages –Translator Programs-Problem SolvingTechniques.
**Extra Reading/Keywords:** *Develop Algorithms for real time applications.*

**UNITII** 15Hrs

**OVERVIEW OF C:** Introduction-Importance of C-Basic Structure of C Programs-Executing a C Program.

**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/Keywords:** *Basic I/O and Control operations in C Language.*


**UNITIII** 15Hrs

**DECISION MAKING AND BRANCHING:** Introduction-Decision Making with if Statement-Simple if Statement- 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–for Statement-Jumps in Loops.

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

**Extra Reading/ Keywords***: Develop multidimensional array programs with Branching and looping constructs*


**UNIT IV** 15Hrs

**CHARACTER ARRAY AND 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–StructuresWithinStructures-StructuresandFunctions–Unions.

**Extra Reading/Keywords:***Create Programs using functions, Structures and Unions*


**UNIT V** 15Hrs

**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/Keywords:** *Implement the system and file concepts using Pointers.*

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

**COURSE OUTCOMES**

| CO No. | Course Outcomes | Cognitive Level (K1-K4) |
|---|---|---|
| CO-1 | Identify the basic concepts of the programming languages and Examine the effective ways to solve the problems | K1 |
| CO-2 | Summarize and associate the correct identifiers, keywords, operators and control structures to solve the problem with reduced complexity and to promote reusability | K2 |
| CO-3 | Describe the problem, compare the appropriate pre-build functions, procedures and construct customized coding sequence to solve the problem effectively | K3 |
| CO-4 | Construct solutions to solve the real world problems and develops small to medium sized application programs to demonstrate professionally Acceptable coding with performance standards | K4 |

**(K1=Remember, K2=Understand, K3=Apply, K 4=Analyze)**

**TEXTBOOKS**

E. Balagurusamy, Computing Fundamentals and C Programming, McGraw Hill, Second Edition, 2018.

E. Balagurusamy, ANSIC Seventh Edition McGraw Hill Education (India) Private Limited, NewDelhi, 2017

**SUGGESTED READINGS**

1. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", Prentice HallPublishing 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 EducationPrivate Limited, 2015.

**WEBREFERENCES**

1. https://www.guru99.com/c-programming-language.html
2. https://www.tutorialspoint.com/cprogramming/index.htm
3. https://www.freecodecamp.org/news/the-c-beginners-handbook/
4. https://www.programiz.com/c-programming
5. https://www.learn-c.org/

*Note: Learners are advised to use latest edition of books.*

**PO–COMAPPING**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| **CO-1** | H | M | M | M | M | L | H | H | M |
| **CO-2** | M | M | M | M | M | L | H | H | M |
| **CO-3** | H | H | H | M | M | L | H | H | M |
| **CO-4** | H | H | H | H | H | L | H | H | H |

**PSO–COMAPPING**

| CO/PSO | PSO1 | PSO2 | PSO3 |
|--------|------|------|------|
| **CO-1** | H | M | M |
| **CO-2** | H | M | M |
| **CO-3** | H | H | H |
| **CO-4** | H | H | H |

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**B. Voc. (Software Development)-First Year-Semester-1**

| Course Title | MAJOR CORE 2-PROGRAMMING IN C- LAB |
|---|---|
| Total Hours | 60 |
| Hours/Week | 4 |
| Code | U22SD1MCP02 |
| Course Type | Practical |
| Credits | 4 |
| Marks | 100 |

## CONSPECTUS
To write code and develop application programs using C for solving real-time problems.

## COURSE OBJECTIVES
1. To recall the syntax of control structures and solve problems using C
2. To remember the syntax of looping statements and solve problems using C
3. To Create programs for arrays and strings using C
4. To Develop programs for Functions, Pointers and Structures in C
5. To 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

**COURSE OUTCOMES**

| CO. No. | Course Outcomes | Cognitive Level (K1-K4) |
|---------|-----------------|-------------------------|
| CO-1 | Recognize the basics of C Programming | K1 |
| CO-2 | Demonstrate the internal structure of the C Programming | K2 |
| CO-3 | Apply different Data type, Structures, functions, files and use the min Programming to solve Computational Problems in the required Domain. | K3 |
| CO-4 | Evaluate the best logic and methods to solve the problems, develop programs and Tools for Solving Real-time Problems. | K4 |

**(K1=Remember, K2=Understand, K3=Apply, K4=Analyze)**

**PO–CO MAPPING**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| **CO-1** | H | M | H | H | H | L | H | H | H |
| **CO-2** | H | M | H | H | H | L | H | M | H |
| **CO-3** | H | M | H | H | H | L | H | M | H |
| **CO-4** | H | H | H | H | H | L | H | H | H |

**PSO–CO MAPPING**

| CO/PSO | PSO1 | PSO2 | PSO3 |
|--------|------|------|------|
| **CO-1** | M | M | M |
| **CO-2** | H | M | H |
| **CO-3** | H | H | H |
| **CO-4** | H | H | H |

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**B. Voc. (Software Development)-First Year-Semester-1**

| Course Title | MAJOR CORE 3-MS-OFFICE AND UNIX -LAB |
|---|---|
| Total Hours | 60 |
| Hours/Week | 4 |
| Code | U22SD1MCP03 |
| Course Type | Practical |
| Credits | 4 |

## CONSPECTUS

To understand and explore the various concepts of MS-OFFICE packages and ShellProgramming using UNIX commands.

## COURSE OBJECTIVES

1. Remembers and understands a word processor to create and organize documents
2. Understand a spreadsheet for calculation, graphing tools, pivot tables
3. Remembers and understands a slideshow presentation software to develop slide-basedpresentations
4. Understand and analyze to create and manage simple database effectively and be ableto create and modify simple Tables, Queries, Forms and Reports
5. Learn and understand the basic Unix commands and the concept of Shell Programming

## EXERCISES

### Word Processing-MSWORD
- Formatting Documents
- Working with Tables and Columns
- Working with Graphics
- Creation of Mail Merge

### Electronic Spread Sheet- MS Excel
- Working and Formatting with Worksheet
- Functions and Formulas
- Working with Excel Graphics

**Database Management System MS Access**
- Working with Table, Form and Report
- Working with Queries

**Presentation–MS PowerPoint**
- Create the Presentation using following concepts:
  - To change the appearance of slide and formatting the Slides
  - Slide Animation and Slide Transition

**Basic Commands in UNIX**

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:
   - Interactive shell scripts
   - Positional parameters
   - Arithmetic
   - if-then-fi, if-then-else-fi, nested if-else
   - Logical operators
   - else+if equals elif, case structure
   - while, until, for loops, use of break

4. Write a shell script to create a file. Follow the instructions
   - Input a page profile to yourself, copy it in to other existing file;
   - Start printing file at certain line
   - Print all the difference between two file, copy the two files.
   - Print line smatching certain word pattern

5. Write shell script for-
   - Showing the count of users logged in,
   - Printing Column list of files in your home directory
   - Listing your job with belownormal 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 directoryshowing date of creation & serial number of the file.

# COURSE OUTCOMES

| CO. No. | Course Outcomes | Cognitive Level(K1-K4) |
|---------|-----------------|------------------------|
| CO-1 | Recall the basic operations of word processing, spreadsheet DBMS, MS-PowerPoint, Unix commands and operations. | K1 |
| CO-2 | Demonstrate the various methods involved in word processing, spreadsheet, DBMS, MS-PowerPoint and Shell Programming | K2 |
| CO-3 | Apply the skills to manipulate and create word document, work on spread sheet to calculate and represent visually, develop aesthetic style shows, shell scripts. | K3 |
| CO-4 | Create and manage databases. | K4 |

**(K1=Remember, K2=Understand, K3=Apply, K4=Analyze)**

## PO–CO MAPPING

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| **CO-1** | H | L | M | L | M | - | M | H | M |
| **CO-2** | M | M | M | L | M | - | H | H | M |
| **CO-3** | M | M | M | L | M | L | H | H | M |
| **CO-4** | H | H | H | L | M | - | H | M | L |

## PSO–CO MAPPING

| CO/PSO | PSO1 | PSO2 | PSO3 |
|--------|------|------|------|
| **CO-1** | H | M | H |
| **CO-2** | H | M | H |
| **CO-3** | H | M | H |
| **CO-4** | H | M | H |

| Course Title | **ENGLISH -PRACTICAL ENGLISH – II** |
|---|---|
| **Total Hours** | **45** |
| **Hours/Week** | **3** |
| **Code** | **U22SD2ENT02** |
| **Course Type** | **Theory** |
| **Credits** | **3** |

## CONSPECTUS
Advanced understanding of Listening, Speaking, Reading & Writing

## COURSE OBJECTIVES
1. To understand aspects of grammar and pronunciation;
2. To use effective listening techniques;
3. To speak clearly with proper Pronunciation;
4. To choose the right kind of material to read for research;
5. To know the components of high IMPACT writing.

### UNIT-I: VOCABULARY                                                              9Hrs

Root – Prefix –Suffix – "word –wide –web" - Spelling rules - Homophones – Homonyms - Pronunciation
**Extra Reading/Keywords***: Pronunciation and Enunciation*

### UNIT-II: LISTENING                                                             9Hrs

Listening to the unsaid words and messages - Asking questions - Seeking Clarification-Summarizing - Listening Effectiveness Assignment
**Extra Reading/Keywords***: Deep Listening*

### UNIT-III: SPEAKING                                                            9Hrs

Speaking clearly and Pronunciation - The power of words and choosing them Right-Voice and Proxemics - Getting it right across cultures - Speaking Assignment
**Extra Reading/Keywords***: Personal space and cultural practices*

### UNIT-IV: READING                                                              9Hrs

Appreciating different genres, styles, authors - Reading for Pleasure (Fiction – Novels, Short Story, Poem) - Reading for Inspiration (Autobiography, Self Help books) - Reading for Research - Identifying the right resources - Books, Periodicals, Magazines, newspaper - Reading off the Internet
**Extra Reading/Keywords***: Blogs and e-books*

### UNIT-V: PERSUASIVE WRITING PROJECT                                            9Hrs

**I**dentify the Audience: Who am I writing to- what are their interests - **M**ission of the Message:

Identify the Purpose/Goal of the communication - **P**lan: Organizing thoughts – Creating structure – Choosing Flow - **A**ction: Write Right- Words – Grammar- Style – Tone – Getting Punctuation right - **C**heck: Edit -Rewrite- Simplify – Format - Preparing a pamphlet (e.g. Plastic free zones, Drug abuse)- Preparing an ad (e.g. Air purifiers, FMCG) - Writing an article (Dream Big, Be Positive) - Movie Review

**Extra Reading/Keywords***: Different types of writing*

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

**COURSE OUTCOMES**

| CO No. | Course Outcomes | Cognitive Level (K1-K4) |
|--------|-----------------|-------------------------|
| **CO-1** | Define and remember the concepts and the rules learnt | K1 |
| **CO-2** | Describe and give examples of the concepts learnt | K2 |
| **CO-3** | Practice the required skills to express oneself | K3 |
| **CO-4** | Solve the challenges given to communicate better | K4 |

**(K1= Remember, K2= Understand, K3= Apply, K4= Analyze)**

**TEXT BOOKS:**
 Student Manual

**SUGGESTED READINGS:**
1. English Communication by Madumitha Chakraborty et al , Macmillan Publications 2017
2. Business Communication by Courtland L. Bovee, et al , Pearsons  2018
3. High School English Grammar – Wren and Martin, 2017 edition
4. Word Power Made Easy – Norman Lewis, 2015 edition
5. The Hindu or The New Indian Express

**WEB REFERENCES:**
1 www.ThoughtCo.com
2 www.bbc.co.uk
3 learnenglish.britishcouncil.org/en
4 https://www.teachingenglish.org.uk/
5 www.businessballs.com
6 www.ted.com
7 www.inktalks.com

 **PO – CO MAPPING**

| CO/PO | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 |
|-------|------|------|------|------|------|------|------|------|------|
| **CO 1** | H | M | H | M | H | M | M | M | L |
| **CO 2** | H | M | H | M | H | M | M | M | L |
| **CO 3** | H | M | H | M | H | M | M | M | L |
| **CO 4** | H | M | H | M | H | M | M | M | L |

 **PSO – CO MAPPING**

| CO/PSO | PSO 1 | PSO 2 | PSO 3 |
|--------|-------|-------|-------|
| **CO 1** | M | L | L |
| **CO 2** | M | L | L |
| **CO 3** | M | L | L |
| **CO 4** | M | L | L |

| Course Title | MAJOR CORE-4-DATA STRUCTURES AND ALGORITHMS |
|---|---|
| Total Hours | 75 |
| Hours/Week | 5 |
| Code | U22SD2MCT04 |
| Course Type | Theory |
| Credits | 5 |

## CONSPECTUS
To understand the fundamental concepts of data structures and learn to develop algorithms.

## COURSE OBJECTIVES
1. To learn the fundamental Concepts of Data Structures.
2. To understand the working principles of Queues and Linked Lists.
3. To study how to balance a Binary Search tree.
4. To understand of various sorting algorithms, including insertion sort, selection sort, merge sort, Heap sort and quick sort.
5. To understand the concepts of Graphs and its terminologies.

## UNIT-I INTRODUCTION TO DATA STRUCTURES                          15Hrs
Definitions–Overview of Data Structures-Implementation of Data Structures. **ARRAYS:** Definition – Terminology – One-dimensional Array: Operations on Arrays. **STACKS:** Definition-Representation of Stack: Implementing the Push and Pop operation – **APPLICATIONS:** Arithmetic Expressions – Polish Notation – Evaluation of Postfix Expression – Transforming an Infix Expression into Postfix.
**Extra Reading/Key words:** *two dimensional and multi-dimensional array concepts.*

## UNIT-II QUEUES                                                  15Hrs
Representation of Queue using an Array– Enqueue and Dequeue Operations–Priority Queue using an array. **LINKED LISTS:** Representation of Linked list in memory – Traversing a Linked list-Inserting after a given node–Deleting the node following a given node, Double Linked Lists and Operations.
**Extra Reading/Keywords:** *real time applications of Stacks & Linked Lists.*

## UNIT-III TREES                                                  15Hrs
Binary Trees: Representing Binary Tree - Operations on Binary trees - Traversing Binary Tree – **GRAPHS:** Introduction-Graph Terminologies-Representation of Graphs: Set Representations–Linked Representations.
**Extra Reading/Keywords:** *cyclic and a cyclic graph, shortest path, Binary Search Tree.*

## UNIT-IV SORTING                                                 15Hrs
Insertion Sort-Selection Sort –Heap Sort-Quick Sort-Merge Sort–Shell Sort (C Implementation).
**Extra Reading/Keywords:** *Applications of Sorting Techniques.*

## UNIT-V ALGORITHMS:                                              15Hrs
Definition-Algorithm Specification: Pseudo code conventions-Recursive Algorithms-Performance Analysis: Space Complexity-Time Complexity-Amortized Complexity-Asymptotic Notations.

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

## COURSE OUTCOMES

| CO. No. | Course Outcomes | Cognitive Level (k1-k4) |
|---------|-----------------|-------------------------|
| CO-1 | Recall the concepts of Arrays, Stack, Queues and Linked List | K1 |
| CO-2 | Compare and associate Stack, Queues, various Linked Lists, binary tree traversal, the operations of binary tree and Sorting algorithms | K2 |
| CO-3 | Apply various data structures and operations in the real time projects. | K3 |
| CO-4 | Analyze various sorting algorithms and performance based on space and time complexity | K4 |

(**K1=Remember, K2=Understand, K3=Apply, K4=Analyze**)

## TEXTBOOKS

1. **Samanta D**, "**Classic Data Structures"**, 2009, Prentice Hall of India Private Ltd, NewDelhi.

   Unit –I, II, IV, V.

2. **Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran**, "**Fundamentals of Computer Algorithms**" second edition - 2018, Universities Press (India) Pvt. Ltd.
   Unit-V

## SUGGESTED READINGS

1. Ellis Horowitz, Sartaj Sahniand Dinesh Mehta, "Fundamentals of Data Structures in C++", University Press (India) Pvt. Ltd., Hyderabad, 2018.
2. Yashavant P. Kanetkar, "Data Structures Through C++", BPB Publications, 2019.
3. A.Chitra and P.T.Rajan, Data Structures, Tata McGraw–Hill Publishing Company Limited, New Delhi, 2006.
4. Ean Paul Tremblay and PaulG. Sorenson, "An Introduction to Data Structures with Applications", Tata McGraw-Hill, Second Edition, 2007.
5. S.E.Goodman and S.T.Hedetniemi, "Introduction to the Design and Analysis of Algorithms", Tata McGraw-Hill, International Edition, 1987.

## WEB REFERENCES

1. https://beginnersbook.com/2018/10/data-structure-array/
2. https://www.tutorialspoint.com/data_structures_algorithms/stack_algorithm.htm
3. https://www.javatpoint.com/binary-search-tree
4. https://www.interviewbit.com/tutorial/sorting-algorithms/
5. https://www.geeksforgeeks.org/dijkstras-shortest-path-algorithm-greedy-algo-7/

*Note: Learners are advised to use latest edition of books.*

**PO–CO MAPPING**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| CO-1  | H   | M   | H   | H   | H   | L   | M   | H   | H   |
| CO-2  | H   | M   | H   | H   | H   | L   | M   | H   | H   |
| CO-3  | H   | M   | H   | H   | H   | L   | M   | H   | H   |
| CO-4  | H   | H   | H   | H   | H   | L   | H   | M   | M   |

**PSO–CO MAPPING**

| CO/PSO | PSO1 | PSO2 | PSO3 |
|--------|------|------|------|
| CO-1   | H    | H    | M    |
| CO-2   | H    | H    | M    |
| CO-3   | H    | H    | H    |
| CO-4   | H    | H    | H    |

| Course Title | MAJOR CORE-5-DATA STRUCTURES AND ALGORITHMS - LAB |
|---|---|
| Total Hours | 75 |
| Hours/Week | 4 |
| Code | U22SD2MCP05 |
| Course Type | Theory |
| Credits | 3 |

## CONSPECTUS

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

## COURSE OBJECTIVES:

1. To remember stack concepts and develop programs using C.
2. To understand the concepts of Queue and develop programs using C.
3. To insert and delete nodes into and from a linked list using C.
4. To develop C programs for implementing different sorting techniques and searching an element in an array.
5. To perform searching an element in an array using C

## EXERCISES

1. Operations on Stack.
2. Conversion of expressions.
3. Operations on Queue.
4. Operations on Linked List.
5. Operations on Binary tree.
6. Binary Tree Traversals.
7. Quick Sort.
8. Insertion Sort.
9. Linear Search.
10. Binary Search.

## COURSE OUTCOMES

| CO No. | Course Outcomes | Cognitive Level (k1-k4) |
|---|---|---|
| CO-1 | Recognize the different sorting algorithms | K1 |
| CO-2 | Identify the various operation in stack, queue and their applications | K2 |
| CO-3 | Apply various types of Linked List and their Applications | K3 |
| CO-4 | Performs the operations on searching algorithms | K4 |

**(K1=Remember, K2=Understand, K3=Apply, K4=Analyze)**

**PO–CO MAPPING**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| **CO-1** | H | M | H | H | H | L | H | H | H |
| **CO-2** | H | M | H | H | H | L | H | M | H |
| **CO-3** | H | M | H | H | H | L | H | M | H |
| **CO-4** | H | H | H | H | H | L | H | H | H |

**PSO–CO MAPPING**

| CO/PSO | PSO1 | PSO2 | PSO3 |
|--------|------|------|------|
| **CO-1** | H | H | M |
| **CO-2** | H | M | H |
| **CO-3** | H | M | H |
| **CO-4** | H | H | M |

| Course Title | MAJOR CORE-6-WEB DEVELOPMENT TOOLS LAB |
|---|---|
| Total Hours | 75 |
| Hours/Week | 5 |
| Code | U22SD2MCP06 |
| Course Type | Practical |
| Credits | 4 |

## CONSPECTUS

To get knowledge and practical skill to create dynamic web applications.

## COURSE OBJECTIVES

1. To understand the concepts necessary to create Dynamic Web Applications;
2. To evaluate Several Alternatives in the Design of a Web Application;
3. To develop A Functional Web Application;
4. To comprehend and Propose Web Application Infrastructure;
5. To apply Code Reuse with Templates, Libraries, And Snippets;
6. To create effective and attractive web applications required for the project developments;

## HTML5

1. Develop a web page for a Restaurant's Menu Card using tables.
2. Design a web page for your college displaying various courses using Lists and Frames.
3. Design an Online Application form for your college.

## CSS 3

1. To illustrate CSS Border Style Properties
2. To illustrate CSS Border Image Properties.
3. To illustrate CSS Selector Properties.

## 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.

## COURSE OUTCOMES

| CO No. | Course Outcomes | Cognitive Level (K1-K4) |
|---|---|---|
| CO-1 | Recognize the fundamental concepts of web technologies | K1 |
| CO-2 | Understand the syntax of different technologies used in web development | K2 |
| CO-3 | Apply different designing tools for developing interactive webpages | K3 |
| CO-4 | Examine the designing tools suitable for current scenario to solve real-time problems | K4 |

**(K1=Remember,     K2=Understand,     K3=Apply,     K4=Analyze)**

## PO – CO MAPPING

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO-1** | H | M | H | H | H | L | H | H | H |
| **CO-2** | H | M | H | H | H | L | H | M | H |
| **CO-3** | H | M | H | H | H | L | H | M | H |
| **CO-4** | H | H | H | H | H | L | H | H | H |

## PSO – CO MAPPING

| CO/PSO | PSO1 | PSO2 | PSO3 |
|---|---|---|---|
| **CO-1** | M | M | M |
| **CO-2** | H | M | H |
| **CO-3** | H | H | H |
| **CO-4** | H | H | H |

**HOLY CROSS COLLEGE (AUTONOMOUS), TIRUCHIRAPALLI-620 002.**
**SCHOOL OF MATHEMATICAL COMPUTATION SCIENCES**
**DEPARTMENT OF B. Voc. (SOFTWARE DEVELOPMENT)**
**CHOICE BASED CREDIT SYSTEM**
**LEARNING OUTCOME-BASED CURRICULUM FRAMEWORK LOCF)**

**B. Voc. (Software Development)-Second Year-Semester-III**

| Course Title | ENGLISH: PRACTICAL ENGLISH- III |
|---|---|
| Code | U22SD3ENT03 |
| Course type | Theory |
| Semester | III |
| Hours/Week | 3 |
| Credits | 3 |
| Marks | 100 |

**CONSPECTUS**
To understand the communication process and basics skills of Listening, Speaking, Reading &Writingand apply them in the work place scenarios and day-to-day lives

**COURSE OBJECTIVES**
**The Learner will be able to**

1. Define and remember the concepts and the rules learnt
2. Describe and give examples of the concepts learnt
3. Practice the required skills to express oneself
4. Solve the challenges given to communicate better
5. Evaluate the scenarios to offer  achieve better communication channels
6. Write / prepare communication models according to the formats taught

**UNIT I**                                                                                            **9Hrs**
**Errors and How to avoid them**
   Subject – verb agreement -  Pronoun
   Apostrophe                -    Comma splice
   Sentence Fragments and Run-on Sentence
**Extra Reading/Key Words:** *Writing without errors*


**UNIT II**                                                                                          **9Hrs**
**LISTENING**
   Listening to understand vs Listening to respond
   Learning to summarize – Handling emotions when listening
   Distractions to listening
**Extra Reading/Key Words:** *Levels of Listening*

**UNIT III**                                                         **9Hrs**

**Speaking**

Engaging the mind before the mouth – Why? What? When? Where? Who? How?

Speaking on the phone, Conference calls

3.3.          Speaking in meetings

**Extra Reading/Key Words:** *Speaking skills- fluency, Vocabulary, Grammar, Pronunciation*

**UNIT IV**                                                         **9Hrs**

**Reading**

Reading and learning to summarize, abridge, abstract – Making a reading plan

Reading, recording and reviewing – Reading project

Book Review – Presentation and Report

**Extra Reading/Key Words:** *Reviews, summary, abstracts and excerpts, Fiction, Biographies,Autobiographies & Self – improvement books*

**UNIT V**                                                         **9Hrs**

**Writing Approaches in Action through Email**

Email, Messaging Written Communication – DO s and DON'T s

Emails – introducing- informing-thanking-following up – Emails – Asking, Replying-Summarizing/Reporting – Emails - sending wishes

Writing for the Social Media (LinkedIn Profile, replying, etc) – Writing to Peers-Bosses-Clients-Customers

**Extra Reading/Key Words:** *Writing for Social Media and networking on professional Social Media*

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

**COURSE OUTCOMES**

| CO No. | Course Outcomes | Cognitive Level (K1-K5) |
|--------|-----------------|-------------------------|
| **CO-1** | Define and remember the concepts and the rules learnt | K1 |
| **CO-2** | Describe and give examples of the concepts learnt | K2 |
| **CO-3** | Practice the required skills to express oneself | K3 |
| **CO-4** | Solve the challenges given to communicate better | K4 |
| **CO-5** | Evaluate the scenarios to offer to achieve better communication channel | K5 |

**(K1=Remember, K2=Understand, K3=Apply, K4=Analyze, K5=Evaluate)**

## BOOK FOR REFERENCE

1. Business Communication Today by Corutl and Bovee- 14<sup>th</sup> edition, 2018
2. Technical Communication by Meenakshi Raman
3. Business Communication by Namitha Gopal
4. High School English Grammar – Wren and Martin
5. Word Power Made Easy – Norman Lewis
6. The Hindu, The New Indian Express, etc.

## WEB REFERENCES

1. www.ThoughtCo.com
2. www.bbc.co.uk
3. learnenglish.britishcouncil.org/en
4. https://www.teachingenglish.org.uk/
5. www.businessballs.com
6. www.ted.com
7. www.inktalks.com

## PO – CO MAPPING

| CO/PO | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 |
|-------|------|------|------|------|------|------|------|------|------|
| CO 1 | H | M | H | H | H | H | M | M | H |
| CO 2 | H | M | H | H | H | H | M | M | H |
| CO 3 | H | M | H | H | H | H | M | M | H |
| CO 4 | H | M | H | H | H | H | M | M | H |
| CO-5 | H | M | H | H | H | H | M | M | H |

## PSO – CO MAPPING

| CO/PSO | PSO 1 | PSO 2 | PSO 3 |
|--------|-------|-------|-------|
| CO 1 | H | M | L |
| CO 2 | H | M | L |
| CO 3 | H | M | L |
| CO 4 | H | M | L |
| CO-5 | H | M | L |

| Course Title | MAJOR CORE-7- JAVA PROGRAMMING |
|---|---|
| Code | U22SD3MCT07 |
| Course type | Theory |
| Semester | III |
| Hours/Week | 5 |
| Credits | 5 |
| Marks | 100 |

## CONSPECTUS

To understand the fundamentals of object-oriented programming concepts and its application in a Java environment.

### COURSE OBJECTIVES

1. To understand the Java features and its expressions
2. To apply the concepts of classes, objects and methods
3. To implement the types of Inheritance & Packages
4. To differentiate and demonstrate the types in Thread creation and Exception Handling
5. To understand and create applications with Applet Programming
   and JavaCollection Framework.

## UNIT I JAVA EVOLUTION                                    12Hrs

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 LANGUAGE

Introduction – Simple Java Program – More of Java – An Application with Two Classes – Java ProgramStructure – 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 – Nestingof If. Else Statements – The Else If Ladder – The Switch Statement – The ? : Operator.
**Extra Reading /Keywords:** *Netbean, Eclipse*

## UNIT II DECISION MAKING AND LOOPING                      12Hrs

Introduction – The While Statement – The do Statement – The for Statement – Jumps in Loops – LabeledLoops. **CLASSES, OBJECTS AND METHODS:** Introduction – Defining a Class – Fields Declaration
–Methods Declaration – Creating Objects – Accessing Class Members – Constructors – MethodsOverloading – 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 /Keywords:** *Generalization, Specialization*

## UNIT III INTERFACES: MULTIPLE INHERITANCE                    12Hrs

Introduction – Defining Interfaces – Extending Interfaces – Implementing Interfaces – Accessing InterfaceVariables.
**PACKAGES: PUTTING CLASSES TOGETHER:** Introduction – Java API Packages – Using System Packages – Naming Conventions – Creating Packages – Accessing a Package – Using a Package
– Addinga Class to a Package – Hiding Classes – Static Import.
**Extra Reading /Keywords:** *Proxy, JAR Files*


## UNIT IV MULTITHREADED PROGRAMMING                    12Hrs

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 /Keywords:** *Deadlock, Synchronization*


## UNIT V APPLET PROGRAMMING                    12Hrs
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 Appletto 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 theUser-EventHandling-Introduction to AWT Package-Introduction to Swings-
**JAVA COLLECTIONS:** Overview of Interfaces-Overview of Classes-Overview of Algorithms.
**Extra Reading /Keywords:** *HTML5, Servlet*


Note: Texts given in the Extra reading /Key words must be tested only through Assignment andSeminars.
**COURSE OUTCOMES**
The learners will be able to:

| CO No. | Course Outcomes | Cognitive Level (K1-K5) |
|--------|-----------------|-------------------------|
| **CO-1** | Identify classes, objects, members of a class and relationships among them and understand abstraction, polymorphism needed for a specific problem | **K1** |
| **CO-2** | Understand and Apply encapsulation concepts in developing programs and develop exception handling and multithreaded applications withsynchronization | **K2** |
| **CO-3** | Construct the packages with visibility control and designprograms using different methods of thread creation | **K3** |
| **CO-4** | Design GUI based applications and develop applets for web applicationsimplementing java collection | **K4** |
| **CO-5** | Construct Java Programs involving multithreaded programming,exception handling and applets with evaluating criteria | **K5** |

**(K1=Remember, K2=Understand, K3=Apply, K4=Analyze, K5=Evaluate)**

**TEXT BOOKS**
1.E. Balagurusamy, **"Programming with JAVA"**, 2019, 6th Edition, Tata
McGraw-HillPublishing Company Limited, New Delhi.
UNIT I: CHAPTERS 2, 3(3.1-3.2), 5.12& 6
**UNIT II: CHAPTERS 7, 8**
UNIT III: CHAPTERS 10, 11
**UNIT IV: CHAPTERS 12, 13**
UNIT V: CHAPTERS 14, 17

**SUGGESTED READINGS**
1. Yashavant P. Kanetkar, "**Let Us Java**", 2019, BPB Publications.
2. Herbert Schildt, **"Java The Complete Reference"**, 2017, 7th edition, TataMcGraw-HillPublications Pvt. Ltd.
3. Y. Daniel Liang, **"Introduction to Java Programming and Data Structures"**, 2020, 12[th]edition,Pearson Education Ltd.
4. R. Nageswara Rao, "**Core Java: An Integrated Approach**",2016, Dream tech Press.
5. Herbert Schildt, "**Java A Beginner's Guide"**, 2020, 8th edition, Tata McGraw-HillPublicationsPvt. Ltd.

**WEB REFERENCES**

1. https://www.programiz.com › java-programming
2. https://www.w3schools.com › java › java_intro
3. https://www.javatpoint.com › java-tutorial
4. https://docs.oracle.com › docs › technotes › guides › language
5. https://www.geeksforgeeks.org › java

*Note: Learners are advised to use latest edition of books.*

**PO–CO MAPPING**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| **CO-1** | H | M | M | L | M | L | H | H | M |
| **CO-2** | H | M | M | M | M | L | H | H | M |
| **CO-3** | H | H | M | L | M | L | H | H | M |
| **CO-4** | H | H | M | M | M | L | H | H | H |
| **CO-5** | H | M | M | L | M | L | H | H | H |

**PSO–CO MAPPING**

| CO/PSO | PSO1 | PSO2 | PSO3 |
|--------|------|------|------|
| **CO-1** | H | M | M |
| **CO-2** | H | M | M |
| **CO-3** | H | H | H |
| **CO-4** | H | H | H |
| **CO-5** | H | H | H |

| Course Title | MAJOR CORE-8-COMPUTER NETWORKS |
|---|---|
| Code | U22SD3MCT08 |
| Course type | Theory |
| Semester | III |
| Hours/Week | 5 |
| Credits | 4 |
| Marks | 100 |

**CONSPECTUS**
To impart knowledge on different layers of Computer Networks and its functionalities.

**COURSE OBJECTIVES**
1. To remembers and understands the basic concept of computer hardware and software
2. To understand the types of Transmission Media and remembers the working principles ofPublic Switched Telephone Network.
3. To examine functionalities of data link layer such as Error control and Flow control.
4. Analyze the routing and congestion control algorithms in network layer and to determine theprotocol in transport layer
5. To identify and analyze the various services of application layer and the techniques in cryptography.

**UNIT I**             **15Hrs**
**INTRODUCTION**-Uses of Computer Networks - Network Hardware - Network Software - Referencemodels OSI reference Model (TCP/IP reference Model, A comparison of the OSI and TCP/IP ReferenceModels).
**Extra Reading/Keywords***: IoT interoperation across the OSI model.*

**UNIT II**             **15Hrs**
**PHYSICAL LAYER**: Guided Transmission Media - Wireless Transmission - The Public SwitchedTelephone Network: Structure of the Telephone System – Trunks and Multiplexing - Switching.
**Extra Reading/Keywords***: Mobile Telephone System.*

**UNIT III**             **15Hrs**
**DATA LINK LAYER**: Data link Layer Design issues - Error Detection and Correction- Elementary DataLink Protocols - Sliding Window Protocols: A One-Bit Sliding Window Protocol**.**
**Extra Reading/Keywords***: Orthogonal frequency division multiplexing (OFDM) Technique*

**UNIT IV**             **15Hrs**
**THE NETWORK LAYER**: Network Layer Design Issues - Routing Algorithms - Congestion ControlAlgorithms.
**THE TRANSPORT LAYER:** The Transport Service (Services Provided to the Upper Layers, TransportService Primitives) – Elements of Transport Protocols.
**Extra Reading/Keywords***: Quality of Service (QoS)*

**UNIT V**                                                              **15Hrs**

**THE APPLICATION LAYER-** DNS - Domain Name System - Electronic Mail - The World Wide Web.NETWORK SECURITY: Cryptography - Symmetric Key Algorithms - Public Key Algorithms.

**Extra Reading/Keywords***: Communication Security and Web Security*

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

## COURSE OUTCOMES

**The learners will be able to:**

| CO. No. | Course Outcomes | Cognitive Level (K1-K5) |
|---------|-----------------|-------------------------|
| CO-1 | Recognize the functionalities of Network hardware, Network software and protocols in various layer of OSI reference Model | K1 |
| CO-2 | Summarize and classify the working principles of Physical, Data Link, Network and the application layer. | K2 |
| CO-3 | Illustrate the mechanism of multiplexing, switching, error detection and correction and apply the suitable congestion control algorithm to solve routing issues and cryptographic algorithm to enhance security. | K3 |
| CO-4 | Analyze the issues in each layer of OSI reference model and the suitable routing and security algorithm to control congestion and to improve security. | K4 |
| CO-5 | Evaluate the various cryptographic techniques suitable to solve security issues in network | K5 |

**(K1=Remember, K2=Understand, K3=Apply, K4=Analyze,K5=Evaluate)**

## TEXT BOOK

1. Tanenbaum Andrew. S| Wetherall, Computer Networks, 2013, Fifth Edition, Prentice-Hall India of IndiaPvt. Ltd.,New Delhi.

| | | |
|---|---|---|
| **UNITI** | : | Chapter 1 (1.1, 1.2, 1.3, 1.4.1, 1.4.2, 1.4.3) |
| **UNITII** | : | Chapter 2 (2.2, 2.3, 2.5 (2.5.1, 2.5.4, 2.5.5)) |
| **UNITIII** | : | Chapter 3 (3.1 -3.4) |
| **UNITIV** | : | Chapter 5 (5.1, 5.2(5.2.1-5.2.8), 5.3) |
| | | Chapter 6 (6.1.1, 6.1.2), 6.2), |
| **UNITV** | : | Chapter 7 (7.1, 7.2, 7.3) |
| | | Chapter 8.1, 8.2, 8.3 |

## SUGGESTED READINGS

1. Forouzan, "**Data Communications and Networking**",2017, Tata McGraw Hill Publishing Limited
2. Kurose James F. and Ross Keith W, "**Computer Networking**", 2017, Pearson Education.
3. Stallings William, **"Data and Computer Communications"**, 2017, Pearson Education
4. Brijendra Singh, **"Data Communication and computer Networks"**, 2014, Pearson Education.
5. P.K. Sing, **"Introduction to Computer Networks"**, 2020, V.K global publication limited.

*Note: Learners are advised to use latest edition of books.*

## WEB REFERENCES

1. https://www.networkworld.com/article/3239677/the-osi-model-explained-and-how-to- easily- remember-its-7-layers.html
2. https://osi-model.com/physical-layer/
3. https://web.cs.wpi.edu/~rek/Nets2/C10/Data_Link_Layer_10.pdf
4. https://www.uobabylon.edu.iq/eprints/publication_4_20245_670.pdf
5. https://www.uobabylon.edu.iq/eprints/paper_9_19459_27.pdf
6. https://ptgmedia.pearsoncmg.com/images/9781587132087/samplechapter/ 158713 2087_ 03.pdf

*Note: Learners are advised to use latest edition of books.*

## PO–CO MAPPING

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| CO1 | H | M | M | M | H | M | H | H | L |
| CO2 | H | H | H | M | L | L | H | H | H |
| CO3 | H | H | H | M | H | M | H | H | H |
| CO4 | H | H | H | H | H | H | H | H | H |
| CO5 | H | H | M | L | M | M | H | H | H |

## PSO – CO MAPPING

| CO/PSO | PSO1 | PSO2 | PSO3 |
|--------|------|------|------|
| CO1 | H | H | L |
| CO2 | H | M | L |
| CO3 | H | H | H |
| CO4 | H | H | H |
| CO5 | H | M | H |

| Course Title | MAJOR ELECTIVE – 1 JAVA PROGRAMMING -LAB |
|---|---|
| Code | U22SD3MEP01 |
| Course type | Practical |
| Semester | III |
| Hours/Week | 4 |
| Credits | 3 |
| Marks | 100 |

## CONSPECTUS
To gain the knowledge to develop and create multiple web-based or server-based applicationsin java to enhance the industrial competency.

## COURSE OBJECTIVES
1. To recall the syntax, structure and concepts of Java programming language
2. To understand logical constructs for branching and loops as well as use of iterator objects
3. To develop applications with polymorphism through use of super-classes and interfaces
4. To design and implement custom checked and unchecked exception types
5. To create Enterprise based applications by encapsulating an application's business logic.

## EXERCISES

1. Simple Programs.

2. Control Structures

3. Classes & Objects and Methods

4. Arrays

5. Interface

6. Inheritance

7. Packages

8. Multithreaded Programming

9. Exception Handling

10. Applets

**COURSE OUTCOMES**

| CO. No. | Course Outcomes | Cognitive Level (K1-K5) |
|---|---|---|
| CO1 | Recognize the basics of Java Programming | K1 |
| CO2 | Demonstrate the use of control structures, classes , objects and methods in Java Programming | K2 |
| CO3 | Apply arrays, interfaces, inheritance, and packages to solve real time problems | K3 |
| CO4 | Analyze the best logic and methods to solve the problems using multithreaded programming, exception handling and applets | K4 |
| CO5 | Write application programs in Java evaluating the best suitable constructs, concepts and logic | K5 |

**(K1=Remember, K2=Understand, K3=Apply, K4=Analyze, K5=Evaluate)**

**PO–CO MAPPING**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO-1** | H | H | H | H | H | L | H | H | H |
| **CO-2** | H | M | M | M | H | L | H | M | H |
| **CO-3** | H | M | H | H | H | L | H | M | H |
| **CO-4** | H | H | M | M | H | L | H | H | H |
| **CO-5** | H | M | H | H | H | L | H | M | H |

**PSO–CO MAPPING**

| CO/PSO | PSO1 | PSO2 | PSO3 |
|---|---|---|---|
| **CO-1** | H | M | M |
| **CO-2** | H | M | H |
| **CO-3** | H | H | H |
| **CO-4** | H | H | H |
| **CO-5** | H | H | H |

| Course Title | MAJOR SKILL BASED ELECTIVE 1-ANIMATION- LAB |
|---|---|
| Code | U22SD3SBP01 |
| Course type | Practical |
| Semester | III |
| Hours/Week | 2 |
| Credits | 1 |
| Marks | 100 |

**CONSPECTUS**
To impart the skills in 2D and 3D animation by creating objects and adding
special effectsusing Pencil 2D and Blender.

**COURSE OBJECTIVES**
1. To recall the concepts of 2D animation and 3D animation
2. To understand the tools and attributes used in 2D animation.
3. To design and implement various 2D animation effect using Pencil 2D
4. To develop 3D models, logo and scene using Blender.
5. To design 3D object and add animation effect to it

**EXERCISES**

**Pencil2D**
1. Bouncing Ball
2. Birds on the Nest
3. Burning Candle
4. Moving Car
5. Shooting Gun
6. Rocket Launch

**Blender**

1. Creating 3D models
2. Creating a 3D Logo
3. Creating a 3D scene
4. Creating and animating 3D dices
5. Creating a 3D animation Game
6. Creating and animating a 3D Character

**COURSE OUTCOMES**

| CO. No. | Course Outcomes | Cognitive Level (K1-K5) |
|---|---|---|
| CO-1 | Recognize the basics of 2D and 3D animation | K1 |
| CO-2 | Demonstrate the use of various tools and attributes for designing object used for animation | K2 |
| CO-3 | Apply the special effects and movement to the object to create motion effect to the object. | K3 |
| CO-4 | Analyze the different tools, attributes and effects available to develop effective animation applications | K4 |
| CO-5 | Evaluate and find suitable animation tools to design real time animation applications | K5 |

**(K1=Remember, K2=Understand, K3=Apply, K4=Analyze,K5=Evaluate)**

**PO–CO MAPPING**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|---|---|---|---|---|---|---|---|---|---|
| **CO-1** | H | H | H | H | H | L | H | H | H |
| **CO-2** | H | M | M | M | H | L | H | M | H |
| **CO-3** | H | M | H | H | H | L | H | M | H |
| **CO-4** | H | H | M | M | H | L | H | H | H |
| **CO-5** | H | H | M | M | H | L | H | H | H |

**PSO–CO MAPPING**

| CO/PSO | PSO1 | PSO2 | PSO3 |
|---|---|---|---|
| **CO-1** | H | M | M |
| **CO-2** | H | M | M |
| **CO-3** | H | H | H |
| **CO-4** | H | H | H |
| **CO-5** | H | H | H |

| Course Title | NON-MAJORELECTIVE-3- INTRODUCTION TO INFORMATION TECHNOLOGY |
|---|---|
| Code | U22SD3NMT01 |
| Course type | Theory |
| Semester | III |
| Hours/Week | 2 |
| Credits | 2 |
| Marks | 100 |

## CONSPECTUS
To develop a broad understanding of the discipline of Information technology thatenlightens the students to be successful professionals in the IT industry

## COURSE OBJECTIVES
1. To understand the basics of computer systems and information technology.
2. To acquire knowledge of computer hardware, software, its component and operatingsystem.
3. To explore the various types of programming languages.
4. To obtain the knowledge about e-commerce, internet and extranet and uses of web applications.
5. To develop the applications of computer information system in various businessfield

**UNIT I**                                                                                                        **6Hrs**
Hardware and Software: computer systems, importance of computers in business, data and information, data processing, data storage and data retrieval capabilities, computer applications in various areas of business, computer related jobs in business.
**Extra Reading/Keywords:** *Data information*

**UNIT II**                                                                                                      **6Hrs**
Hardware Software and Communication: Computing Hierarchy – Input – Output Technologies– Hardware    Issues – System Architecture – Network Operating Systems – Grid Computing – Mobile Computing – Ubiquitous Computing – Application Programming – Managing Application Development – Data Resources – Managing Data Resources – Problemof Change and Recovery.
**Extra Reading/Keywords:** *Mobile computing and Communication*

**UNIT III**                                                                                                     **6Hrs**
Components of computers input, output and storage devices, system software  and Application software- Programming language-machine language- assembly language, higher Level languages. Flowchart and programme flow charts. Steps in developing a computer programme.
 **Extra Reading/Keywords: Types of languages and components of computers**

**UNIT IV**                                                                                                      **6Hrs**
Operating systems: Dos, windows, UNIX, Windows NT, windows98 - Ecommerce. Internet Extranet- Email and its uses-world wide websites-mobile computers.
**Extra Reading/Keywords:** *Various kinds of operating system*

**UNIT V**                                                                                                           **6Hrs**

System analysis and design, computer-based information systems-Transaction processing office Automation- management information system-decision support systems-expert system.

**Extra Reading/Keywords:** *System design*

**Note: Texts given in the Extra reading / Keywords must be tested only throughAssignment and Seminars.**

**COURSE OUTCOMES**

| CO No. | Course Outcomes | Cognitive Level (K1-K5) |
|--------|-----------------|-------------------------|
| **CO-1** | Understand the basic concepts about hardware and software Components and data retrieval from various areas of business. | **K1** |
| **CO-2** | Recall and remember the different types of computers available in business   industries. | **K2** |
| **CO-3** | Aware of different programming and machine level languages and steps to develop computer programmes. | **K3** |
| **CO-4** | Analyze about e-commerce, internet and extranet understand the uses of world wide web applications. | **K4** |
| **CO-5** | Explain the students to develop the applications of computer information system in various business fields. | **K5** |

**(K1=Remember, K2=Understand, K3=Apply, K4=Analyze, K5=Evaluate, K6 = Create)**

**TEXT BOOK**

1. Henry C. Lucas. Jr, "Information Technology",2015 – Strategic Decision Making for Managers, JohnWiley & Sons (Asia) Pvt. Ltd., Singapore.

**SUGGESTED READINGS**

1. Alexis Leon and Mathews Leon," Introduction to computers",2015, Vikas publishing house pvt. Ltd.,
2. V. Rajaraman," Introduction to information technology", 2$^{nd}$ edition- 2018.
3. Garroll W. Frenzel Johne. Frenzel, "Management of Information Technology", 2016, Thomson   core Technology, Boston,
4. Henry C. Lucas. Jr, "Information Technology",2015 – Strategic Decision Making for Managers, John Wiley & Sons (Asia) Pvt. Ltd., Singapore.
5. Computer and common Sense-Roger Hunt and John Shellery., 2016.

*Note: Learners are advised to use latest edition of books.*

## WEB REFERENCES

1. http://itacademic.ir/upload/IT_Fund.&Infra-1.pdf
2. https://www.pakistanbix.com/ebooks-pdf/the-concepts-of-information-technology-book-pdf/
3. https://nap.nationalacademies.org/topic/279/computers-and-information-technology/
4. https://content.kopykitab.com/ebooks/2017/09/11831/sample/sample_11831.pdf
5. https://www.tutorialspoint.com/fundamentals_of_science_and_technology/information_technology.htm

## PO–CO MAPPING

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| CO1 | H | M | H | L | H | M | H | H | L |
| CO2 | H | M | M | L | M | M | H | H | H |
| CO3 | H | H | H | M | H | M | H | H | H |
| CO4 | H | M | H | H | H | H | H | H | H |
| CO5 | H | H | M | L | M | M | M | H | H |

## PSO – CO MAPPING

| CO/PSO | PSO1 | PSO2 | PSO3 |
|--------|------|------|------|
| CO1 | H | M | H |
| CO2 | H | M | H |
| CO3 | H | M | H |
| CO4 | H | H | H |
| CO5 | H | M | H |

| Course Title | PRACTICAL ENGLISH – IV |
|---|---|
| Total Hours | 45 |
| Hours/Week | 3 |
| Code | U22SD4ENT04 |
| Course Type | Theory |
| Credits | 3 |

## CONSPECTUS

To understand the corporate communication models and basic skills of Listening, Speaking, Reading and Writing, and apply them in workplace scenarios and day-to-day lives

## COURSE OBJECTIVES

1. To understand the corporate communication models and Self-analysis

2. To remember and apply the techniques of High Impact Presentation

3. To learn about common mistakes while using English and avoiding them

4. To learn and practice the dos's and don'ts of Group discussions for placement

5. To learn and prepare for the job interview process

**Unit I        Campus to Corporate                                                                9Hrs**

Corporate Communication - Power dressing and grooming - Corporate Terms (advanced) - JOHARI window - SWOT analysis of the self
 **Extra Reading/Key Words:** *Heuristic technique*

**Unit II        High Impact Presentation                                                          9Hrs**
PowerPoint and how to use it effectively - Using PowerPoint correctly - Delivering using PowerPoint - Other Presentation tools - Delivering in person vs. on the phone vs. video - Public Speaking Assignment - Micro Presentation – Video Mirroring
**Extra Reading/Key Words:** *Audience response systems*

**Unit III    Common Writing Mistakes and How to Avoid Them                      9Hrs**
The Wrong word - The Impotent Word - Common Grammatical errors - Indianisms and their unintended impact
**Extra Reading/Key Words:** *Malapropism*
**Preparing for Placement – I**
Resume - Cover Letter for Internship - Cover Letter for Job - Statement of Purpose
**Extra Reading/Key Words:** *Hard and soft skills*

**Unit IV Preparing for Placement – II                                                          9Hrs**
Group Discussion (GD) & Evaluation Components - Roles in GD - Analysis of Topics - Handling different views - Controlling Emotions - Mock GD
**Extra Reading/Key Words:** *Types of Group Discussion*

**Unit V Preparing for Placement – III                                                         9Hrs**
Interviews & Evaluation Components - Different formats of Interviews - Handling conflicts – Practice - Mock Interview

**Extra Reading/Key Words:** *Assessing Strengths and Weaknesses*

**Note: Texts given in the Extra reading /Keywords must be tested only through Assignments and Seminars.**
**TEXTBOOK:**
     Student Manual

**SUGGESTED READINGS**
1. Technical Communication by Meenakshi Raman
2. Business Communication by Namitha Gopal
3. High School English Grammar – Wren and Martin
4. Body Language – Allan Pease
5. The Hindu, The New Indian Express, etc.

**WEB REFERENCES**

1. www.ThoughtCo.com
2. www.bbc.co.uk
3. learnenglish.britishcouncil.org/en
4. https://www.teachingenglish.org.uk/
5. www.businessballs.com
6. www.ted.com
7. www.inktalks.com

**Course Outcomes:**

| CO No. | Course Outcomes | Cognitive Level |
|--------|-----------------|-----------------|
| CO-1 | Understanding Self and introduction to corporate communication. | K1 |
| CO-2 | Use of technology in presentation | K2 |
| CO-3 | Write English correctly and Resume writing | K3 |
| CO-4 | Participate in group discussions | K4 |
| CO-5 | Attend interviews for placement | K5 |

**(K1- Remember; K2- Understand; K3 – Apply; K4 – Analyse; K5- Evaluate)**

**PO – CO MAPPING**

| CO/PO | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 |
|-------|------|------|------|------|------|------|------|------|------|
| CO 1  | H    | M    | H    | H    | H    | H    | M    | M    | H    |
| CO 2  | H    | M    | H    | H    | H    | H    | M    | M    | H    |
| CO 3  | H    | M    | H    | H    | H    | H    | M    | M    | H    |
| CO 4  | H    | M    | H    | H    | H    | H    | M    | M    | H    |

**PSO – CO MAPPING**

| CO/PSO | PSO 1 | PSO 2 | PSO 3 |
|--------|-------|-------|-------|
| CO 1   | H     | M     | L     |
| CO 2   | H     | M     | L     |
| CO 3   | H     | M     | L     |
| CO 4   | H     | M     | L     |

| Course Title | MAJOR CORE – 11- DATABASE SYSTEMS |
|---|---|
| Total Hours | 75 |
| Hours/Week | 5 |
| Code | U22SD4MCT09 |
| Course Type | Theory |
| Credits | 5 |

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

## COURSE OBJECTIVES
1. To understand fundamentals of database management system and its architecture.
2. To apply Structured Query Language to access data from database related to software industry.
3. To explore the basics of PL/SQL concept, functions and triggers used to solve problems.
4. To apply Normalization techniques to refine database to reduce software and hardware cost.
5. To analyze Transaction Processing and Concurrency Control mechanism in database system to secure the software.

## UNIT-I: INTRODUCTION TO DBMS                                    12Hrs
**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 Models
**Extra reading/Keywords**: *DB Software, Big Data*

## UNIT-II: STRUCTURED QUERY LANGUAGE                             12Hrs
**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/Keywords**: *PostgreSQL, Embedded SQL*

## UNIT-III: PL/SQL PROCEDURE                                     12Hrs

**Procedural Language- SQL**: PL/SQL Block Structure - PL/SQL Tables. Cursor Management and Advanced PL/SQL: Opening and Closing a Cursor - Processing Explicit Cursor - Implicit Cursor - Exception Handlers – Sub Programs in PL/SQL - Functions - Precaution While Using PL/SQL Functions - Stored Procedure –DB Triggers - Object Oriented Technology
**Extra reading/Keywords:** PL/SQL Engine, Oracle Server

## UNIT-IV: NORMALIZATION                                         12Hrs

Introduction – Normalization - Normal Forms - BCNF – Multi-value Dependencies and 4NF – Join Dependencies and 5NF
**Extra reading/Keywords**: *6NF, ONF*

**UNIT-V: TRANSACTION PROCESSING**                                       **12Hrs**

**Transaction Processing and Concurrency Control**: Introduction - Transaction Concepts - Concurrency Control - **Database Recovery System**: Database Recovery Concepts-Types of Database Failure-Types of Database Recovery.
**Extra reading/Keywords***: Web Server, Transaction Processing Monitor*

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

**COURSE OUTCOMES**

| CO No. | Course Outcomes | Cognitive Level (K1-K5) |
|--------|-----------------|--------------------------|
| **CO-1** | Recall and relate file management systems with DBMS and design relations using Database Schema | **K1** |
| **CO-2** | Understand the concepts data models, SQL Queries, PL/SQL procedures, normalization techniques and database recovery system | **K2** |
| **CO-3** | Apply normalization techniques to avoid data redundancy in databases and apply SQL queries and PL/SQL procedure to access the database. | **K3** |
| **CO-4** | Analyze the suitable normalization techniques to design a database schema for real-time database management problems. | **K4** |
| **CO-5** | Evaluate Concurrency Control methods to secure the data and assess the types of Database failures and Database Recovery to develop the software with integrity | **K5** |

**(K1=Remember, K2=Understand, K3=Apply, K4=Analyze, K5=Evaluate)**

**PRESCRIBED TEXT BOOKS**
1. S.K. Singh, "Database Systems - Concepts, Design and Application", Pearson education, 2nd edition, 2013.

   Unit-I Chapter 1(1.1-1.7), Chapter 2(2.1-2.3, 2.7)

   Unit-II Chapter-5(5.4,5.5)

   Unit IV Chapter-10(10.1-10.6)

   Unit V Chapter-12(12.1-12.3), Chapter 13(13.1-13.5)
2. Rajesh Narang, "Database Management Systems", PHI Learning Private Limited, New Delhi, 2011

   Unit – III Chapter 10(Pages: 178-190), Chapter11 (Pages:191-222)

**SUGGESTED READINGS**
1. Abraham Silberscatz, Henry F. Korth and S. Sundhrasan, "**Database System Concepts**", 2019, Mc Graw Hill Publications Pvt. Limited.
2. Elmasri Ramez Navathe Shamkant, "**Fundamentals of Database System**", 2017, Pearson Education Publications.
3. Rajiv Chopra, "**Database Management System**", 2016, S. Chand Publications.
4. Seemakedar, "**Database Management System**", 2011, Technical Publications.
5. A. Hoffer Jeffrey, V. Ramesh, TopiHeikki, "**Modern Database Management**", 2017, Pearson Education Publications

**WEB REFERENCES**

1. https://www.oracle.com/in/database/what-is-database/
2. https://www.javatpoint.com/dbms-tutorial
3. https://www.sciencedirect.com/topics/computer-science/database-systems
4. https://www.geeksforgeeks.org/introduction-of-dbms-database-management-system-set-1/
5. https://www.ibm.com/docs/en/zos-basic-skills?topic=zos-what-is-database-management-system

*Note: Learners are advised to use latest edition of books.*

**PO–CO MAPPING**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| **CO-1** | H | M | M | L | M | L | H | H | M |
| **CO-2** | H | M | M | M | M | L | H | H | M |
| **CO-3** | H | H | M | L | M | L | H | H | M |
| **CO-4** | H | H | M | M | M | L | H | H | H |
| **CO-5** | H | H | M | M | M | L | H | H | H |

**PSO–CO MAPPING**

| CO/PSO | PSO1 | PSO2 | PSO3 |
|--------|------|------|------|
| **CO-1** | H | M | M |
| **CO-2** | H | M | M |
| **CO-3** | H | H | H |
| **CO-4** | H | H | H |
| **CO-5** | H | M | H |

| Course Title | MAJOR CORE - 10 - DATABASE SYSTEMS LAB |
|---|---|
| Total Hours | 60 |
| Hours/Week | 4 |
| Code | U22SD4MCP10 |
| Course Type | Practical |
| Credits | 3 |

## CONSPECTUS

To impart the fundamental aspects of database design, database-system implementation using techniques of database to create and work in database up to IT Industry standard.

## COURSE OBJECTIVES

1. To understand to create table, aggregate functions, set operators using queries;
2. To provide practices to work with views;
3. To apply PL/SQL block to prepare mark sheet, pay slip, electricity bill;
4. To apply Triggers and functions in databases;
5. To implement an Inventory software with Oracle and MySQL.

## EXERCISES

1. Table creation and simple queries, aggregate functions.

2. Queries using set Operators, various joins.

3. Creation of Views, Synonyms, Sequence, Indexes, Save point

4. Nested sub queries and correlated sub queries.

5. Creating an employee database to set various constraints.

6. Write a PL/SQL block to prepare mark sheet.

7. Write a PL/SQL block to prepare a pay slip that handles all types of exceptions.

8. Write a PL/SQL block to prepare the electricity Bill to satisfy some conditions by accepting input from the user.

9. Creation of Procedures for student database

10. Creation of database triggers and functions for employee database

**COURSE OUTCOMES**

| CO. No | Course Outcomes | Cognitive Level (K1-K5) |
|--------|-----------------|------------------------|
| CO-1 | Recognize the basics queries and aggregate functions | K1 |
| CO-2 | Demonstrate the use views, synonyms, sequence, nested queries and sub queries | K2 |
| CO-3 | Apply PL/SQL to various application domains | K3 |
| CO-4 | Analyze the best logic and methods to solve the problems using procedures | K4 |
| CO-5 | Write programs in PL/SQL using triggers and functions | K5 |

(K1=Remember,    K2=Understand,    K3=Apply,    K4=Analyze,    K5=Evaluate)

**PO–CO MAPPING**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| CO-1 | H | H | H | H | H | L | H | H | H |
| CO-2 | H | M | M | M | H | L | H | M | H |
| CO-3 | H | M | H | H | H | L | H | M | H |
| CO-4 | H | H | M | M | H | L | H | H | H |
| CO-5 | H | M | H | H | H | L | H | M | H |

**PSO–CO MAPPING**

| CO/PSO | PSO1 | PSO2 | PSO3 |
|--------|------|------|------|
| CO-1 | H | M | M |
| CO-2 | H | M | H |
| CO-3 | H | H | H |
| CO-4 | H | H | H |
| CO-5 | H | H | M |

| Course Title | AUGMENTED AND VIRTUAL REALITY- LAB |
|---|---|
| Code | U22SD4MEP02 |
| Course Type | Practical |
| Semester | IV |
| Hours/Week | 4 |
| Credits | 3 |
| Marks | 100 |

**CONSPECTUS**
To practice the concepts and technologies of Virtual and Augmented reality in Software applications.

**COURSE OBJECTIVES**
1. To understand the concepts & explore the current states of Virtual and Augmented Reality
2. To explore the technological options for consuming virtual &augmented reality experiences
3. To learn to create content for the VR and AR Projects
4. To explore specific applications built in virtual and augmented reality
5. To assess the near-future scenario for virtual and augmented reality

**Theoretical Concepts**
Introduction-Augmented Reality and Virtual Reality-Key components of AR/VR-Applications of AR/VR-Unity Software and its Features-Installation of the Software-Hardware and Software Specification-Introduction to Vuforia Database-Augmented reality using 3D Image-Coding for game development in VR.

**EXERCISES**

1. Creating an account in Vuforia
2. Employee database creation
3. Adding license to the employee database
4. Manipulation of images
5. Augmented reality application for interior decoration
6. Augmented reality application for advertisement
7. Virtual reality – Displaying a message
8. Virtual reality – Displaying the output based on a condition
9. Virtual reality –Performing arithmetic operations and displaying the result
10. Virtual reality – Performing relational operations and displaying the result

**COURSE OUTCOMES**

| CO.No. | Course Outcomes | Cognitive Level (K1-K5) |
|--------|-----------------|-------------------------|
| CO-1 | Recognize the basics augmented and virtual reality | K1 |
| CO-2 | Demonstrate account creation in Vuforia and database creation | K2 |
| CO-3 | Apply augmented reality concepts by adding license | K3 |
| CO-4 | Analyze the best logic and methods to solve the problems using virtual reality | K4 |
| CO-5 | Assess virtual reality techniques for mathematical operations | K5 |

(K1=Remember, K2=Understand, K3=Apply, K4=Analyze, K5=Evaluate)

**PO–CO MAPPING**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| CO-1 | H | H | H | H | H | L | H | H | H |
| CO-2 | H | M | M | M | H | L | H | M | H |
| CO-3 | H | M | H | H | H | L | H | M | H |
| CO-4 | H | H | M | M | H | L | H | H | H |
| CO-5 | H | M | H | H | H | L | H | M | H |

**PSO–CO MAPPING**

| CO/PSO | PSO1 | PSO2 | PSO3 |
|--------|------|------|------|
| CO-1 | H | M | M |
| CO-2 | H | M | H |
| CO-3 | H | H | H |
| CO-4 | H | H | H |
| CO-5 | H | H | M |

| | |
|---|---|
| **Course Title** | **NON-MAJOR ELECTIVE-2- GRAPHICS AND ANIMATION LAB** |
| **Total Hours** | **30** |
| **Hours/Week** | **2** |
| **Code** | **U22SD4NMP02** |
| **Course Type** | **Practical** |
| **Credits** | **2** |

**GENERAL OBJECTIVE**

To give basic knowledge on working of Pencil 2D to create an animation.

**COURSE OBJECTIVES**

1. To understand and learn the types of tools;
2. To learn and understand the working procedure of 2D;
3. To develop the animated image using pencil 2D;
4. To learn and understandthe tools to do the exercises;
5. To know and understand the main memory, auxiliary memory, associative, cache and virtual memory.

**EXERCISES**

1. Create and Animate a ball to bounce using Pencil 2D.
2. Create and Animate a stick man to walk using Pencil 2D.
3. Create and Animate the needle in wall clock using Pencil 2D.
4. Create and Animate the sun rise in sceneries using Pencil 2D.
5. Create and Animate the fish to swim in the river and boat to move using Pencil 2D.
6. Create and Animate the man to climb the mountain in Pencil 2D
7. Create and Animate the man to play the basketball in Pencil 2D.
8. Create and Animate the man to shoot the person and make the blood to shed in pencil 2D
9. Make any story and do animated work using Pencil 2D.

**COURSE OUTCOMES**

| CO NO. | COURSE OUTCOMES | COGNITIVE LEVEL (K1-K5) |
|---|---|---|
| **CO-1** | Recognize the basics tools in Pencil 2D | K1 |
| **CO-2** | Demonstrate the use of the animation tools | K2 |
| **CO-3** | Apply the tools in creative manner. | K3 |
| **CO-4** | Analyze the creative animation design. | K4 |
| **CO-5** | Develop a story related animation in real time. | K5 |

(**K1=Remember,    K2=Understand,    K3=Apply,    K4=Analyze,    K5=Evaluate**)

**PO–CO MAPPING**

| CO/PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| **CO-1** | H | H | H | H | H | L | H | H | H |
| **CO-2** | H | M | M | M | H | L | H | M | H |
| **CO-3** | H | M | H | H | H | L | H | M | H |
| **CO-4** | H | H | M | M | H | L | H | H | H |
| **CO-5** | H | M | H | H | H | L | H | M | H |

**PSO–CO MAPPING**

| CO/PSO | PSO1 | PSO2 | PSO3 |
|--------|------|------|------|
| **CO-1** | H | M | M |
| **CO-2** | H | M | H |
| **CO-3** | H | H | H |
| **CO-4** | H | H | H |
| **CO-5** | H | H | M |