**KALASALINGAM UNIVERSITY**
**(KALASALINGAM ACADEMY OF RESEARCH AND EDUCATION)**
**(Under Section 3 of the UGC Act 1956)**
**Anand Nagar, Krishnankoil-626126**
**Srivilliputtur (via); Virudhunagar (Dt.), Tamil Nadu, INDIA**
(www.kalasalingam.ac.in)



# B.Sc (Information Technology)
## (Bachelor of Science)
## CURRICULUM AND SYLLABUS - 2017

**KALASALINGAM UNIVERSITY**
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## DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY

### VISION

- To become a Center of excellence offering quality education and innovation in Computer Science and Information Technology.

### MISSION

- To prepare the students to excel in the field of Computer Science and IT industry
- To prepare the students to pursue higher studies and develop sustainable innovative solutions for the society.

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DEPARTMENT OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY
**B.Sc (Information Technology)**

## Programme Educational Objectives (PEOs)

| | |
|---|---|
| **PEO 1** | Graduates of the programme will pursue higher studies. |
| **PEO 2** | Graduates of the programme will have the skills and knowledge to take on appropriate professional positions in information technology. |
| **PEO3** | Graduates of the programme will become information technology professionals, able to work effectively at planning, implementing, configuring and maintaining an organization's computing infrastructure |

## Programme Outcomes (Pos)

**PO1**:  Ability to apply knowledge in mathematics, science fundamentals to solve problems.

**PO2:**  Understand the basic concepts of system software, hardware and computer graphics.

**PO3:** Design, and analyze precise specifications of algorithms, procedures, and interaction behavior.

**PO4:** Apply the technologies in various fields of IT, including Mobile applications, Web site development and management, databases, and computer networks.

**PO5:** Ability to Work in teams as well as individual to build software systems and to use a range of programming languages and tools to develop computer programs to solve problems effectively.

**PO6:** Ability to communicate effectively in both verbal and writing form in industry and society.

**PO7:** Ability to select appropriate techniques to tackle and solve problems in the discipline of information security management.

**KALASALINGAM UNIVERSITY**
**(KALASALINGAM ACADEMY OF RESEARCH AND EDUCATION)**
**Department of Computer Science & Information Technology**
**B.Sc (Information Technology) Programme**

### I Semester

| Code | Subjects | C |
|---|---|---|
| BAE17R112 | Tamil | 3 |
| BAE17R107 | Communicative English | 2 |
| MAT17R151 | Probability and Statistics | 6 |
| BSI17R101 | Computer Fundamentals and Office Automation Tools | 4 |
| BSI17R102 | Information Technology and HTML Programming | 4 |
| BSI17R181 | Office Automation Tools Lab | 2 |
| BSI17R182 | HTML Programming Lab | 2 |

### II Semester

| Code | Subjects | C |
|---|---|---|
| BAE17R111 | English | 3 |
| CHY17R103 | Environmental Science | 2 |
| MAT17R152 | Discrete Mathematics | 6 |
| BSI17R103 | Structured Programming in C | 4 |
| BSI17R104 | Multimedia and its Applications | 4 |
| BSI17R183 | Structured Programming in C lab | 2 |
| BSI17R184 | Multimedia Lab | 2 |
| | **TOTAL** | **23** |

### III Semester

| Code | Subjects | C |
|---|---|---|
| MAT17R254 | Numerical Methods | 6 |
| BSI17R201 | Object Oriented Programming | 4 |
| BSI17R202 | Operating System Concepts | 4 |
| BSI17R2** | Skill Enhancement Course-I | 2 |
| BSI17R281 | Object Oriented Programming lab | 2 |
| BSI17R282 | Linux lab | 2 |
| | **TOTAL** | **20** |

## IV Semester

| Code | Subjects | C |
|---|---|---|
| BSI17R203 | Database System Concepts | 4 |
| BSI17R204 | Data Communication and Networking | 4 |
| BSI17R205 | Software Engineering | 6 |
| BSI17R2** | Skill Enhancement Elective-II | 2 |
| BSI17R283 | RDBMS Lab | 2 |
| BSI17R284 | Networking Lab | 2 |
| | TOTAL | 20 |

## V Semester

| Code | Subjects | C |
|---|---|---|
| BSI17R3** | DSE Elective-I | 6 |
| BSI17R3** | DSE Elective-II | 6 |
| BSI17R3** | DSE Elective-III | 6 |
| BSI17R3** | Skill Enhancement Elective-III | 2 |
| | TOTAL | 20 |

## VI Semester

| Code | Subjects | C |
|---|---|---|
| BSI17R3** | DSE Elective-IV | 6 |
| BSI17R3** | DSE Elective-V | 6 |
| BSI17R399 | Project /Dissertation | 6 |
| BSI17R3** | Skill Enhancement Elective-IV | 2 |
| | TOTAL | 20 |

## List of Discipline Specific Electives

| Code | Subjects | C |
|---|---|---|
| BSI17R301 | Information Security and Cyber laws | 6 |
| BSI17R302 | Mobile Computing | 6 |
| BSI17R303 | Wireless Sensor Networks | 6 |
| BSI17R304 | Artificial Intelligence | 6 |
| BCS17R301 | System Software | 6 |
| BCS17R302 | Client Server Computing | 6 |
| BCS17R303 | Big Data Analytics | 6 |
| BCS17R304 | Data Mining and Data Warehousing | 6 |
| BCS17R305 | Cloud Computing | 6 |
| BSI17R371 | Computer Animation | 6(4+4) |
| BSI17R372 | Programming in Python | 6(4+4) |
| BCS17R371 | Java Programming | 6(4+4) |
| BCS17R372 | Data Structures and Algorithms | 6(4+4) |
| BCS17R376 | Visual Programming | 6(4+4) |
| BCS17R377 | Computer Graphics | 6(4+4) |

**List of Skill Enhancement Electives**

| Code | Subjects | C |
|------|----------|---|
| BSI17R251 | Communicative skills | 2 |
| BSI17R252 | Desktop Publishing | 2 |
| BCS17R 252 | XML Programming | 2 |
| BCS17R 253 | Quantitative Aptitude Development | 2 |
| BCS17R 254 | Working with Corel Draw | 2 |
| BCS17R 256 | Search Engine Optimization | 2 |
| BSI17R351 | J2EE Programming | 2 |
| BSI17R352 | Programming with PL/SQL | 2 |
| BCS17R351 | PHP Programming | 2 |
| BCS17R353 | Software Testing Concepts | 2 |
| BCS17R 354 | Android Programming | 2 |
| BCS17R 356 | Open Source Software | 2 |

**Consolidated CGPA Credits**

| Semester | Credits |
|----------|---------|
| I – Semester | 23 |
| II – Semester | 23 |
| III – Semester | 20 |
| IV – Semester | 20 |
| V – Semester | 20 |
| VI – Semester | 20 |
| **Total Credits** | **126** |

## Semester – I

| BAE17R112 | TAMIL | L | T | P | Credit |
|-----------|-------|---|---|---|--------|
|           |       | 3 | 1 | 0 | 3 |

**Course Category:** Language
**Course Type**: Theory

கூறு-1

தமிழ் மொழியின் பழமையும் சிறப்பும் –திராவிட மொழிக்குடும்பம்-தமிழ்நாடு-தமிழின் சிறப்புகள் பழந்தமிழ் இலக்கண நூல்கள்-தொல்காப்பியம்,நன்னூல் முதலிய இலக்கண நூல்கள்-எழுத்து,சொல்,பொருள் அதிகாரங்கள்

கூறு-2

சங்க காலம்-மூன்று சங்கங்கள்-இலக்கியச் சான்றுகள்-கல்வெட்டுச் சான்றுகள்-இலக்கண,சங்க நூல்களின் சிறப்பு-பத்துப் பாட்டு-எட்டுத்தொகை-சங்கத் தமிழர் மாண்புகள்

கூறு-3

சங்கம் மருவிய காலம்-பதிணெண் கீழ்க்கணக்கு நூல்கள்-வகைகள்-காப்பிய இலக்கிய வரலாறு-ஐம்பெருங்காப்பயங்கள்-சிறு காப்பியங்கள்-காப்பியக்கூறுகள்

கூறு-4

புதினம் தேடல்

கூறு-5

அடிப்படை இலக்கணம் முதல்,சார்பு எழுத்துக்கள்,மொழி முதல்,இறுதி எழுத்துக்கள்,வல்லினம் மிகும் மிகா இடங்கள்

பாட நூல்:

1. தமிழ் இலக்கிய வரலாறு முனைவர் ச.வே.சுப்பிரமணியன் மணிவாசகர் பதிப்பகம் 31,சிங்கர் தெரு,பாரி முனை, சென்னை-600 108

2. நன்னூல்-எழுத்ததிகாரம் முனைவர் சு.அழகேசன் உரை சுதன் பதிப்பகம் தூத்துக்குடி

3. தேடல் பொன்னீலன் ஒன்பதாம் பதிப்பு நியூபுக் ஹவூஸ் வெளியீடு சென்னை-98

| BAE17R107 | COMMUNICATIVE ENGLISH | L | T | P | Credit |
|-----------|----------------------|---|---|---|--------|
|           |                      | 2 | 1 | 0 | 2 |

**Course Category :** Ability Enhancement  Course

**Course Type        :** Theory

**COURSE OBJECTIVES**

- To help the learner compose CVs, Emails, Business Letters and Job Applications.
- To introduce the learner to diverse official communications like Circulars, Notices, Minutes, and also Manuals.
- To help the learner prepare power point presentations and deliver short lectures.

- To facilitate the learner to compose Welcome address, Vote of Thanks, Farewell Speeches with appropriate Body Language.
- To enable the learner compose and speak situational Dialogues.

**COURSE OUTCOMES**

Upon the completion of this course, the students will be able to

**CO1**: Understand the types of Communication

**CO2**: Analyze the Verbal Communication and Non Verbal Communication

**CO3**: Practice dynamics of Professional presentations

**CO4**: Know how to translate the foreign language

**CO5**: Know how to write letters both personal and professional

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---------|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | | | | S | | | |
| CO2 | | | | S | | | |
| CO3 | | | | S | | | |
| CO4 | | | | S | | | |
| CO5 | | | | S | | | |

**UNIT I**

**Introduction**: Theory of Communication, Types and modes of Communication

**UNIT II**

**Language of Communication**:
- Verbal and Non-verbal (Spoken and Written)
- Personal, Social and Business
- Barriers and Strategies
- Intra Personal, Inter Personal and Group Communication

**UNIT III**

**Speaking Skills**
- Monologue
- Dialogue
- Group Discussion
- Effective Communication/ Mis- Communication
- Interview
- Public Speech

**UNIT IV**

**Reading and Understanding**
- CloZe Reading
- Comprehension
- Summary Paraphrasing
- Analysis and Interpretation
- Translation (from Indian language to English and vice-versa) Literary/Knowledge Texts

## UNIT V

**Writing Skills**
- Documenting
- Report Writing
- Making notes
- Letter Writing

## TEXT BOOKS

1. Language through Literature (forthcoming) ed. Dr. Gauri Mishra, DrRanjana Kaul, Dr Brat Biswas
2. Fluency in English Part II Oxford University Press, 2006
3. Business English, Pearson, 2008.

| MAT17R151 | PROBABILITY AND STATISTICS | L | T | P | C |
|---|---|---|---|---|---|
| | | 5 | 1 | 0 | 6 |

**Pre-requisite: :** Basic Knowledge about Probability and Statistics

**Course Category :** Program Core

**Course Type       :** Theory

## COURSE OBJECTIVE

The students will be enable to have the knowledge probability and correlation.

## COURSE OUTCOMES

Upon successful completion of this course, Students will be able to

**CO1:** understand the basic concept of Probability and Conditional probability.

**CO2:** know the concept of random variables, expectations and moment generating functions.

**CO3:** know about some standard distributions.

**CO4:** know about correlation and regression.

**CO5:** Understand the concept of testing of hypothesis.

## MAPPING OF COURSE OUTCOME(S)

| CO / PO | PO | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | S | | L | | | | |

| | | | | | | | |
|-----|---|---|---|---|---|---|---|
| **CO2** | S | | | | | | |
| **CO3** | S | M | | | | | |
| **CO4** | M | | | | | | |
| **CO5** | S | | | | | | |

**UNIT I**

Probability - Conditional Probability –Baye's Theorem.

**UNIT II**

Random Variables- Discrete Random Variable- Continous Random variable - Probability mass function and probability density function- Mathematical Expectations of discrete random variable and Continuous Random Variable - Moment Generating Function (Except cumulant generating function)

**UNIT III**

Binomial Distribution- Poisson Distribution- Normal Distribution.

**UNIT IV**

Correlation- Rank Correlation- Regression lines.

**UNIT V**

Sampling- Sampling Distribution- Testing of Hypothesis-Procedure for Testing of Hypothesis for Large Samples- Tests of Significance for Large Samples- Test of Significance for Means- Test for Standard Deviation-Test of Significance based on t-distribution (t-test) - Test of Significance based on F-test- Test for Significance of an Observed Sample Correlation. Test Based on Distribution- Chi-square -Test to test the Goodness of Fit.

**TEXT BOOK**

1. S.Arumugam and A. Thangapandi Isaac, Statistics,New Gamma Publishing Houses,Edition, Year 2009.

**REFERENCE BOOK**

1. S.C.Gupta, V.K.Kapoor, *Elements of Mathematical Statistics,* Sultan Chand and Sons, Third Editon, 2001.

Unit I:Chapter 11
Unit II: Chapter 12 (Except cumulant generating functions)
Unit III: Chapter 13
Unit IV:Chapter 6 (6.1, 6.2, 6.3)
Unit V: Chapter 14 and Chapter 15

| **BSI17R101** | **COMPUTER FUNDAMENTALS AND OFFICE AUTOMATION TOOLS** | **L** | **T** | **P** | **C** |
|---------------|-------------------------------------------------------|-------|-------|-------|-------|
| | | 3 | 1 | 0 | 4 |
| **Pre-requisite:** Basic knowledge in Computer fundamentals | | | | | |
| | **Course Category:** Program Core | | | | |
| | **Course Type**      **:** Theory | | | | |

**COURSE OBJECTIVES**

The students will be enable to know about the fundamentals of computer and familiar with office automation tools and create documents, spread sheets and presentations.

**COURSE OUTCOMES**

Upon successful completion of this course, Students will be able to

**CO1:** Understand the structure and basic components of computer.

**CO2:** Know about the processor structure and communication between memory and I/O devices

**CO3:** Know about number representation and Conversions

**CO4:** Know about Ms-Word and its features

**CO5:** Familiar in working with spreadsheets and create their own powerpoint presentations

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---------|----|----|----|----|----|----|----|
|         | 1  | 2  | 3  | 4  | 5  | 6  | 7  |
| CO1     | L  | S  |    |    |    |    |    |
| CO2     | L  | M  |    |    |    |    |    |
| CO3     | L  |    | M  |    |    |    |    |
| CO4     | L  | S  |    |    |    | S  |    |
| CO5     | L  | S  |    |    |    |    |    |

**UNIT I**                                                                 **12 Hours**

Computer Basics-Algorithms-Simple model of computer-Problem solving using computer-Data representation-Hexadecimal representation of number-Decimal to binary conversion

**UNIT II**                                                                 **12 Hours**

Processor-Structure of instructions-Description of a Processor-Computer Architecture-Interconnection of Units-Processor to memory communication-I/O devices to Processor communication-Bus architecture of personal computer

**UNIT III**                                                                 **12 Hours**

Binary Arithmetic-Binary addition-Binary Subtraction-signed numbers-Two's complement representation-Addition and Subtraction of binary numbers-Multiplication of binary numbers-Binary Division-Floating point arithmetic

**UNIT IV**                                                                 **12 Hours**

Windows OS-Structure of Windows panel-Windows explorer-Configuring the screen-configuring the mouse-MS-Word-MS-Word screen and its components-Office Button

**UNIT V**                                                                 **12 Hours**

MS-Excel-Basics of spread sheet-MS-Excel screen and its components-office button-Ms-Power Point-Basics of Power point-MS Power point screen and its components –Office button

**TEXT BOOKS**
1. V.Rajaraman, Fundamentals of Computers,6th Edition, PHI Publications
2. Anita Goel, Computer Fundamentals , Pearson Education ,5th Edition,2010

**REFERENCE BOOK**
1.  P. K. Sinha & Priti Sinha, "Computer Fundamentals", BPB Publications, 2007.

| BSI17R102 | INFORMATION TECHNOLOGY AND HTML PROGRAMMING | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 1 | 0 | 4 |

**Pre-requisite:** Basic knowledge in Computer & Internet

**Course Category:** Program Core

**Course Type** : Theory

**COURSE OBJECTIVES**
This course will enable the student to gain an understanding of the core concepts and Technologies which constitute Information Technology. Learn how to design and develop a Web page using HTML and CSS through develop the skill & knowledge of Web page design

**COURSE OUTCOMES**
**CO1:** Understand basic internet services and web services protocol
**CO2:** Design and develop a Web site using text, images, links, lists, and tables for navigation and layout.
**CO3** Design and develop basic web pages using HTML and CSS.
**CO4:** Know the importance of IT in various fields and gain knowledge regarding anatomy of a Computer and Foundations of Modern IT
**CO5:** Gain the basic knowledge on I/O devices, printers and modern storage media.

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | L | | | S | | | S |
| CO2 | L | | | | S | | |
| CO3 | L | | | | S | | |
| CO4 | L | | M | | | M | |
| CO5 | L | S | | | | | |

**UNIT I** **12 Hours**
Introduction-History of the Internet-internal services and accessibility-use of the internet-protocols-web concepts-the client server model of the web-retrieving data from the web-browsers, navigation features-searching information on the web-internet standards

**UNIT II** **12 Hours**
Introduction to SGML- outline of HTML document- Head section, prologue, link, base, meta, script, style- Body section headers, paragraph, text formatting, linking internal linking, embedding images, lists, tables, frames, other special tags and characters- HTML Forms

**UNIT III** **12 Hours**

Introduction to Cascading style sheet, coding CSS, properties of tags, other style properties, inline embedded and external style sheets, grouping, inheritance, class ID and contextual selector, positioning, backgrounds, element dimensions- DHTML document object model and collections- Event handling- filters and transitions- data binding, tabular data control, sorting data, dynamic sorting, filtering

**UNIT IV**                                                                                                         **12 Hours**
IT in Business, Industry, Home, play, Education, Training Entertainment, Arts, Science, Engineering and Maths- Computers in Sliding – Global Positioning System (GPS)- Anatomy of a Computer

**UNIT V**
I/O devices-Inputting text and graphics-pointing devices-Foundations of modern output-Display screens-Printers Foundations of modern output-Display screens-Printers Foundations of Model Storage-storage media-increasing data storage capacities-the smart card.

**TEXT BOOKS**
1. D. P. Curtin, K. Foley, K. Sen, and C. Morin, "Information Technology", 5th Edition, TMH , 2002. (Chapter II,III,IV,V)
2. N.P. Gopalan and J. Akilandeswari, "Web Technology", 2th Editio, PHI Learning, Delhi, 2014. (Chapter I, IV, VII)

**REFERENCE BOOKS**
1. Satcey C. Sawyer, Brain K. Williams Sarah E Hutchinson, "Using Information Technology – Brief version" A practical introduction to computer and communications, 2nd edition McGraw Hill, 2003.
2. Achyut S Godbole and Atul Kahate, "Web Technologies", 2th Edition, Tata McGraw Hill, 2012.

| BSI17R181 | OFFICE AUTOMATION TOOLS  LAB | L | T | P | C |
|-----------|------------------------------|---|---|---|---|
|           |                              | 0 | 0 | 3 | 2 |

| **Pre-requisite:** Basic knowledge in Computer & Internet |
|---|
| **Course Category:** Program Core |
| **Course Type**: Laboratory course |

**COURSE OBJECTIVES**
The students will be enable to familiar with office automation tools and create documents, spread sheets and presentations.

**COURSE OUTCOMES**

Upon successful completion of this course, Students will be able to

**CO1:** Create documents with salient features of MS Word

**CO2:** Create spreadsheets with salient features of MS Word

**CO3:** Create their own power point presentations


**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| **CO1** | | L | M | | | S | |
| **CO2** | | L | M | | | S | |
| **CO3** | | L | M | | | S | |

**MS-WORD**

1. Text Manipulations
2. Usage of Numbering, Bullets, Tools and Headers
3. Usage of Spell Check and Find and Replace
4. Text Formatting
5. Picture Insertion and Alignment
6. Creation of Documents Using Templates
7. Creation of Templates
8. Mail Merge Concept
9. Copying Text and Picture from Excel
10. Creation of Tables, Formatting Tables
11. Splitting the Screen
12. Opening Multiple Document, Inserting Symbols in Documents


**MS-EXCEL**

1. Creation of Worksheet and Entering Information
2. Aligning , Editing Data in Cell
3. Excel Function (Date , Time, Statistical, Mathematical, Financial Functions)
4. Changing of Column Width and Row Height (Column and Range of Column)
5. Moving, copying, Inserting and Deleting Rows and Columns
6. Formatting Numbers and Other Numeric Formats
7. Drawing Borders around Cells
8. Creation of Charts Raising Moving
9. Changing Chart Type
10. Controlling the Appearance of a Chart


**MS-POWER POINT -Working with slides**

1. Creating, saving, closing presentation
2. Adding Headers and footers
3. Changing slide layout
4. Working fonts and bullets
5. Inserting Clipart
    5.1 Working with Clipart
    5.2 Applying Transition and animation effects
6. Run and Slide Show

| BSI17R182 | HTML PROGRAMMING LAB | L | T | P | C |
|-----------|----------------------|---|---|---|---|
| | | 0 | 0 | 3 | 2 |

**Pre-requisite:** Basic knowledge in Computer & Internet

**Course Category** : Program Core

**Course Type**          : Laboratory course

## COURSE OBJECTIVES

The objective of this lab is to develop an ability to design and implement static and dynamic website

## COURSE OUTCOMES

Upon successful completion of this course, Students will be able to

**CO1:** Design and implement dynamic websites with good aesthetic sense of designing and latest technical know-how's.

**CO2:** Have a Good grounding of Web Application Terminologies, Internet Tools, E – Commerce and other web services.

## MAPPING OF COURSE OUTCOME(S)

| CO / PO | PO | | | | | | |
|---------|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | | M | | | S | | M |
| CO2 | | L | S | | S | | M |

## CYCLE I

1. Develop a HTML document, which displays your name as <h1> heading and displays any four of your friends. Each of your friend's names must appear as hot text. When you click your friend's name, it must open another HTML document, which tells about your friend.
2. Apply various colors to suitably distinguish key words. Also apply font styling like italics, underline and two other fonts to words you find appropriate. Also use header tags
3. Insert an image and create a link such that clicking on image takes user to other page.
4. Create links on the words e.g. "Wi-Fi" and "LAN" to link them to Wikipedia pages.
5. Write an HTML code to create a Home page having three links: About Us, Our Services and Contact Us. Create separate web pages for the three links.
6. Write an HTML code to display your profile on a web page.

## CYCLE II

1. Write an html code to display your education details in a tabular format.
2. Create a webpage with html describing your department. Use paragraph and list tags.

3. Create a table to show your class time-table.
4. Create a simple form to submit user input like his name, age, address and favorite subject, movie and singer.
5. Create a HTML table with rows and columns and split them using Rowspan and Colspan.
6. Create a Web Page, showing an ordered list of the names of five of your friends

7. Add few form elements such as radio buttons, check boxes and password field. Add a submit button at last.

### CYCLE III

1. Create a web page with a text box and a button. On click of a button a message box is displayed with the text entered by the user in the textbox
2. Create a web page with some text in using some color. Change the color of the text on click of a button or on mouse over.
3. Client side scripts for validating web form controls Using DHTML
4. Calendar Creation: Display all month
5. Event Handling
   - Validation of registration form
   - Open a Window from the current window
   - Change color of background at each click of button or refresh of a page
   - Display calendar for the month and year selected from combo box OnMouseover event

| BAE17R111 | ENGLISH | L | T | P | C |
|-----------|---------|---|---|---|---|
| | | 3 | 1 | 0 | 3 |

| **Pre-requisite**: Basic Knowledge in English |
|---|
| **Course Category :** Language |
| **Course Type :** Theory |

**COURSE OBJECTIVES**

The objective of this lab is to develop an ability to design and implement static and dynamic website

**COURSE OUTCOMES**

Upon the completion of this course, the students will be able to

**CO1:** To introduce World renowned poets to students.

**CO2:** To make them understand the nuances of Short stories.

**CO3**: To acquaint students with the writings of Nobel laurates.

**CO4:** To excel in Grammar.

**CO5:** To excel in Composition.

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---------|----|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | | | | | S | | |
| CO2 | | | | | S | | |
| CO3 | | | | | S | | |
| CO4 | | | | | S | | |

| CO5 | | | | S | | |
|-----|---|---|---|---|---|---|

**UNIT – I – Poetry**
Nissim Ezekiel – Night of the scorpion
Robert Frost – Road Not Taken
Percy Bysshe Shelley – Ode to the West Wind

**UNIT – II – Short Stories**
Jesse Owens - My Greatest Olympic Prize
R.K.Narayan – An Astrologer's Day
Stephen Leacock – My Financial Career

**UNIT – III – Fiction**
Ernest Hemingway – The Old man and the Sea

**UNIT – IV – Grammar**
  a. Tenses
  b. Nouns – Countable and Uncountable
  c. Kinds of Sentences
  d. Articles
  e. Prepositions

**UNIT – V – Composition and Vocabulary**
  **1. Composition**
  a. Letter Writing (Formal and Informal)
  b. Curriculum Vitae
  c. Situational Conversation
  **2. Vocabulary**

  **One Word Substitutes**

> alimony, amateur, amnesty, anaesthesia, anarchist, anatomy, anonymous, archive, atheist, autobiography, cannibal, carcinogen, cardiologist, carnivorous, centenarian, contemporary, connoisseur, cosmopolitan, crew, detective, (21 – 40) emigrant, epitaph, extempore, fauna, feminist, fleet, flora, forgery, gymnasium, gynaecologist,  herbivorous, hypocrisy, incorrigible, kleptomania, lexicographer, manuscript, mercenary, misanthrope, mortuary, novice, (41 – 60) obituary, omniscient, ophthalmologist, optimist, omnipotent, orphan, panacea, parasite, pedestrian, pessimist, philanthropy philatelist, polygamy, posthumous, post-mortem, secular, somnambulist , theology, unanimous, utopia.

**REFERENCE BOOKS**
  1. Sadanand Kamalesh. & Punitha, Susheela. **Spoken English: A Foundation Course**. Part 2 Orient Black Swan, New Delhi, 2011
  2. Taylor, Grant. **English Conversational Practice**. New Delhi. Tata McGraw- Hill, 1975

| CHY17R103 | ENVIRONMENTAL SCIENCE | L | T | P | C |
|-----------|----------------------|---|---|---|---|
| | | 2 | 1 | 0 | 2 |

**Pre-requisite**: Basic knowledge about Biology, Physics and Chemistry

**Course Category :**  Ability Enhancement course

**Course Type    :**  Theory

## COURSE OBJECTIVES

The main objective of the course is to create awareness among students about the importance of environment and to understand the effect of technology on the environment and ecological balance

## COURSE OUTCOMES

Upon successful completion of this course, students will be able to

**CO1:** Know the importance of environmental studies and methods of conservation of natural resources.

**CO2:** Identity the values and conservation of bio-diversity.

**CO3:** Explain the causes, effects and control  measures of various types of  pollutions.

**CO4:** Select the appropriate methods for waste management.

**CO5:** Recall social issues and legal provision

## MAPPING OF COURSE OUTCOME(S)

| CO / PO | PO | | | | | | |
|---------|----|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | S | | | | | | |
| CO2 | S | | | | | | |
| CO3 | S | | | | | | |
| CO4 | S | | | | | | |
| CO5 | S | | | | | | |

## UNIT-I: Natural Resources

Definition, scope, and importance of environmental sciences -Need for public awareness-Natural resources: Forest resources, Water resources, Land resources, Mineral resources, and Energy resources - Role of an individual in conservation of natural resources.

## UNIT-II: Ecosystem and Biodiversity

Concept of an ecosystem - Structure and function of an ecosystem -   Food chains, food webs and ecological pyramids - Biodiversity - Definition,   value of biodiversity- Hot spots of biodiversity - Threats to biodiversity - Endangered and endemic species of India - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

## UNIT-III: Environmental Pollution

Sources, consequences and control measures of Air pollution, Water pollution, Soil pollution, Thermal pollution and nuclear pollution. Environmental threats -, Acid rain, Climate change, Global warming (Greenhouse effect), Ozone layer depletion. Fireworks: current

environmental issues.

## UNIT-IV: Management of Environmental Pollution

Causes, effects, treatments methods and control measures of solid waste, municipal waste, biomedical waste - Waste minimization techniques - Cleaner technology-- Disaster management: floods, earthquake, cyclone, landslides and Tsunami.

## UNIT-V: Social Issues and the Environment

Water conservation, rain water harvesting- Environmental impact assessment-Precautionary and polluters pay principle- environment protection act - air (prevention and control of pollution) act - water (prevention and control of pollution) act - Population explosion - Family Welfare Programmes -  Environment and human health  -  Human Rights -  Women and Child Welfare.

## TEXT BOOKS

1. Dhameja, S. K., Environmental Engineering and Management, S. K. Kataria and sons, New Delhi, 1st edition 2015.
2. Anubha Kaushik and Kaushik C.P., Environmental Science & Engineering" New Age international Publishers, New Delhi, 2010.

## REFERENCES

1. Gilbert M. Masters, Introduction to Environmental Engineering and Science, Pearson Education Pvt., Ltd., 2nd edition, 2004.
2. Erach Bharucha, Textbook for Environmental Studies, UGC, New Delhi, 2004.
3. Miller T.G. Jr., "Environmental Science", Wadsworth Publishing Co. USA, 2nd edition 2004.
4. Erach Bharucha, "The Biodiversity of India", Mapin publishing Pvt. Ltd., Ahmedabad India, 2002.
5. Trivedi R.K., "Handbook of Environmental Laws", Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro media, 2003.
6. Cunningham, W.P. Cooper, T.H. Gorhani, "Environmental Encyclopedia", Jaico Publ., House, Mumbai, 2001.
7. Wager K.D., "Environmental Management", W.B. Saunders Co., Philadelphia, USA, 1998. Sawyer C. N, McCarty P. L, and Parkin G. F., Chemistry for Environmental Engineering, McGraw-Hill, Inc., New York, 1994.

| MAT17R152 | DISCRETE MATHEMATICS | L | T | P | C |
|---|---|---|---|---|---|
| | | 5 | 1 | 0 | 6 |

**Pre-requisite**: Basic knowledge about Algebra and polynomial

**Course Category  :**  Program Core

**Course Type      :** Theory

## COURSE OBJECTIVES
To enable the students to be familiar with Lattices and Graph theory**.**

## COURSE OUTCOMES
Upon successful completion of this course, students will be able to

**CO1:** Understand the concept of sets, relations, functions.
**CO2:** Know the methods of proof of theorems and the basic ideas in logic.
**CO3:** Understand the concept of lattices and Boolean algebra.
**CO4:** Understand the concept of Polynomials and Recurrence relations.
**CO5:** Know the representation of graphs.

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| **CO1** | S | | | | | | M |
| **CO2** | S | | M | | | | |
| **CO3** | M | | S | | M | S | S |
| **CO4** | S | | | | | | |
| **CO5** | S | | | | | | L |

**UNIT -I**

     Relations And Functions**:** Cartesian product of two sets – Relations – Representation of a relation – Operations on relations – Equivalence relations – Functions – one-to-one, onto functions – Special type of functions – Invertible functions – Composition of functions.

**UNIT -II**

     Logic: Introduction – TF(True/ False) Statements – Connectives – Atomic and Compound statements – Truth table of a formula – Tautology – Tautological implications – Equivalence of formulae – Replacement process – Normal forms – Principal normal forms – Theory of Inference.

**UNIT -III**

     Lattices And Boolean Algebra: Lattices – Hasse Diagrams - Some properties of lattices – Duality principle – Lattice through Algebraic operations - New lattices – Lattice Homomorphisms – Product lattice of two lattices - Modular and Distributive lattices – Boolean Algebras.

**UNIT -IV**

     Recurrence Relations And Generating Functions: Recurrence – Recurrence relations-Solutions to finite order Homogeneous linear relations-Generating functions.

**UNIT- V**

     Graph Theory: Basic Concepts – Graph - Subgraph – Spanning subgraph – Adjacent and Incident matrix and  simple theorem – Degree – Complete graph – Bipartite graph – Connected graphs – Walk - Trail-Paths and Cycles – Isomorphic graphs- Digraph – Spanning tree and algorithms

**TEXT BOOKS:**
1. Dr. M.K. Venkataraman, Dr. N. Sridharan and N. Chandrasekaran, *Discrete Mathematics*, National Publishing Company, October 2001
.

Unit I  : Chapter II (Sec 1 to 5), Chapter 3 (Sec 1 to 5)
Unit II  : Chapter IX (Sec 1 to 13)
Unit III: Chapter X (Sec 1 to 5)
Unit IV: Chapter V (Sec 1 to 3, 5 to 7)
Unit V :  Chapter XI (Sec 1)

**REFERENCE BOOKS**

1. Rosen, K.H., Discrete Mathematics and its applications, Tata McGraw-Hill Publishing Company Limited, New Delhi, 4<sup>th</sup> Edn., 1999.
2. Manohar , R., Discrete Mathematics Structure with Application to Computer Science, Tata McGraw Hill Education, 2001.

| BSI17R103 | STRUCTURED PROGRAMMING IN C | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 1 | 0 | 4 |

**Pre-requisite:** Basic understanding of Computer Programming terminologies

**Course Category** : Program Core

**Course Type** : Theory

**COURSE OBJECTIVES**

To learn the fundamental programming concepts and methodologies which are essential to building good C programs.

**COURSE OUTCOMES**

Upon successful completion of this course, students will be able to

**CO1:** Understand the structured programming concepts, Tokens and Use different Data types in a computer program.
**CO2:** Apply Operators, Input and Output functions and Control Structures in C Programs.
**CO3:** Design programs involving single, Multi dimensional Arrays and Functions,
**CO4:** Familiar with Structures, Unions, Dynamic Allocation of Memory by the use of pointers and explain the difference between call by value and call by reference
**CO5:** Use different data structures and create/update basic data files.

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | | L | S | S | M | | L |
| CO2 | L | | L | S | M | | L |
| CO3 | L | L | L | S | M | | L |
| CO4 | | M | L | S | S | | S |
| CO5 | | M | L | S | S | | S |

**UNIT I - Overview of C**                                                                 **12 Hours**

Introduction to algorithm, flowchart, structured programming concept, programs – Compiler, Interpreter. Introduction to C Language: The C character set, identifiers and keywords, data types, constants, variables and arrays, declarations, expressions, statements, type conversion, symbolic constants.

**UNIT II - Operators, I/O functions and Control Structures in C** **12 Hours**

Operators and expressions: Arithmetic operators, unary operator, relational and logical operator, assignment operators, the conditional operator, type conversion, Library function
Data input and output: Single character input, single character output, scanf, printf, puts gets functions, interactive programming. Control statement: Branching: if else statement, Looping, nested control structure, switch statement, jumping statements.

**UNIT III - Functions and Arrays** **12 hours**

Functions: Overview, function prototypes, passing arguments to a function, recursion.
Arrays: Defining an array, passing array to functions, multidimensional arrays, strings: one dimensional character array, array of strings.

**UNIT IV – Pointers and Structures** **12 hours**

Pointers: Fundamentals, passing pointers to a function, pointers and one dimensional arrays, dynamic memory allocation, operation on pointers, pointer to an array, pointer to string, pointer to structure, pointers to function, array of pointers.
Structures and unions: Defining a structure, processing a structure, user defined data types, structure and pointers, passing structure to function, self-referential structures, and union.

**UNIT V – File Handling** **12 hours**

Data files: opening and closing a data file, File Management Functions, reading and writing a data file, processing a data file, and unformatted data file, concept of binary file, Random access.

**TEXT BOOK**
1. Programming with C – Byron S Gottfried– Schaum's outlines 2nd Edition,2010.

**Chapters**
Unit I – 1,2
Unit II – 3,6
Unit III – 7,9
Unit IV – 11,12
Unit V – 13

**REFERENCE BOOKS**
1. Computer Science: A Structured Programming Approach Using C, Forouzan, 3rd Cengage Learning 2007
2. Programming in C –PradipDey, ManasGhosh – Oxford Higher Education ,2007
3. The c programming language – Brian W Kernighan & Dennis Ritchie IInd edition  Eastern Economy Edition, Prentice Hall 2001
4. Working with C - YashavantKanetkar – BPB publication,2008

| BSI17R104 | MULTIMEDIA AND ITS APPLICATIONS | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 1 | 0 | 4 |

**Pre-requisite:** Basic programming concepts

**Course Category :** Program Core

**Course Type** **:** Theory

## COURSE OBJECTIVES

This course provides the students up to date multimedia technology knowledge and it's applications. It covers introduction to multimedia concepts, types of equipment and technical considerations used in the process of multimedia production and profession.

## COURSE OUTCOMES

Upon successful completion of this course, students will be able to

**CO1:** Know about the multimedia skills, components, communication devices and I/O devices.
**CO2:** Able to develop interactive animations using multimedia tools
**CO3:** Gain proficiency in 3D computer graphics and the knowledge of different media streams in multimedia transmission.
**CO4:** Design and develop a Web site using text, images using HTML.
**CO5:** Design and develop projects using HTML and DHTML.

## MAPPING OF COURSE OUTCOME(S)

| CO / PO | PO | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | S | S | | M | L | | L |
| CO2 | | M | | S | | | |
| CO3 | | | | S | | S | L |
| CO4 | | | L | S | M | S | |
| CO5 | | M | L | S | S | | S |

**UNIT- I** 12 Hours

Introduction: Making multimedia- Multimedia skills. Multimedia hardware components-Mac and Windows systems- Memory and storage devices- Input and output devices-communication devices.

**UNIT- II** 12 Hours

Multimedia Software And Authoring Tools : Basic software tools: text- image- and sound editing tools- painting and drawing tools- animation tools. making instant multimedia: Office suite. Multimedia authoring tools: types- card and page based authoring tools- icon and time based authoring tools.

**UNIT- III** 12 Hours

Macromedia Flash MX: Getting started- managing window & panels- Creating objects using the primary drawing tools- choosing & applying colors- working with text- modifying graphics-Using symbols and instances-creating animation and effects & techniques adding sound importing artwork embedding video - working with 3D Graphics.

## UNIT -IV
**12 Hours**

Macromedia Dreamweaver: Getting started- working with tools- working with text-inserting images- using basic -HTML in dream weaver - adding text to web pages- inserting images- setting up tables Using frame & forms - adding multimedia elements to dream weaver - building style sheets using web page

## UNIT -V
**12 Hours**

Internet And Project Management: Working and tools for WWW- designing for WWW-HTML and DHTML. Project planning and costing; designing and producing; content and talent; delivering.

## TEXT BOOK
 1. Tay Vaughan, Multimedia making it work, TMH 6th Edition, 2003.

## REFERENCE BOOKS
1. John F. Koegal Buford, Multimedia System, Pearson Educational Asia, 1994.
2. Gaugav Bhatnager, Introduction Multimedia system, Academic press – Elsevier.

| BSI17R183 | STRUCTURED PROGRAMMING IN C LAB | L | T | P | C |
|-----------|---------------------------------|---|---|---|---|
|           |                                 | 0 | 0 | 3 | 2 |

**Pre-requisite:** Fundamentals of Programming Language

**Course Category** : Program Core

**Course Type**      : Laboratory course

## COURSE OBJECTIVES
The main objective of the course is teach the students to practice the fundamental programming methodologies in the C programming language via laboratory experiences. And to implement a well-structured program using the C programming language.

## COURSE OUTCOMES

At the end of this course, Student will be able to

**CO1:** Understand basic structure of C program and concepts in problem solving.
**CO2:** Design Algorithms for different scenarios  using different techniques pertaining problem solving skills
**CO3:** Develop solutions for a range of problems by writing diversify solutions
**CO4:** Debug programs in C language and Display the output to the world with neat format  using output functions.
**CO5:** Explain the techniques used to solve the given/real time problem.

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| **CO1** | L | | S | S | | | L |
| **CO2** | M | | S | S | M | | M |
| **CO3** | | | S | S | M | | L |
| **CO4** | L | L | L | | S | | |
| **CO5** | L | M | M | | | S | |

**Course Topics**                                                                                    **45 Hours**

**Programs**
### CYCLE 1
1. Implementation of the various Data Types in C.
2. Demonstration of for loop.
3. Demonstration of do...while loop.
4. Demonstration of while loop.
5. Demonstration of nested if (Hint: Use logical operators).
6. Demonstration of switch... case structure.
### CYCLE 2
7. Implementation of arrays.
8. Implementation of multidimensional arrays (Hint: implement matrix operation).
9. Implementation of functions (Hint: Demonstrate call by value, call by reference).
10. Demonstration of various string operations (Hint: Usage of user defined functions only allowed).
11. Demonstration of pointer operations.
12. Demonstration of recursion (Hint: GCD, factorial, Fibonacci series).
### CYCLE 3
13. Implementation of structures (Hint: simple structure operations, array of structures).
14. Implementation of pointers to structures.
15. Demonstration of dynamic allocation of memory (Hint: malloc, calloc, realloc, free).
16. Demonstration of various file operations. (Hint: Text file)

| BSI17R184 | MULTIMEDIA LAB | **L** | **T** | **P** | **C** |
|---|---|---|---|---|---|
| | | **0** | **0** | **3** | **2** |

**Pre-requisite:** Fundamentals of graphics and multimedia technology

**Course Category :** Program Core

**Course Type      :** Laboratory course

## COURSE OBJECTIVES

This course to create e-page, power point presentations and desktop publishing, and the techniques for multimedia so that the students will come across to produce an appropriate design.

## COURSE OUTCOMES

At the end of this course, Student will be able to

**CO1:** To understand about various latest interactive multimedia devices.

**CO2:** To understand the basic concepts about images and image formats.

**CO3:** To understand about data compression techniques, image compression techniques like JPEG, video compression techniques like MPEG, and the basic concepts about animation.

**CO4:** To develop an interactive multimedia presentation by using multimedia devices and identify theoretical and practical aspects in designing multimedia applications

**CO5:** To understand the various designing process in multimedia production.

## MAPPING OF COURSE OUTCOME(S)

| CO / PO | PO | | | | | | |
|---------|----|----|----|----|----|----|----|
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | L |  | S | S |  |  | L |
| CO2 | M |  | S | S | M |  | M |
| CO3 |  |  | S | S | M |  | L |
| CO4 | L | L | L |  | S |  |  |
| CO5 | L | M | M |  |  | S |  |

**Course Topics**                                                                 **45 Hours**

**Programs**

### CYCLE I

1. Draw an animation to show a bouncing ball.
2. Draw an animation to show a moving stick man.
3. Draw an animation to show a fainting banana.
4. Draw an animation to show sunrise and sunset.
5. Draw an animation to show a disappearing house.

### CYCLE II

6. Draw an animation to show two boats sailing in river
7. Draw an animation to show a scene of cricket match.
8. Draw an animation to help teach a poem or a song
9. Draw an animation to show cartoon with a message]

### CYCLE III

10. Make a movie showing Shape Tweening.
11. Make a movie showing Motion Tweening.
12. Add sound and button to the movie

| MAT17R254 | NUMERICAL METHODS | L | T | P | C |
|---|---|---|---|---|---|
| | | 5 | 1 | 0 | 6 |

## COURSE OBJECTIVES
To enable the students to apply the numerical method solutions to real world problems.

## COURSE OUTCOMES
Upon successful completion of this course, students will be able to
**CO1:** Solve by Direct methods and Iteration methods for solving system of equations.
**CO2**: Know different types of difference operators.
**CO3:** Solve physical problems using different types of operator.
**CO4**: Find derivatives of functions using operator.
**CO5**: Know different rules of Numerical integration.

## MAPPING OF COURSE OUTCOME(S)

| CO / PO | PO | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | S | | L | | | | |
| CO2 | M | | S | | | | |
| CO3 | M | | | | | | L |
| CO4 | S | L | M | L | | | |
| CO5 | S | | M | | | | |

**UNIT – I**
Errors in Numerical Computation - Iteration method – Regula Falsi Method - Newton-Raphson Method - Simultaneous Equations-Back Substitution-Gauss Elimination Method-Gauss' Jordan Elimination Method-Iterative methods- Gauss Jacobi Iteration Method – Gauss–Seidel Iteration Method.

**UNIT– II**
Difference Operators- Forward difference Table- Properties of the Operator - Backward Differences – Central Difference Operator.- Other Difference Operators.

**UNIT – III**
Newton's Interpolation Formulae-Central Difference Interpolation Formulae – Lagrange's Interpolation Formula -Divided Differences - Newton's Divided Difference Formula.

**UNIT – IV**
Derivatives using Newton's Forward Difference Formula and Newton's Backward Difference Formula – Derivatives using Central Difference Formulae.

**UNIT – V**

Numerical Integration- Newton – Cotes quadrature formula – Trapezoidal rule – Simpson's one third rule – Simpson's three eight rule –Weddle's rule – Romberg's method.


**TEXT BOOK**
Numerical Analysis
1. S.Arumugam, A.Thangapandi Isaac, and A. Somasundaram, Numerical Methods, Scitech Publications Pvt.Ltd., 2012.

Unit-1 Chapter 3 (Sections 3.1, 3.2, 3.3 and 3.5
Chapter 4 (Sections 4.1 to 4.4, 4.7, 4.8)
Unit II: Chapter 6 (Sections 6.1 and 6.2)
Unit III: Chapter 7 (Sections 7.1 to 7.5)
Unit IV: Chapter 8 (Sections 8.1 to 8.3)
Unit V: Chapter 8 (Section 8.5)


**REFERENCE**
1. S.S. Sastry Introduction Methods of Numerical Analysis, Prentice Hall of India Pvt. Ltd., 2000.

| BSI17R201 | OBJECT ORIENTED PROGRAMMING | L | T | P | C |
|-----------|------------------------------|---|---|---|---|
|           |                              | 3 | 1 | 0 | 4 |

**Pre-requisite:** Structured Programming in C  **(**BSI17R103)

**Course Category** **:** Program Core

**Course Type** **:** Theory

**COURSE OBJECTIVES**

To learn the fundamentals of Object Oriented Programming and Methodologies which are essential to building good Object Oriented Applications using C++.

**COURSE OUTCOMES**
At the end of this course, Student will be able to
**CO1:** Describe the Procedural and Object Oriented Paradigm with Concepts of Streams, Classes, Functions, Data and Objects.
**CO2:** Demonstrate Adeptness of Object Oriented Programming in Developing Solutions to Problems Demonstrating Usage of Classes, Objects, Constructors and Destructors and Overloading.
**CO3:** Classify Inheritance with the understanding of Early and late Binding.
**CO4:** Develop Efficient Applications using formatted, unformatted I/O operations and Exception handling methods.
**CO5:** Understand the File I/O Operations, String Manipulation Methods and Create/Update Basic Data Files.

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---------|----|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | | L | M | L | L | | L |
| CO2 | | | L | S | S | | S |
| CO3 | | L | M | S | M | | S |
| CO4 | | M | L | S | S | | S |
| CO5 | | M | L | S | S | | S |

**UNIT- I**                                     **12 Hours**

Basic Concepts of Object Oriented Programming – Procedural Approach Vs Object-Oriented Approach, Benefits of Oops, Application of OOP, Structure of C++ Program, Basic Data Type, Derived Data Type, User Defined Data Type, Operators in C++, Control Structures, Inline Function, Function Overloading

**UNIT- II**                                     **12 Hours**

**Class and Objects** : Specifying a Class, Defining Member Function, Private Member Functions, Memory Allocation for Objects, Static Data Member, Static Member Function, Array of Objects, Objects as Arguments, Friend Functions, Returning Objects, Pointers to Members, Constructors, Parameterized Constructor, Constructor with Default Arguments, Copy Constructor, Destructors. **Operator Overloading** - Overloading Unary Operator, Overloading Binary Operator, Rules for Operator Overloading

**UNIT- III**                                    **12 Hours**

**Inheritance** - Single Inheritance, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Virtual Base Class, Abstract Base Class. **Polymorphism** - Pointer, Pointer to Object, this Pointer, Virtual Function, Pure Virtual Function, Pointers to Derived Class.

**UNIT- IV**                                     **12 Hours**

**I/O Operation**: C++ Streams, C++ Stream Classes, Unformatted I/O Operations, Formatted Console I/O Operation, Managing Output with Manipulators. **Exception Handling** - Basics of Exception Handling, Exception Handling Mechanism, Throwing Mechanism, Catching Mechanism, Rethrowing an Exception, Specifying Exceptions.

**UNIT- V**                                     **12 Hours**

**File Handling**: Class for File Stream Operations, Opening and Closing Files, Detecting End of File, File Modes, File Pointer and their Manipulation, Sequential Input and Output Operations, Random Access, Error Handling during File Operation -Command Line Argument. **Manipulating Strings** – Creating and Manipulating String Objects, String Characteristics

**TEXT BOOK**
1. Balagursamy E, Object Oriented Programming with C++, Tata McGraw Hill Publications, Sixth Edition, 2013

**Chapters**
Unit I – 1.3, 1.4, 1.5, 1.6, 1.8, 2.6, 3.5, 3.6, 3.8, 3.14, 3.25, 4.6, 4.10
Unit II - 5.3, 5.4, 5.8, 5.9 - 5.16, 5.18,  6.1-6.5, 6.7, 6.11, 7.1 - 7.4, 7.8
Unit III - , 8.1 - 8.10, 9.2 - 9.7
Unit IV- , 10.1 -10.6, 13.1-13.7

Unit V - 11.1 - 11.10, 15.1-15.5

**REFERENCES**
1. Ashok Kamthane, Programming in C++, Pearson Education, 2013.
2. Herbert Scildt, C++, The Complete Reference, Tata McGraw-Hill.
3. Robert Lafore, Object Oriented Programming in C++, PHI.

| BSI17R202 | OPERATING SYSTEM CONCEPTS | L | T | P | C |
|---|---|---|---|---|---|
| | | 3 | 1 | 0 | 4 |

**Pre-requisite:** Computer Fundamentals and Office Automation Tools (BSI17R101)

**Course Category :** Program Core

**Course Type     :** Theory

**COURSE OBJECTIVES**

The main aim of this course is to provide the various functions of the operating system and how they are implemented. The Students learn about structure and functions of OS, Process scheduling, Deadlocks, Memory management and File systems and modern operating systems.

**COURSE OUTCOMES**

Upon successful completion of this course, Students will be able to

**CO1:** Learn the principles of operating systems functions, structures and history.

**CO2:** Understand various process management concepts including scheduling, synchronization, and deadlocks

**CO3:** Demonstrate the design and management concepts along with issues and challenges of main memory, virtual memory.

**CO4:** Understand the issues related to file system interface and implementation, disk management

**CO5:** Be familiar with various types of operating systems including Unix operating system concepts such as process management, synchronization, networked processes and file systems

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | | S | M | | S | | L |
| CO2 | | S | M | | S | | L |
| CO3 | M | | M | | S | | |
| CO4 | | S | | | | | M |
| CO5 | | S | M | | S | | L |

**UNIT- I**                                                                                          **12 Hours**

Operating systems introduction- Computer-System Organization- Operating-System Structure- Operating-System Operations-process, memory and storage management- Protection and

Security-operating system structure- Operating-System Services- User and Operating-System Interface-system calls and types-system programs-operating system structure-operating system generation- system boot.

**UNIT- II**                                                                                                    **12 Hours**

Process Management: Process states, concurrent processes, process control block and its role. Process Scheduling: FCFS, Round Robin, SJF, Priority Scheduling. Cooperation among the processes, Interprocess Communication, Threads, Deadlocks: Characterization, Methods for Handling Deadlocks.

**UNIT- III**                                                                                                  **12 Hours**

Memory Management: Address Binding - Dynamic Loading and Linking, Contiguous Allocation - Internal & External Fragmentation. Non-Contiguous Allocation: Paging and Segmentation Schemes. Virtual Memory: Demand Paging - Page Replacement - Page Replacement Algorithms – Thrashing.

**UNIT- IV**                                                                                                  **12 Hours**

File System: File Concepts, Access Methods, Directory Structures, Protection, File System Structures, Allocation Methods, Free Space Management.

**UNIT -V**                                                                                                    **12 Hours**

Unix history- Design Principles- Programmer Interface- User Interface- Process Management- Memory Management- File System- I/0 System.

**TEXT BOOK**
1. Silberschatz P.B.Galvin, Gange, "Operating System Concepts", 9th Edition., John   Wiley & Sons., 2013. (Chapter I,II,III, IV,VI, VII,VIII, IX,XI,XII)

**REFERENCE BOOK**
1. H.M. Deitel, "An Introduction to Operating System", 2th Edition, Addison Wesley, 1990.

| BSI17R281 | OBJECT ORIENTED PROGRAMMING LAB | L | T | P | C |
|-----------|----------------------------------|---|---|---|---|
|           |                                  | 0 | 0 | 3 | 2 |

**Pre-requisite:** basic concepts of object oriented programming

**Course Category**    : Program Core

**Course Type**         : Laboratory course

**COURSE OBJECTIVES**

The main objective of the course is to implement the Object Oriented Concepts to solve problems and to develop applications applying the Object Oriented Concepts

**COURSE OUTCOMES**

Upon successful completion of this course, students will be able to

**CO1:** Strengthen their problem solving ability by applying the characteristics of an Object Oriented Approach.

**CO2:** Design algorithms for different scenarios and Apply Object Oriented Approach to developing applications of varying complexities

**CO3:** Develop solutions for a range of problems using Class, Objects, Typecasting, Inheritance, Polymorphism, Templates, and File Handling Methods.

**CO4:** Compile and debug programs in C++ language.

**CO5:** Display the output to the world with neat format using Output Functions/Manipulators

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---------|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| **CO1** | L | | S | S | | | L |
| **CO2** | M | | S | S | M | | M |
| **CO3** | | | S | S | M | | L |
| **CO4** | L | L | L | | S | | |
| **CO5** | L | M | M | | | S | |

**COURSE TOPICS** 45 Hours

**CYCLE I**

1. Program to Implement Classes and Objects.
2. Program to Implement Constructors and Destructors with array of Objects.
3. Program to Implement Passing and returning parameters as objects by reference.
4. Program to demonstrate Function Overloading.
5. Program to overload different operators – increment & decrement operators with post & performs and arithmetic operators.

**CYCLE II**

6. Program to demonstrate friend functions and friend classes.
7. Program using objects for String manipulation functions.
8. Program to implement different types of inheritances like Multiple, Multilevel and Hybrid.
9. Program to demonstrate the use of Virtual Functions.
10. Program to demonstrate the use of abstract classes.

**CYCLE III**

11. Program to demonstrate I/O streams and functions.
12. Program to Overload << and >> operators as a member and as a non-member operator functions.
13. Program to create a file to store some records and search for a particular record and display it.
14. Program to create function Templates, and overload the function Templates.

| BSI17R282 | LINUX LAB | L | T | P | C |
|-----------|-----------|---|---|---|---|

| | | 0 | 0 | 3 | 2 |
|---|---|---|---|---|---|

**Pre-requisite:** Basic knowledge about process management

**Course Category :** Program Core

**Course Type** : Laboratory course

## COURSE OBJECTIVES

This Lab course will introduce the basic principles in Operating System. The objective of this course is to enable the students to get practical knowledge in process management, Memory management, File management, Disk management, Network management, I/O management and learn shell programming in unix environment.

## COURSE OUTCOMES

Upon successful completion of this course, Students will be able to

**CO1:** To understand and write a program in Unix environment using editors

**CO2:** To Understand the concept of inter process communications using fock, msgque and pipe.

**CO3:** To design and implement advanced file system operations (Manipulate files and directories)

**CO4:** Ability to write system level programs

**CO5:** To Write a shell scripts to automate common tasks

## MAPPING OF COURSE OUTCOME(S)

| CO / PO | PO | | | | | | |
|---------|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | L | | S | S | | | L |
| CO2 | M | | S | S | M | | M |
| CO3 | | | S | S | M | | L |
| CO4 | L | L | L | | S | | |
| CO5 | L | M | M | | | S | |

## CYCLE I

1. Usage of following commands:
   ls, pwd, tty, cat, who, who am I, rm, mkdir, rmdir, touch, cd.
2. Usage of following commands:
   cal, cat(append), cat(concatenate), mv, cp, man, date.
3. Usage of following commands:
   chmod, grep, tput (clear, highlight), bc.
4. Write a shell script to check if the number entered at the command line is prime or not.
5. Write a shell script to modify "cal" command to display calendars of the specified months.
6. Write a shell script to modify "cal" command to display calendars of the specified range of months.

## CYCLE II

1. Write a shell script to accept a login name. If not a valid login name display message –

"Entered login name is invalid".
2. Write a shell script to display date in the mm/dd/yy format.
3. Write a shell script to display on the screen sorted output of "who" command along with the total number of users .
4. Write a shell script to display the multiplication table any number,
5. Write a shell script to compare two files and if found equal asks the user to delete the duplicate file.
6. Write a shell script to find the sum of digits of a given number.

### CYCLE III
1. Write a shell script to merge the contents of three files, sort the contents and then display them page by page.
2. Write a shell script to find the LCD(least common divisor) of two numbers.
3. Write a shell script to perform the tasks of basic calculator.
4. Write a shell script to find the power of a given number.
5. Write a shell script to find the factorial of a given number.
6. Write a shell script to check whether the number is Armstrong or not.

| BSI17R203 | DATABASE SYSTEM CONCEPTS | L | T | P | C |
|-----------|--------------------------|---|---|---|---|
| | | 3 | 1 | 0 | 4 |

**Pre-requisite:** Basic knowledge about Information Systems

**Course Category :** Program Core

**Course Type      :** Theory

### COURSE OBJECTIVES
The aim of this course to get broad understanding of the basic concepts of database management system in particular relational database system. The students will also develop the skills to design database system and develop application programs to manage & retrieve data from different perspective using Structured Query Language (SQL).

### COURSE OUTCOME
Upon successful completion of this course, Students will be able to
**CO1:** Understand the Database terminology, features, classifications, characteristics and architecture of the database systems.
**CO2:** Design Databases for applications and use the Relational model, ER diagrams.
**CO3:** Demonstrate an understanding of dependencies and normalization theory and apply such knowledge to the normalization of a database.
**CO4:** Able to select best data storage medium for databases.
**CO5:** Construct DDL, DML, TCL and DCL commands for different databases with various constraints.

### MAPPING OF COURSE OUTCOME(S)

| CO / PO | PO | | | | | | |
|---------|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | L | S | S | S | S | | S |
| CO2 | | | M | S | | | S |
| CO3 | | S | S | S | S | | S |
| CO4 | | M | | S | | | |
| CO5 | | S | | S | M | | |

**UNIT -I**                                                                          **12 Hours**

Databases and Database Users: Characteristics of database approach, Actors behind the scene, Workers behind the scene. Advantages of using the DBMS approach, Database application, Disadvantages. Database System-Concepts and Architecture: Data Models, Schema, and Instances, Three schema architecture and data Independence, Database languages and interfaces, The database system environment, Centralized and client/server architecture for DBMS, Classification of DBMS.

**UNIT – II**                                                                          **12 Hours**

Data Modeling using the E-R Model: Entity types, Entity sets, Attributes, and Keys, Relationship types, Weak entity types, EER modeling. The Relational Data Model and Relational Database Constraints. Relational algebra and Relational calculus.

**UNIT -III**                                                                          **12 Hours**

Relational Commercial languages, Structured Query languages (SQL), Query by example. Relational Database Design: Informal design guidelines for relation schema, Functional dependencies, Normal forms, General definition of second and third normal forms, BCNF

**UNIT- IV**                                                                          **12 Hours**

Disk Storage, Basic File Structures, and Hashing-introduction- Secondary Storage Devices- Buffering of Blocks- Placing File Records on Disk- Operations on Files- Files of Unordered Records- Files of Ordered Records- Hashing Techniques- Other Primary File Organizations- Parallelizing Disk Access Using RAID Technology.

**UNIT -V**                                                                          **12 Hours**

SQL data definition and data types- specifying constraints in SQL- schema change statements- Basic queries- INSERT- DELETE and UPDATE statements in SQL- Views – Concept of a view in SQL.

**TEXT BOOKS**
1. R Elmasri, S B Navathe, "Fundamentals of Database Systems", 6th Edition, Pearson Education, 2007. (Chapter I,II,III, IV,VI, VII,VIII, IX,XI,XII)
2. H.F. Korth, A Silberschatz and S. Sudarasan, "Database System Concepts", Computer Science Series, McGraw-Hill, 1997

**REFERENCE BOOKS**
1. C.J.Date, "An Introduction to Data Base Systems," Volume L Addison Wesley, Reading, MA, 1990

2. Database Management and Design – Hansen & Hansen – Prentice Hall of India.

| BSI17R204 | DATA COMMUNICATION AND NETWORKING | L | T | P | C |
|-----------|-----------------------------------|---|---|---|---|
|           |                                   | 3 | 1 | 0 | 4 |

**Pre-requisite:** Basic knowledge about Networks

**Course Category :** Program Core

**Course Type      :** Theory

## COURSE OBJECTIVES

To lay the foundation for the study of hardware organization of digital computers. It brings out the interplay between various building blocks of computers, without being specific to any particular computer. At the end of the course, the student is expected to gain a fair idea about the functional aspects of each building block in computer design.

## COURSE OUTCOMES

Upon the completion of this course, the students will be able to

**CO1:** Apply the principles of number system, binary codes and Boolean algebra to minimize logic expressions

**CO2:** Develop K-maps to minimize and optimize logic functions up to 5 variables

**CO3:** Acquire knowledge about various logic gates and logic families and analyze basic circuits of these families.

**CO4:** Design various combinational and sequential circuits such as encoders, decoders and counters using multiplexers, and flip - flops

**CO5:** Describe and compare various memory systems, shift registers and analog to digital and digital to analog conversion circuits

## MAPPING OF COURSE OUTCOME(S)

| CO / PO | PO | | | | | | |
|---------|----|----|----|----|----|----|----|
|         | 1  | 2  | 3  | 4  | 5  | 6  | 7  |
| CO1     | S  | L  |    | S  |    |    |    |
| CO2     | M  | M  |    | L  |    |    |    |
| CO3     | M  | S  |    | S  |    |    |    |
| CO4     | M  | S  |    | S  |    |    |    |
| CO5     | M  | M  |    | L  |    |    |    |

**UNIT- I**                                                                 **12 Hours**

Introductory concepts,Number Systems: Decimal number system, binary number system, octal number system , hexadecimal number system, BCD number system, Excess☐3 code, Gray code, Alpha numeric code, error detecting and error correcting codes.

**UNIT- II**                                                                    **12 Hours**

Logic circuits : OR, AND,NOT,NOR,NAND,EX-OR, EX-NOR, Describing Logic Circuits Algebraically , Evaluating Logic-Circuit Outputs, Implementing Circuits from Boolean Expressions Boolean Theorems , DeMorgan's Theorems , Basic theorem of Boolean Algebra

**UNIT -III**                                                                   **12 Hours**

Sum-of-Products Form, Simplifying Logic Circuits,Algebraic Simplification , Designing Combinational Logic Circuits , Karnaugh Map Method , Exclusive-OR and Exclusive-NOR Circuits,Parity Generator and Checker

**UNIT- IV**                                                                    **12 Hours**

Flip flop and Latch: SR latch, JK flip flop, T flip flop, D flip flop and latch, Master slave RS flip flop, Master slave JK flip flop, asynchronous inputs.

**UNIT -V**                                                                     **12 Hours**

Arithmetic: Arithmetic number representation, Binary arithmetic, Hexadecimal arithmetic, BCD arithmetic.Registers & Counters: Shift registers (SISO, SIPO, PISO, PIPO), universal shift register. Counters☐Asynchronous/Ripple counters, Synchronous counters, Modulus☐n Counter, Ring counter.

**TEXT BOOK**
1. Ronald J. Tocci, "Digital System Principles and Applications", Pearson education 10th edition, 2009

Unit I  : Chapter 1,2
Unit II : Chapter 3
Unit III: Chapter 4
Unit IV: Chapter 5
Unit V: Chapter 6,7

**REFERENCES**
1. Donald P Leach,Albert Paul Malvino,Goutam Saha ,"Digital Principles and Applicationa".Tata Mcgraw Hill,6th Edition , 2008.
2. John F. Wakerly, "Digital Design Principles and Practices", Fourth Edition, Pearson Education, 2007.
3. Charles H. Roth Jr, "Fundamentals of Logic Design", Fifth Edition – Jaico Publishing House, Mumbai, 2003.

| BSI17R205 | SOFTWARE ENGINEERING | L | T | P | C |
|-----------|---------------------|---|---|---|---|
| | | 5 | 1 | 0 | 6 |

**Pre-requisite:** Problem Solving Using Computer (BCS17R181)

**Course Category :** Program Core

**Course Type      :** Theory

## COURSE OBJECTIVES

The main objective of the course is to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, and ethical. This course enables the students to analyze, evaluate, select and synthesize information sources for the purpose of developing a software system;

## COURSE OUTCOMES

Upon the completion of this course, the students will be able to

**CO1:** Plan a software engineering process life cycle, including the specification, design, implementation, and testing of software systems

**CO2:** Evaluate the quality of the requirements, analysis and design work done during the module.

**CO3:** Design and communicate ideas about software system solutions at different levels

**CO4:** Analyze and translate a specification into a design, and then realize that design practically, using an appropriate software engineering methodology.

**CO5:** Know how to develop the code from the design and effectively apply relevant standards and perform testing, and quality management and practice

## MAPPING OF COURSE OUTCOME(S)

| CO / PO | PO | | | | | | |
|---------|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | | L | M | L | | | |
| CO2 | | | S | S | S | | L |
| CO3 | M | | M | S | M | | S |
| CO4 | | | S | M | L | L | L |
| CO5 | | | M | S | L | S | |

**UNIT- I**                                                            **12 Hours**

Software Process: Introduction, S/W Engineering Paradigm, life cycle models (water fall, incremental, spiral, evolutionary, prototyping, object oriented) , System engineering, computer based system, verification, validation, life cycle process, development process.

**UNIT- II**                                                           **12 Hours**

Software requirements: Functional and non-functional , user, system, requirement engineering process, feasibility studies, requirements, elicitation, validation and management, software prototyping, prototyping in the software process, rapid prototyping techniques, user interface prototyping

**UNIT -III**                                                                                    **12 Hours**

Design Concepts and Principles: Design process and concepts, modular design, design heuristic, design model and document, Architectural design, software architecture, data design, architectural design, transform and transaction mapping, user interface design, user interface design principles.

**UNIT -IV**                                                                                    **12 Hours**

Software Configuration Management: The SCM process, Version control, Change control, Configuration audit, SCM standards. Software Project Management: Measures and measurements, S/W complexity and science measure, size measure, data and logic structure measure, information flow measure.

**UNIT -V**                                                                                    **12 Hours**

Testing: Taxonomy of software testing, levels, test activities, types of s/w testing, s/w testing strategies, strategic approach and issues, unit testing, integration testing, validation testing, system testing and debugging.

**TEXT BOOK**
1. Software engineering- A practitioner's Approach, McGraw-Hill, Roger S.Pressman, 7th edition.

**REFERENCE BOOKS**
1. Ian Sommerville, Software engineering, Pearson education Asia, 6th edition, 2000.
2. Pfleeger, "Software Engineering", Pearson Education India, New Delhi, 1999.
3. Carlo Ghezzi, Mehdi Jazayari and Dino Mandrioli, "Fundamentals of Software Engineering", Prentice Hall of India, New Delhi, 1991.

| BSI17R283 | RDBMS LAB | L | T | P | C |
|---|---|---|---|---|---|
| | | 0 | 0 | 3 | 2 |

**Pre-requisite:** Basic Knowledge about SQL

**Course Category :** Program Core

**Course Type** **:** Laboratory Course

## COURSE OBJECTIVES

The major objective of this lab is to provide a strong formal foundation in database concepts, technology and practice to the participants to groom them into well-informed database application developers. Rather than imparting isolated knowledge/experience fragments in each of database concepts

## COURSE OUTCOME

Upon successful completion of this course, Students will be able to

**CO 1:** Design and implement a database schema for a given problem-domain

**CO 2:** Normalize a database

**CO 3:** Populate and query a database using SQL DML/DDL commands.

**CO 4:** Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS

**CO 5:** Programming PL/SQL including stored procedures, stored functions, cursors, packages.
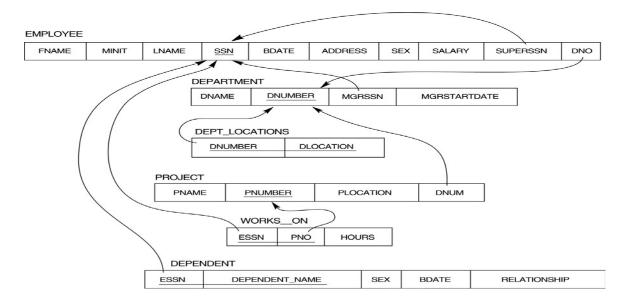
## MAPPING OF COURSE OUTCOME(S)

| CO / PO | PO | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | M | | M | S | L | | S |
| CO2 | | | S | S | M | | M |
| CO3 | | | S | S | S | | L |
| CO4 | | | M | S | S | | S |
| CO5 | L | | S | S | S | | M |

## CYCLE I

Programs using ORACLE

Consider the Relational Database Schema – COMPANY

1. Create tables with relevant foreign key constraints
2. Populate the tables with data
3. Perform the following queries on the database:
1. Display all the details of all employees working in the company.
2. Display ssn, lname, fname, address of employees who work in department no7.
3. Retrieve the birthdate and address of the employee whose name is 'Franklin T. Wong'
4. Retrieve the name and salary of every employee
5. Retrieve all distinct salary values

## CYCLE II

1. Retrieve all employee names whose address is in 'Bellaire'
2. Retrieve all employees who were born during the1950s
3. Retrieve all employees in department 5 whose salary is between 50,000and 60,000(inclusive)
4. Retrieve the names of all employees who do not have supervisors
5. Retrieve SSN and department name for all employees

## CYCLE III

1. Retrieve the name and address of all employees who work for the 'Research' department
2. For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birth date.

3. For each employee, retrieve the employee's name, and the name of his or herimmediate supervisor.

4. Retrieve all combinations of Employee Name and Department Name

5. Make a list of all project numbers for projects that involve an employee whose last name is 'Narayan' either as a worker or as a manager of the department that controls the project.

6. Retrieve all employees who were born during the1950s Retrieve all employees in department 5 whose salary is between 50,000and 60,000(inclusive)

| BSI17R284 | NETWORKING LAB | L | T | P | C |
|-----------|----------------|---|---|---|---|
| | | 0 | 0 | 3 | 2 |

**Pre-requisite:** Basic Knowledge about UNIX commands

**Course Category :** Program Core
**Course Type** **:** Laboratory Course

**COURSE OBJECTIVES**

The main objective of the course is to understand basic Unix Commands and fundamental services provided by TCP and UDP and how information is sent between TCP and UDP ports. This course enables the students to understand the basic techniques of design and to design basic network services with sockets.

**COURSE OUTCOMES**

Upon the completion of this course, the students will be able to
**CO1:** Demonstrate the client server communication.
**CO2:** Implement data link layer operations.

**CO3:** Develop applications with RMI.
**CO4:** Aware of UNIX commands for Networking.
**CO5:** Implement Application layer functions

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---------|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | S | M | | S | | | S |
| CO2 | | S | | S | | | S |
| CO3 | | | S | M | S | | L |
| CO4 | | S | | S | | | L |
| CO5 | | S | M | S | | | S |

**CYCLE-I**

1. Basic Unix Commands
3. Introduction to socket programming
4. Write an application for client server environment (TCP, UDP)
5. Multicast Server/Client application

## CYCLE-II

1. Data Link Layer Operations
2. Domain name service
3. Getting the MAC Address
4. HTTP Download

## CYCLE-III

1. Cryptography
2. Remote Command Execution
3. Remote Method Invocation

| BSI17R399 | PROJECT DISSERTATION | L | T | P | C |
|-----------|----------------------|---|---|---|---|
| | | 0 | 0 | 6 | 6 |

**Pre-requisite:** Any Programming Language

**Course Category:** Program Core
**Course Type:** Laboratory

(For the Students admitted from the academic year 2017-2018 and onwards)
**CBCS PATTERN**
**GUIDELINES FOR PROJECT**

1. The aim of the project work is to acquire practical knowledge on the implementation of the programming concepts studied.
2. Minimum two students should carry out one project work and it may be a work using the software packages that they have learned or the implementation of concepts from the papers studied or implementation of any innovative idea focusing on application oriented concepts.
3. The project work should be compulsorily done in the college only under the supervision of the department staff concerned.

**Viva-Voce**

2. Viva-Voce will be conducted at the end of the year by both Internal (Respective Guides) and External Examiners, after duly verifying the Annexure Report available in the College, for a total of 100 marks at the last day of the practical session.
3. Out of 100 marks, 80 marks for project report and 20 marks for Viva Voce.

**PROJECT WORK**

**TITLE OF THE PROJECT WORK**

Bonafide Work Done by

STUDENT NAME

REG. NO.

Project Work submitted in partial fulfillment of the requirements

for the award of <Name of the Degree>

of KalasalingamUniversity, Krishnan Koil- 620610

College emblem


GUIDE                                                                                    HOD



Submitted for the Viva-Voce Examination held on _____



Internal Examiner                                                      External Examiner

MONTH – YEAR

# CONTENTS

# DISCIPLINE SPECIFIC ELECTIVES

| BSI17R301 | INFORMATION SECURITY AND CYBER LAWS | L | T | P | C |
|-----------|-------------------------------------|---|---|---|---|
|           |                                     | 5 | 1 | 0 | 6 |

**Pre-requisite**: Data Communication and Networking (BSI17R204)

**Course Category :** Discipline Specific Elective

**Course Type** **:** Theory

## COURSE OBJECTIVES

The main objective of the course is students can understand the basics of information security, issues in information security, aspects of risk management and to become aware of *technological concepts relating to cyberspace*

## *COURSE OUTCOMES*

Upon completing this course, the student will be able to:
**CO1:** Discuss the basics of information security
**CO2:** Illustrate the legal, ethical and professional issues in information security

**CO3:** Demonstrate the aspects of risk management.
**CO4:** Design of Security Architecture
**CO5:** Understand the concepts of cyber law.

## MAPPING OF COURSE OUTCOME(S)

| CO / PO | PO | | | | | | | | |
|---------|----|---|---|---|---|---|---|---|---|
|         | 1  | 2 | 3 | 4 | 5 | 6 | 7 |   |   |
| CO1     |    |   | S | S |   |   |   |   |   |
| CO2     |    |   | S | M | L |   |   |   |   |
| CO3     |    | S | M | S | L |   |   |   |   |
| CO4     |    | M | S | S | M |   |   |   |   |
| CO5     |    | M | S | M |   |   | M |   |   |

**UNIT- I**                                                                    **12 Hours**
History - What is Information Security? - Critical Characteristics of Information -NSTISSC Security Model - Components of an Information System - Securing the Components - Balancing Security and Access - The SDLC - The Security SDLC

**UNIT- II**                                                                   **12 Hours**
Need for Security - Business Needs – Threats – Attacks – Legal - Ethical and Professional Issues

**UNIT- III**                                                                  **12 Hours**
Risk Management - Identifying and Assessing Risk - Assessing and Controlling Risk

**UNIT- III** **12 Hours**

Security Technology, IDS, Scanning and Analysis Tools, Cryptography, Access Control Devices, Physical Security, Security and Personnel

**UNIT- V** **12 Hours**

Overview of cyber-law, Basic concepts like cyber-law,cyberspace,Building blocks of cyber space, Evolution of Internet and types of net, Defining computer, computer network, computer system, computer system, Cyber Jurisprudence at International and Indian Level

**TEXT BOOKS**
1. "Principles of Information Security" – by Michael E Whitman and Herbert J,Mattord, Vikas Publishing House, New Delhi, 2003
2. Rodney D. Ryder, " Guide to Cyber Laws", Second Edition, Wadhwa and Company,New Delhi, 2012

**REFERENCES**
1. "Handbook of Information Security Management" – by Micki Krause, Harold,F. Tipton, Vol 1-3 CRC Press LLC, 2004.
2. "Hacking Exposed" - by Stuart Mc Clure, Joel Scrambray, George Kurtz, Tata,McGraw-Hill, 2003
3. Justice Yatindra Singh, " Cyber Laws", Universal Law Publishing, New Delhi, 2013.
3. J. Rosenoer, "CyberLaw: The Law of the Internet", 2010.

| BSI17R302 | MOBILE COMPUTING | L | T | P | C |
|-----------|------------------|---|---|---|---|
|           |                  | 5 | 1 | 0 | 6 |

**Pre-requisite**: Data Communications and Networking( BSI17R204)

**Course Category :** Discipline Specific Elective

**Course Type** **:** Theory

**COURSE OBJECTIVE(S)**

This course introduces the basic concepts and principles in mobile computing. This includes the major techniques involved, and networks & systems issues for the design and implementation of mobile computing systems and applications.

**COURSE OUTCOME(S)**

After completing this course, the student will be able to:
**CO1:** Understand the basic concepts and principles in mobile computing
**CO2:** Understand the concept of Wireless LANs, PAN, Mobile Networks, and Sensor Networks
**CO3:** Analyze the structure and components for Mobile IP and Mobility Management
**CO4:** Understand positioning techniques and location-based services and applications
**CO5:** Analyze the important issues and concerns on security and privacy

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | | | | | | | | |
| CO2 | M | S | | | | | | | |
| CO3 | | | | S | | | | | |
| CO4 | | | | M | M | | | | |
| CO5 | | | | L | S | | S | | |

**UNIT -I**            **12 Hours**
Mobile Computing – Mobile Computing Vs wireless Networking – Mobile Computing Applications – Characteristics of Mobile computing – Structure of Mobile Computing Application. MAC Protocols – Wireless MAC Issues – Fixed Assignment Schemes – RandomAssignment Schemes – Reservation Based Schemes.

**UNIT- II**            **12 Hours**
Overview of Mobile IP – Features of Mobile IP – Key Mechanism in Mobile IP – route Optimization. Overview of TCP/IP – Architecture of TCP/IP- Adaptation of tCP Window – Improvement in TCP Performance.

**UNIT- III**            **12 Hours**
Global System for Mobile Communication (GSM) – General Packet Radio Service (GPRS) –Universal Mobile Telecommunication System (UMTS).

**UNIT- IV**            **12 Hours**
Ad-Hoc Basic Concepts – Characteristics – Applications – Design Issues – Routing – Essential of Traditional Routing Protocols –Popular Routing Protocols – Vehicular Ad Hoc networks(VANET) – MANET Vs VANET – Security.

**UNIT -V**            **12 Hours**
Mobile Device Operating Systems – Special Constrains & Requirements – Commercial MobileOperating Systems – Software Development Kit: iOS, Android, BlackBerry, Windows Phone –M-Commerce – Structure – Pros & Cons – Mobile Payment System – Security Issues.

**TEXT BOOK(S)**
1. Prasant Kumar Pattnaik, Rajib Mall, "Fundamentals of Mobile Computing", PHI Learning Pvt. Ltd, New Delhi – 2012.

**REFERENCE(S)**
1. Jochen H. Schller, "Mobile Communications", Second Edition, Pearson Education, New Delhi, 2007.
2. Dharma Prakash Agarval, Qing and An Zeng, "Introduction to Wireless and Mobile systems", Thomson Asia Pvt Ltd, 2005.
3. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer.

| BS17R303 | WIRELESS SENSOR NETWORKS | L | T | P | Credit |
|---|---|---|---|---|---|
| | | 5 | 1 | 0 | 6 |

**Pre-requisite:** Data Communications and Networking( BSI17R204)

**Course Category :**  Discipline Specific Elective

**Course Type       :** Theory

**COURSE OBJECTIVE(S)**

To understand the basics of wireless sensor network , wireless communications and wireless networking infrastructure.

**COURSE OUTCOME(S)**

After completing this course, the student will be able to:

**CO1:** Understand the concepts in the terminology of wireless communication
**CO2:** Learn how reflection, diffraction, and scattering contribute to path-loss.
**CO3:** Understand about the time synchronization mechanisms.
**CO4:** Understand various routing protocols and localization techniques.
**CO5:** Analyse various attacks and defences,secure routing.

**MAPPING OF COURSE OUTCOME(S)**

| CO      /   PO | PO | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| CO1 | S | | | | | | | | |
| CO2 | | | | S | | | | | |
| CO3 | S | | | | | | | | |
| CO4 | | M | S | | M | | | | |
| CO5 | S | | | | S | | S | | |

**UNIT -I**                                                                                          **12 Hours**

Challenges for WSNs - Why are sensor networks different - Types of applications - Single node architecture -Hardware components - Energy consumption of sensor nodes - Operating systems and execution environments - Design principles for WSNs - Service interfaces of WSNs – Gateway concepts

**UNIT- II**                                                                                          **12 Hours**

Wireless channel and communication fundamentals - Physical layer & transceiver design considerations in WSNs - Contention-based protocols - Schedule-based protocols - The IEEE 802.15.4 MAC protocol - Error control . Framing - Link management

**UNIT -III**                                                                                          **12 Hours**

Fundamentals - Address and name management in wireless sensor networks - Assignment of MAC addresses - Distributed assignment of locally unique addresses -Content-based and

geographic addressing - Introduction to the time synchronization problem - Protocols based on sender/receiver synchronization - Protocols based on receiver/receiver synchronization.

**UNIT- IV**                                                        **12 Hours**

Gossiping and agent-based unicast forwarding - Energy-efficient unicast - Broadcast and multicast - Geographic routing - Data-centric routing - Data aggregation . Single- hop localization, Multi .hop localizatio . Properties of positioning

**UNIT -V**                                                        **12 Hours**

Tiny OS, Security issues and challenges. Various attacks and Defences. Secure routing

**TEXT BOOK(S)**
1. Holger Karl, Andreas Willing, Protocols and Architectures for Wireless SensorNetworks, Wiley, 2005

**REFERENCE(S)**
1. Feng Zhao, Leonidas Guibas, Wireless Sensor Networks. An information processing approach, Elsevier, 2005

| **BSI17R304** | **ARTIFICIAL INTELLIGENCE** | **L** | **T** | **P** | **Credit** |
|---|---|---|---|---|---|
| | | **5** | **1** | **0** | **6** |

| **Pre-requisite: Nil** |
|---|
| **Course Category :** Discipline Specific Elective |
| **Course Type**     **:** Theory |

**COURSE OBJECTIVE(S)**

To understand the basic concepts of Artificial Intelligence to learn about intelligent agents, various searching technique, knowledge representation and develop applications based on object recognition and agents.

**COURSE OUTCOME(S)**

After completing this course, the student will be able to:

**CO1:** Understand the Intelligent Agents concept, Structure of Agents, Uniformed search strategies, Avoiding repeated search.

**CO2:** Can analyze the Searching Techniques, Informed search strategies, Simulated Annealing, Local Beam searches.

**CO3:** Understand Importance of Knowledge representation and Reasoning Logical Agents, Knowledge Based Agents, Ontological Engineering, Actions Situations and Events

**CO4:** Understand the different kinds of Planning and learning, Construction and use of planning graphs, Conditional Planning.

**CO5:** Understand the concepts of communication, perception and Action, Robotics Hardware Perception, Planning Moving Software

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** |
| **CO1** | S | | | | | | | | |
| **CO2** | M | S | | | | | | | |
| **CO3** | | | | S | | | | | |
| **CO4** | | | | M | M | | | | |
| **CO5** | | | | L | S | | S | | |

**UNIT -I**                                                                 **12 Hours**
         Intelligent Agents – Agents and environments - Good behavior – The nature of environments –structure of agents - Problem Solving - problem solving agents – example problems – searching for solutions – uniformed search strategies - avoiding repeated states – searching with partial information.

**UNIT- II**                                                                **12 Hours**
         Informed search and exploration – Informed search strategies – heuristic function – local search algorithms and optimistic problems – local search in continuous spaces – online search agents and unknown environments - Constraint satisfaction problems (CSP) – Backtracking search and Local search for CSP – Structure of problems - Adversarial Search – Games – Optimal decisions in games – Alpha – Beta Pruning.

**UNIT -III**                                                               **12 Hours**
         First order logic – representation revisited – Syntax and semantics for first order logic – Using first order logic – Knowledge engineering in first order logic - Inference in First order logic –prepositional versus first order logic – unification and lifting – forward chaining – backward chaining - Resolution

**UNIT- IV**                                                                **12 Hours**
         Learning from observations - forms of learning - Inductive learning - Learning decision trees - Ensemble learning - Knowledge in learning – Logical formulation of learning – Explanation based learning – Learning using relevant information – Inductive logic programming – Statistical learning mehods - Learning with complete data - Learning with hidden variable - EM algorithm - Instance based learning - Neural networks

**UNIT- V**                                                                 **12 Hours**
         Communication – Communication as action – Formal grammar for a fragment of English – Syntactic analysis – Augmented grammars – Semantic interpretation – Ambiguity and disambiguation – Discourse understanding – Grammar induction - Probabilistic language processing - Probabilistic language models – Information retrieval – Information Extraction – Machine translation.

**TEXT BOOK(S)**
   1. Stuart Russell, Peter Norvig, "Artificial Intelligence – A Modern Approach", 2nd Edition, Pearson Education / Prentice Hall of India, 2004.

**Reference(s):**
1. Nils J. Nilsson, "Artificial Intelligence: A new Synthesis", Harcourt Asia Pvt. Ltd., 2000.
2. Elaine Rich and Kevin Knight, "Artificial Intelligence", 2nd Edition, Tata Hill, 2003.
3. George F. Luger, "Artificial Intelligence-Structures and Strategies for Complex Problem Solving", Pearson Education / PHI, 2002.

| BCS17R301 | SYSTEM SOFTWARE | L | T | P | C |
|---|---|---|---|---|---|
| | | 5 | 1 | 0 | 6 |

**Pre-requisite:** Computer System Architecture(BCS17R103),

Operating Systems(BCS17R203)

**Course Category :** Discipline Specific Elective

**Course Type** **:** Theory course

## COURSE OBJECTIVES

The main objective of this course is to gain knowledge on system software and machine architecture concepts, DBMS, text editors and interactive debugging system.

## COURSE OUTCOMES

Upon the completion of this course, the students will be able to
**CO1:** Understand the System Software, Machine Architectures and Assembler Features.
**CO2:** Explain the Functions of Loader and Linker.
**CO3:** Describe the functions of Macro Processors.
**CO4:** Discuss the basic functions of Compilers and Interpreters.
**CO5:** Explain the features of DBMS, Text Editors and Debugging System.

## MAPPING OF COURSE OUTCOME(S)

| CO / PO | PO | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | M | S | | | | S | |
| CO2 | S | S | L | L | | S | |
| CO3 | | S | | L | | M | |
| CO4 | | M | L | M | | S | L |
| CO5 | | M | L | M | | S | L |

**UNIT- I** **14 Hours**
Introduction to system software and machine Architecture– Simplified instructional Computer – Traditional machines – RISC Machines Assemblers: Basic assembler functions, machine dependent and machine independent assemblers features – Assemblers design options.

**UNIT- II** **12 Hours**
Loader and Linkers- Basic Loader functions, machine dependent and machine independent loader features – Loader design options.
**UNIT- III** **10 Hours**

Macro Processors- Basic Macro Processor functions – machine independent Macro Processor features – Macro Processor design options

**UNIT –IV**                                                                                          **12 Hours**
        Compliers - Basic Complier functions – machine independent Complier features – Complier design options - Division into passes – Interpreters – p-code compilers - Compiler-compilers.

**UNIT -V**                                                                                          **12 Hours**
        Other System Software - Database Managements Systems – Text Editors – Interactive Debugging Systems

**TEXT BOOKS**
   1. System Software An Introduction to System Programming by Leland L. Beck, Addison-Wesley Publication, 2005
   2. H.M. Deitel, Operating Systems, 2nd Edition, Perason, 2003.
      Chapters: 1 – 5, 7 (Without Implementation Examples).

**REFERENCES**
   1. System programming and operating system, Dhamdhere, Tata McGraw Hill, 2006.
   2. Achy8ut S. Godbole, Operating Systems, TMH, 2002.

| BCS17R302 | CLIENT SERVER COMPUTING | L | T | P | C |
|---|---|---|---|---|---|
| | | 5 | 1 | 0 | 6 |

**Pre-requisite:** Operating System Concepts (BSI17R202),Database System Concepts (BSI17R203)

**Course Category** :   Discipline Specific Elective

**Course Type**        :  Theory course

**COURSE OBJECTIVES**
        The main objective of the course is to gain knowledge on Client / Server Concepts and various components of client / server Applications.

**COURSE OUTCOMES**
        Upon the completion of this course, the students will be able to
**CO1:** Understand the concept of Client/Server computing and its advantages.
**CO2:** Explain the components of Client/ Server Applications.
**CO3:** Describe the communication between Components of Client / Server Applications.
**CO4:** Discuss the hardware and software Components of Client / Server Applications.
**CO5:** Explain the Services and Support provided by the Client / Server Applications.

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **CO1** | | L | M | | | M | |
| **CO2** | | M | M | | | S | |
| **CO3** | | M | M | | L | S | |
| **CO4** | | S | M | | L | S | |
| **CO5** | | | S | M | L | S | |

**UNIT- I**                                                                                    **12 Hours**

Client / Server Computing – Advantages of Client / Server Computing – Technology Revolution – Connectivity – Ways to improve Performance – How to reduce network Traffic.

**UNIT- II**                                                                                   **12 Hours**

Components of Client / Server Applications – The Client: Role of a Client – Client Services – Request for Service. Components of Client / Server Applications – The Server: The Role of a Server – Server Functionality in Detail – The Network Operating System – What are the Available Platforms – The Server Operating system.

**UNIT -III**                                                                                 **12 Hours**

Components of Client / Server Applications – Connectivity: Open System Interconnect – Communications Interface Technology – Inter-process communication – WAN Technologies.

**UNIT- IV**                                                                                 **12 Hours**

Components of Client / Server Applications – Software: Components of Client / Server Applications – Hardware.

**UNIT- V**                                                                                   **12 Hours**

Components of Client / Server applications – Service and Support: System Administration. The Future of Client / Server Computing: Enabling Technologies – Transformational Systems.

**TEXT BOOKS**

1. Client /Server Computing, Patrick Smith, Steve Guenferich, 2nd edition, PHI. (Chapters 1-8 & 10)

**REFERENCE BOOKS**

1. Dewire and Dawana Travis, Client/ Server Computing, TMH.
2. Robert Orfali, Dan Harkey, Jeri Edwards: The Essential Client/Server Survival Guide, 2nd edition, Galgotia Publications.

| | | **L** | **T** | **P** | **Credit** |
|---|---|---|---|---|---|
| **BCS17R303** | **BIG DATA ANALYTICS** | **5** | **1** | **0** | **6** |

**Pre-requisite:** Database Management Systems(BCS17R201)

**Course Category :** Discipline Specific Elective

**Course Type        :** Theory

**COURSE OBJECTIVES**

The main objective of the course is to prepare the students to understand and practice Big Data Analytics using Hadoop, Ecosystem and a Career in Analytics as a Hadoop Developer, Hadoop Administrator, Data Scientist

**COURSE OUTCOMES**

Upon completing this course, the student will be able to:

**CO1:** Understand the key issues on big data, characteristics, data sources and the associated applications in intelligent business and scientific computing.

**CO2:** Acquire fundamental enabling techniques and scalable algorithms in big data analytics.

**CO3:** Interpret business models and scientific computing paradigms, and apply software tools for Big data analytics.

**CO4:** Achieve adequate perspectives of big data analytics in marketing, financial services, health services, social networking, astrophysics exploration, and environmental sensor applications.

**CO5:** Select visualization techniques and tools to analyze big data and create statistical models and understand how to handle large amounts of data.

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | | L | M | | | M | |
| CO2 | | M | M | | | S | |
| CO3 | | M | M | | L | S | |
| CO4 | S | M | | | L | S | |
| CO5 | | | S | M | L | S | |

**UNIT-I**                                               **12 Hours**

Analytics – Nuances of big data – Value – Issues – Case for Big data – Big data options Team challenge – Big data sources – Acquisition – Nuts and Bolts of Big data. Features of Big Data -Security, Compliance, auditing and protection - Evolution of Big data – Best Practices for Big data Analytics - Big data characteristics - Volume, Veracity, Velocity, Variety – Data Appliance and Integration tools – Greenplum – Informatica

**UNIT- II**                                              **12 Hours**

Evolution of analytic scalability – Convergence – parallel processing systems – Cloud computing –grid computing – map reduce – enterprise analytic sand box – analytic data sets – Analytic methods – analytic tools – Cognos – Microstrategy - Pentaho. Analysis approaches – Statistical significance – business approaches – Analytic innovation – Traditional approaches – Iterative

**UNIT-III**                                             **12 Hours**

Introduction to Streams Concepts – Stream data model and architecture - Stream Computing,
Sampling data in a stream – Filtering streams – Counting distinct elements in a stream – Estimating moments – Counting oneness in a window – Decaying window - Realtime AnalyticsPlatform(RTAP) applications IBM Infosphere – Big data at rest – Infosphere streams – Data stage –Statistical analysis – Intelligent scheduler – Infosphere Streams

**UNIT-IV**                                                                                               **12 Hours**
Predictive Analytics – Supervised – Unsupervised learning – Neural networks – Kohonen models – Normal – Deviations from normal patterns – Normal behaviours – Expert options – Variable entry - Mining Frequent itemsets - Market based model – Apriori Algorithm – Handling large data sets in Main memory – Limited Pass algorithm – Counting frequent itemsets in a stream – Clustering Techniques – Hierarchical – K- Means – Clustering high dimensional data Visualizations – Visual data analysis techniques, interaction techniques; Systems and applications

**UNIT- V**                                                                                              **12 Hours**
IBM for Big Data – Map Reduce Framework - Hadoop – Hive - – Sharding – NoSQL Databases - S3 - Hadoop Distributed file systems – Hbase – Impala – Analyzing big data with twitter – Big data for Ecommerce – Big data for blogs.

**TEXT BOOKS**
1. Frank J Ohlhorst, ―Big Data Analytics: Turning Big Data into Big Money‖, Wiley and SAS Business Series, 2012.
2. Colleen Mccue, ―Data Mining and Predictive Analysis: Intelligence Gathering and Crime Analysis‖,Elsevier, 2007

**REFERENCES**
1. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007.
2. Anand Rajaraman and Jeffrey David Ullman, Mining of Massive Datasets, Cambridge University Press, 2012.

| **BCS17R 304** | **DATAMINING AND DATA WAREHOUSING** | **L** | **T** | **P** | **C** |
|---|---|---|---|---|---|
| | | **5** | **1** | **0** | **6** |

**Pre-requisite:** Database System Concepts(BSI17R203)

**Course Category** :  Discipline Specific  Elective

**Course Type**        :  Theory course

**COURSE OBJECTIVES**

The main objective of the course is to introduce the basic concepts of Data Warehouse and Data Mining techniques. Examine the types of the data to be mined and apply preprocessing methods on raw data. Discover interesting patterns, analyze supervised and unsupervised models and estimate the accuracy of the algorithms.

**COURSE OUTCOMES**
Upon the completion of this course, the students will be able to
**CO1:** Gain the knowledge about Data warehouse and DBMS Schemas for Decision Support.
**CO2:** Explain about Reporting, Query tools and OLAP.
**CO3:** Describe Data mining functionalities, Task Primitives and Data Preprocessing steps.
**CO4:** Apply various Association rule mining, classification and prediction methods in various data sets.
**CO5:** Discuss various clustering methods and applications in Data mining.

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---------|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | | | M | L | | | L |
| CO2 | | M | S | | M | | M |
| CO3 | | | S | L | M | | |
| CO4 | | S | S | | S | | M |
| CO5 | | S | S | | S | | L |

**UNIT- I**                                                           **10 Hours**

Data warehousing Components –Building a Data warehouse –- Mapping the Data Warehouse to a Multiprocessor Architecture – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata.

**UNIT- II**                                                          **10 Hours**

Reporting and Query tools and Applications – Tool Categories – The Need for Applications –– Cognos Impromptu - Online Analytical Processing (OLAP) – Need – Multidimensional Data Model – OLAP Guidelines – Multidimensional versus Multi relational OLAP

**UNIT-III**                                                         **12 Hours**

Introduction – Data – Types of Data – Data Mining Functionalities – Interestingness of Patterns – Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining System with a Data Warehouse–Data Preprocessing.

**UNIT- IV**                                                         **14 Hours**

Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining Various Kinds of Association Rules – Correlation Analysis – Constraint Based Association Mining – Classification and Prediction - Basic Concepts - Decision Tree Induction - Bayesian Classification – Rule Based Classification – Classification by Back propagation – Prediction

**UNIT- V**                                                          **14 Hours**

Cluster Analysis - Types of Data – Categorization of Major Clustering Methods - K- means – Partitioning Methods – Hierarchical Methods - Density-Based Methods –Grid Based Methods – Model-Based Clustering Methods – Outlier Analysis – Data Mining Applications.

**TEXT BOOKS**

1. Alex Berson and Stephen J. Smith, " Data Warehousing, Data Mining & OLAP", Tata McGraw – Hill Edition, Tenth Reprint 2007.
2. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", Second Edition, Elsevier, 2007.

**REFERENCE BOOKS**

4. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, " Introduction To Data Mining", Person Education, 2007.

5. K.P. Soman, Shyam Diwakar and V. Ajay ", Insight into Data mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006.
6. G. K. Gupta, " Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006.
7. Daniel T.Larose, "Data Mining Methods and Models", Wile-Interscience, 2006.

| BCS17R305 | CLOUD COMPUTING | L | T | P | Credit |
|---|---|---|---|---|---|
| | | 5 | 1 | 0 | 6 |

**Pre-requisite:** Data Communication and Networking (BSI17R204)

**Course Category :** Discipline Specific Elective

**Course Type     :** Theory

## COURSE OBJECTIVES

The main objective of the course is the students can understand the top-down view of cloud computing from applications and administration to programming, infrastructure, billing and security.

## COURSE OUTCOMES

After completing this course, the student will be able to:

**CO1:** Understand core concepts of the cloud computing paradigm how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing.

**CO2:** Apply the fundamental concepts in data centers to understand the tradeoffs in power, efficiency and cost by Load balancing approach.

**CO3:** Illustrate the fundamental concepts of cloud storage and demonstrate their use in storage systems such as Amazon S3 and HDFS.

**CO4:** Analyze various cloud programming models and apply them to solve problems on the cloud.

**CO5:** Analyze the billing of resources and understand various management and how to deal with disasters.

## MAPPING OF COURSE OUTCOME(S)

| CO / PO | PO | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | | | M | L | | | L |
| CO2 | | M | S | | M | | M |
| CO3 | | | S | L | M | | |
| CO4 | | S | S | | S | | M |
| CO5 | | S | S | | S | | L |

**UNIT-I**                                                                                    **12 Hours**

Introduction to the Cloud Computing, History of cloud computing, Cloud service options, Cloud Deployment models, Business concerns in the cloud  Virtualization and Cloud Platforms -

Exploring virtualization, Load balancing, Hypervisors, Machine imaging,Cloud marketplace overview, Comparison of Cloud providers.

**UNIT-II**                                                                          **12 Hours**
AWS history, AWS Infrastructure, AWS services, AWS ecosystem Programming, management console and storage on AWS- Basic Understanding APIs - AWS programming interfaces, Web services, AWS URL naming, Matching interfaces and services, Elastic block store - Simple storage service, Glacier - Content delivery platforms

**UNIT-III**                                                                         **12 Hours**
Users, groups, and roles - Understanding credentials, Security policies,IAM abilities and limitations, AWS physical security - AWS compliance initiatives, Understanding public/private keys, Other AWS security capabilities.

**UNIT-IV**                                                                          **12 Hours**
Virtual private clouds, Cloud models, Private DNS servers (Route 53),Relational database service – DynamoDB, ElastiCache, Redshift.

**UNIT-V**                                                                           **12 Hours**
Analytics services, Application services, Cloud security, CloudWatch,CloudFormation, CloudTrail, OpsWorks. Managing costs, Utilization and tracking, Bottom line impact,Geographic and other concerns, Failure plans, Examining logs.

**TEXT BOOKS**
1. Cloud Computing Bible. Barrie Sosinsky. John Wiley & Sons. ISBN-13: 978-0470903568.
2. Rajkumar Buyya, Cloud Computing: Principles and Paradigms, John Wiley & Sons, First Edition

**REFERENCES**
1. Amazon Security overview whitepaper- https://aws.amazon.com/whitepapers
2. IAM Getting started Guide http://docs.aws.amazon.com/IAM/latest/UserGuide/getting-started.html

| BSI17R371 | COMPUTER ANIMATION | L | T | P | C |
|-----------|--------------------|---|---|---|---|
|           |                    | 4 | 0 | 4 | 6 |

| |
|---|
| **Pre-requisite:** Information Technology and HTML Programming (BSI17R102) |
| **Course Category :** Discipline Specific Elective |
| **Course Type       :** Integrated Course |

**COURSE OBJECTIVES**
The main objective of the course is to teach students how to build web applications using ASP and client side script technologies use with Microsoft's IIS and to o build XML applications with DTD and style sheets that span multiple domains

**COURSE OUTCOMES**

Upon the completion of this course, the students will be able to

**CO1:** Understand, analyze and apply the role of languages like HTML, DHTML, CSS, XML, Javascript, VBScript, ASP, PHP and protocols in the workings of the web and web applications

**CO2:** Understand, analyze and create web pages using HTML, DHTML and Cascading Styles sheets

**CO3:** Understand, analyze and build dynamic web pages using JavaScript (client side programming).

**CO4:** Understand, analyze and create XML documents and XML Schema.

**CO5:** Understand, analyze and build web applications using PHP.

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---------|----|----|----|----|----|----|----|
|         | 1  | 2  | 3  | 4  | 5  | 6  | 7  |
| CO1     |    |    | L  |    |    | M  | M  |
| CO2     |    | L  | M  |    | L  | M  |    |
| CO3     |    |    | S  |    | L  | S  |    |
| CO4     |    |    | S  |    | L  | S  |    |
| CO5     |    |    |    |    |    | S  | L  |

**UNIT-I**                                                                           **12 Hours**

World Wide Web – Web browsers – Markup Languages –Style Sheet technologies –client side, server side - HTML – Headings –Links -images- Lists- Tables- Forms- Frames

**UNIT-II**                                                                          **12 Hours**

Cascading style sheets-Inline styles-Embedded style sheets-Linking External style sheets-Positioning elements- Dynamic HTML – Object model and collections, Event model, Filters and Transitions.

**UNIT-III**                                                                        **12 Hours**

JAVASCRIPT-Introduction – Simple program-Decision making -  Equality and Relational operators –  Control statements –  Functions – Programmer defined functions, JavaScript global functions,  Recursion – Arrays – References and Reference parameters,  Passing arrays to functions, Multidimensional arrays –  Objects –  Object types.

**UNIT-IV**                                                                         **12 Hours**

XML-Introduction-Structuring data-XML namespaces-Document Type Definitions (DTDs) and Schema-W3C XML schema documents-XML vocabularies-Document Object Model (DOM), DOM methods- Simple API for XML (SAX)-Extensible Style sheet Language (XSL)-Simple Object Access Protocol (SOAP).

**UNIT-V**                                                                          **12 Hours**

PHP-Introduction-String processing and regular expressions-Viewing Client/Server environment variables-Form processing and Business logic-Verifying a username and password-connecting to a database

**TEXT BOOKS**
1. Deitel, Deitel and Neito, INTERNET and WORLD WIDE WEB – How to program, Pearson Education Asia, 5th Edition , 2011.

**REFERENCES**
2. Achyut S Godbole and Atul Kahate, "Web Technologies", Second Edition, Tata McGraw Hill, 2012.
3. Thomas A Powell, Fritz Schneider, "JavaScript: The Complete Reference", Third Edition, TataMcGraw Hill, 2013.
4. David Flanagan, "JavaScript: The Definitive Guide, Sixth Edition", O'Reilly Media, 2011

**List of Programs**

**1. HTML and JavaScript**
a) Preparation of Bio-data using Forms in HTML.
b) Simple Calculation
   a. Inventory Calculation.
c) Input Validation : Payroll  maintenance
d) Event Handling
   a. Changing the Background Color of the Window.
e) Develop a Dynamic Web page Using CSS properties and elements for a university website
f) To generate the random numbers and display in a table format.
g) Generation of Fibonacci series
h) Different Pascal triangle generation
i) Function to determine the pair of integers whether the second integer is multiple of the first.
j) Quiz program
k) Create a guessing number game
l) HTML  fom  validation

**2. PHP and MYSQL**
1. Program to implement the concept of operator, arrays and functions
2. Program to communicate between two web pages using PHP.
3. Program to create session and cookies
4. Program for file manipulation in PHP
5. Create a database with two tables in MYSQL and perform the basic query operations.
6. Demonstration of joining tables and usage of sub queries.
7. Working with string, numeric and date functions in MYSQL.
8. Develop a application for the demonstration of database connectivity to PHP with MySQL.
9. Develop a simple application for student academic performance

| BSI17R372 | PROGRAMMING IN PYTHON | L | T | P | C |
|---|---|---|---|---|---|
| | | 4 | 0 | 4 | 6 |

**Pre-requisite: :** Basic Knowledge about Computers

**Course Category :** Discipline Specific Elective

**Course Type: I**ntegrated Course

**COURSE OBJECTIVES:**

  The main objective of the course is to provide basic knowledge for solving problems using computers and to impart the necessary skills for the development of applications. This course enables the students to design an algorithmic solution to a problem, create and execute Python programs.

**COURSE OUTCOMES:**

  Upon the completion of this course, the students will be able to

**CO1:** Be able to identify computer hardware and peripheral devices.
**CO2:** Examine and analyze alternative solutions to a problem.
**CO3:** To learn how to identify Python object types.
**CO4:** To learn how to write loops and decision statements in Python.
**CO5:** To learn how to read and write files in Python.

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | S | S | | L | L | L | |
| CO2 | S | | M | S | S | | |
| CO3 | | | L | S | S | | |
| CO4 | L | S | S | S | S | | |
| CO5 | | | L | S | S | | M |

**UNIT -I**                   **12 Hours**

  Introduction to Python: Introduction-Python Overview-Comments-Identifiers-Reserved Keywords-Variables-Standard Data type-Operators-Statements and Expressions-String Operations-Boolean Expressions-Control Statements-Iteration Statements-Input from Keyboard.

**UNIT -II**                   **12 Hours**

  Function, String, Lists: Introduction-Built-in Functions-User defined Functions- Python Recursive Function- Writing Python Scripting

**UNIT- III**                  **12 Hours**

  Strings: Introduction-String handling functions-String Formatting operator and functions-Lists: Value & Accessing Elements-Deleting elements from List-Built-in List Operators and methods

**UNIT -IV**                  **12 Hours**

  Tuple, Files & Exceptions: Introduction-Creating Tuple-Accessing Tuple-Tuple Assignment - Tuple as Return Value-Basic Tuple Operations and Functions-Files: Text File-Directories- Exceptions: Exception with arguments-User-Defined Exceptions. .

**UNIT -V**                   **12 Hours**

Classes & Objects: Introduction-class Definition-creating Objects-Objects as a Arguments-Object as Return Values-Built-in Class Attributes-Inheritance-Method Overriding-Data Encapsulation-Data Hiding.

**TEXT BOOK:**

1. Balagurusamy, "Introduction to Computing & Problem Solving Using Python", Mc Graw Hill Education, 2016.

**REFERENCES:**

1. Dr. Anita Goel, Computer Fundamentals, Pearson Education, 2010.
2. T. Budd, Exploring Python, TMH, 1st Ed, 2011.
3. Allen Downey, Jeffrey Elkner, Chris Meyers , How to think like a computer scientist : learning with Python , Freely available online.2012

**List of Programs:**

1. Write a program to swap two numbers
2. Write a program to convert kilogram into pound
3. **Write a program to find largest among given three numbers**
4. Write a function program to find HCF of some given numbers
5. Write a function program to display the factors of a given number
6. Write a function to find the ASCII value of the character.
7. Write a function program to convert a decimal number to its binary,octal and hexa decimal equivalents
8. Write a function program to find sum of several natural numbers using recursion
9. Write a program to find duplicate characters in a given string.
10. Write a program to check whether a string is palindrome or not.
11. Write a program to remove punctuations from a string
12. **Write a program to transpose a matrix**
13. Write a function to print the resolution of an image file.
14. Write a program to catch on divide by zero exception .Add a finally block too.
15. Write a program to write data in a file for both write and append modes.\

| BCS17R371 | **JAVA PROGRAMMING** | L | T | P | C |
|-----------|----------------------|---|---|---|---|
| | | 4 | 0 | 4 | 6 |

**Pre-requisite:** Object Oriented Programming (BSI17R201)

**Course Category :** Discipline Specific Elective

**Course Type       :** Integrated course

**COURSE OBJECTIVES**

The main objective of the course is to introduce students about object oriented concepts in java programming language and develop java programs to be implemented in various fields.

**COURSE OUTCOMES**

Upon the completion of this course, the students will be able to
**CO1:** To understand the principles and practice of object oriented analysis
**CO2:** Ability to implement basic concepts, compile, test and run Java programs comprising more than one class, to address a particular software problem
**CO3:** Ability to make use of members of classes found in the Java API packages and interfaces
**CO4:** Understand the concept of File handling in java
**CO5:** Demonstrate the ability to employ various types of selection constructs in a Java program.

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---------|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | | | L | M | | | |
| CO2 | | S | M | M | L | | L |
| CO3 | | | S | S | L | | |
| CO4 | | L | S | S | L | | |
| CO5 | | | | S | | | |

UNIT-I                                                                                    12 Hours
Introduction-Object Oriented paradigm-Basic concepts of object oriented programming-Benefits of OOP- Applications of OOP- Java Features- How Java differs from C and C++ – Java and Internet – Java and www – simple Java program –Structure – Java Tokens – Statements

UNIT-II                                                                                 **12 Hours**
Constants, Variables, Data Types - Operators and Expressions – Decision Making and Branching: if, if...else, nested if, switch - Decision Making Statements, and Looping: while, do, for – Jumps in Loops - Labeled Loops – Classes, Objects and Methods.

UNIT-III                                                                                **12 Hours**
Arrays- Introduction-One dimensional arrays –Two dimensional arrays-Strings-Vectors-Enumerated types-Interfaces- Defining, Extending and implementing interfaces- Packages –JAVA API packages- creating packages-Accessing packages-Adding a class to a package-Hiding classes

UNIT-IV                                                                                 **12 Hours**
Multithreaded Programming-creating threads- extending thread class- stopping and blocking a thread-life cycle of a thread-synchronization- Implementing a Runnable interface- Inter thread communication- Managing Errors and Exceptions – Applet Programming – Graphics Programming.

UNIT-V                                                                                  **12 Hours**
Managing Input/output Files in Java : Concepts of Streams- Stream Classes – Byte Stream classes – Character stream classes – Using streams – I/O Classes – File Class – I/O exceptions – Creation of files – Reading / Writing characters, Byte-Handling Primitive data Types – Random Access Files.

**TEXT BOOKS:**
1. PROGRAMMING WITH JAVA – A PRIMER - E. Balagurusamy, 4th Edition, Tata McGraw-Hill, 2010

**REFERNCES:**
1. The Complete Reference Java 2 - Patrick Naughton & Hebert Schildt, 3rd ed,TMH

2. S. Ramkumar, K.Sathesh kumar, K.Sumathi, "Java for Beginners – A Guide", Scitech Publications, India, 1st Edition, 2017.

3. Programming with java – John R. Hubbard, 2nd Edition, TMH.

4. JAVA and Object-Oriented Programming Paradigm – Debasish Jana, 2005, PHI.

5.Ken Arnold, James Gosling, David Homes, "The Java Programming Language", 4th Edition, 2005.

**LIST OF PROGRAMS**
1. Programs using classes and methods
2. Programs using one dimensional and two dimensional arrays
3. Programs using Strings
4. Programs using vectors
5. Programs using Inheritance
6. Generate the program using interfaces
7. Programs to implement the exception handling mechanism
8. Programs to implement packages.
9. Programs using multithreading
10. Programs using Applet

| BCS17R372 | DATA STRUCTURES AND ALGORITHMS | L | T | P | C |
|-----------|-------------------------------|---|---|---|---|
|           |                               | 4 | 0 | 4 | 6 |

**Pre-requisite:** Structured Programming in C (BSI17R103)

**Course Category :** Discipline Specific Elective

**Course Type** : Integrated course

**COURSE OBJECTIVES**

The main objective of the course is to teach students various data structures and to explain them algorithms for performing various operations on these data structures.

**COURSE OUTCOMES**

Upon the completion of this course, the students will be able to

**CO1:** Analyze performance of algorithms and choose the appropriate data structure and algorithm design method for a specified application.

**CO2:** Demonstrate understanding of the abstract properties of various data structures such as stacks, queues, lists, trees and graphs and Use various data structures effectively in application programs.

**CO3:** Understand and apply fundamental algorithmic problems including Tree traversals, Graph traversals, and shortest paths.

**CO4:** Demonstrate understanding of various sorting algorithms, including bubble sort, insertion sort, selection sort, heap sort and quick sort.

**CO5:** Gain knowledge about Hashing and Collisions and B- Trees

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---------|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | | | L | M | | | |
| CO2 | | S | M | M | L | | L |
| CO3 | | | S | S | L | | |
| CO4 | | L | S | S | L | | |
| CO5 | | | | S | | | |

**UNIT – I** 12 Hours

Algorithmic notation – Programming principles – Creating programs- Analyzing programs -array –Representation of Arrays- One dimensional array- Multidimensional array- pointer arrays- Stack and Queue – Fundamentals of stack and Queues – Evaluation of Expressions

**UNIT- II** 12 Hours

Linked List: Single Linked List – Doubly Linked List – Circular Linked List- Application of inked List- Dynamic Storage Management – Generalized List – Garbage Collection And Compaction

**UNIT- III** 12 Hours

Tree Introduction - Binary Tree Representation – Tree Traversal- Threaded binary Tree – AVL Tree– Graphs – Graphs representation –Graph Traversal - Topological Sorting

**UNIT –IV** 12 Hours

Bubble sort – Insertion Sort – Selection sort – Radix Sort - Shell Sort– Merge sort – Quick Sort – Heap Sort –Linear Search – Binary Search

**UNIT- V** 12 Hours

Hashing – Types of Hashing – Collision Resolution techniques-  B- Tree Representation – B tree Operations- B+ Tree Indexing

**TEXT BOOKS**

2. Ellis Horowitz, Fundamentals of Computer Algorithms, Sartaj Sahni, Rajasekaran,  2nd Edition, University Press, 2008.

2. D. Samanta- "Classic Data Structures"- Prentice-Hall of India- Pvt. Ltd.- India 2006

**REFERENCES**
1. Robert Kruse- C.L. Tondo and Bruce Leung- "Data Structures and Program Design in C"- Prentice-Hall of India- Pvt. Ltd.- Third- 2006.
2. Jean Paul Tremblay and Paul G. Sorenson- "An Introduction to Data Structures with Applications"- Tata McGraw-Hill- Third Edition- 2006.
3. Mark Allen Weiss-" Data Structures and Algorithm Analysis in C"- Pearson Education- Second edition- 2006

**List of Programs**

1. Implementation of Recursive function
2. Array and Linked list implementation of Stack and Queue
3. Implementation of Single, Double and circular Linked List
4. Creation and traversal of Binary Search Tree.
5. Implement Searching Techniques
6. Implement Insertion Sort (The program should report the number of comparisons)
7. Implement Merge Sort(The program should report the number of comparisons)
8. Implement Heap Sort (The program should report the number of comparisons)
9. Implement Randomized Quick sort (The program should report the number of comparisons)
10. Implement Radix Sort.

| BCS17R376 | VISUAL PROGRAMMING | L | T | P | C |
|-----------|---------------------|---|---|---|---|
|           |                     | 4 | 0 | 4 | 6 |

**Pre-requisite:** Object Oriented Programming (BSI17R201)

**Course Category :** Discipline Specific Elective

**Course Type      :** Integrated course

**COURSE OBJECTIVES**

The main objective of the course is to make the students to work in visual basic and able to do projects using various features of Visual Basic.

**COURSE OUTCOMES**

Upon the completion of this course, the students will be able to

**CO1:** Understand the basic components of visual basic such as data types,arrays and control flow statements

**CO2:** Work with forms, Menu box, List box and Combox controls

**CO3:** Design forms using Graphics and images

**CO4:** Understand Activex controls and implement programs using them

**CO5:** Understand about data base connectivity and accessing fields of database

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---------|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | | | L | M | | | |
| CO2 | | S | M | M | L | | L |
| CO3 | | | S | S | L | | |
| CO4 | | L | S | S | L | | |
| CO5 | | | | S | | | |

**UNIT-1**                                                                                     **12 Hours**

     Visual Basic – Variables – Constant – Arrays – Collections – Procedures – Subroutines, Functions, Calling Procedures – Arguments – Argument Passing Mechanisms, Using Optional Arguments, Passing an UnKnown Number of Arguments, Named Arguments – Function Return Values – Returning Custom Data Type, Arrays, Error as Function Values – Control Flow Statements – If..Then, If..Then..Else, Select Case – Loop Statements – Do..Loop, For..Next, While..Wend – Nested Control Structures – The Exit Statement.

**UNIT- II**                                                                                     **12 Hours**

     Working With Forms: The Appearance of Forms – Start up, Loading, Showing and Hiding, Controlling – Designing Menus – Menu Editor, Programming Menu Commands, Using Access and Shortcut Keys, Manipulating Menus at Runtime – Building Dynamic form at Runtime.Basic ActiveX Controls – The TextBox Control – Basic Properties, Manipulating Control' Text, Text Selection, Search and Replace Operations, Capturing KeyStrokes – The ListBox and ComboBox Control – Basic Properties, Control's methods, Indexing with the ListBox –Searching Sorted List, ComboBox Control – The ScrollBar and Slider Controls – ScrollBar Control, Slider Control – File Controls.

**UNIT- III**                                                                                     **12 Hours**

     Drawing with Visual Basic: Graphics Controls – Sizing Images, Loading and Saving Images, Setting Picture and Image Properties, Exchanging through Clipboard – Coordinate Systems – Scale properties and Methods, Twips Per Pixel X, Twips Per Pixel Y Properties, Current X Current Y Properties – Graphics Methods – Drawing Text, Line and Shapes, Filling Shapes, Circle Method, Drawing Modes, Drawing Curves – Optimization Issues.

**UNIT- IV**                                                                                     **12 Hours**

     Advanced ActiveX Controls: The Common Dialogs Control – Usage, Properties, Color, Font, FileOpen and FileSave Common Dialog Box, Multiple File Selection, Print and Help Common DialogBox – TreeView and List View – How Tree Structure work, ImageList, Using TreeView and List Control, Structuring Tree View Control, Viewing Folder's Files. More Advanced ActiveX Controls: RichTextBox Control –

**UNIT- V**                                                                                     **12 Hours**

     DataBase Programming: RecordSets, Data Control, Data Control's Properties, Data Control's Methods – Understanding Relational Concepts – Using Visual Data Manager – Structure of the BIBLIO DataBase – Validating Data – Entering Data – Accessing fields in Recordset –

Introduction to SQL – Advanced Data – Bound Controls.-Active Data Objects: Creating Data Project –

**TEXT BOOK**
1. Evangelos Petroutsos, Mastering Visual Basic 6, BPB Publications, New Delhi.

**REFERENCES**
1. PK.MCBride, Programming in Visual Basic, BPB Publications, New Delhi.
2. Steve Brown, Visual Basic 6 in Record Time, BPB Publications.
3. Gary Cornell & Troy Strain, Visual Basic Nuts & Bolts For Experienced Programmers, MCGrawHill Publication, New Delhi.

**LIST OF PROGRAMS**

1. Write a visual basic program to design a calculator using control arrays
2. Write a visual basic program to find day of the date after 'n' days from current date
3. Write a visual basic program to draw different shapes and fill them
4. Write a visual basic program to create your own note pad
5. Write a visual basic program to implement graphic functions and also to include free hand drawing.
6. Write a visual basic program to animate a picture
7. Write a visual basic program to prepare a mark statement for the students
8. Write a visual basic program to prepare the Electricity bill
9. Write a visual basic program to prepare the pay bill.

| BSI17R 377 | COMPUTER GRAPHICS | L | T | P | C |
|---|---|---|---|---|---|
| | | 4 | 0 | 4 | 6 |

**Pre-requisite:** Structured Programming in C (BSI17R103)

**Course Category:** Discipline Specific Elective

**Course Type:** Integrated course

**COURSE OBJECTIVES**

The main objective of the course is to teach the students about the importance of computer graphics in the field of computer science and train them to develop their own programs using graphics packages

**COURSE OUTCOMES**

Upon the completion of this course, the students will be able to

**CO1:** Demonstrate about graphics devices and output primitives

**CO2:** Understand the attributes of lines and filling algorithms

**CO3:** Understand Windowing concepts ,Clipping Algorithms and interactive picture construction

techniques

**CO4:** Understand 3D display techniques and 3D representation

 **CO5:** Understand 3D viewing and Hidden space removal techniques.


**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---------|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | | | L | M | | | |
| CO2 | | S | M | M | L | | L |
| CO3 | | | S | S | L | | |
| CO4 | | L | S | S | L | | |
| CO5 | | | | S | | | |

**UNIT-1**                                                                                          **12 Hours**
Overview of Graphic Systems – Display Devices – hard copy Devices – Interactive Input Devices – Display Processor – Graphic software – Output Primitives – Line Drawing Algorithms – Initialising Lines – Line command – fill areas – circle Generation Algorithms.

**UNIT-II**                                                                                         **12 Hours**
Attributes of output primitives – line style – color and Intensity – area filling algorithms – character Attributes – inquiry functions – bundled attributes – two dimensional transformations – basic and composite transformations – metric representations.

**UNIT-III**                                                                                        **12 Hours**
Windowing and Clipping – Windowing concepts – Clipping Algorithms – Window to view port Transformations – segments – Interactive input methods – Physical input devices – logical classification of input devices – interactive picture construction techniques – input functions.

**UNIT-1V**                                                                                         **12 Hours**
Three dimensional concepts – 3D Display Techniques – 3D representation – polygon and curved surface – 3D transformations.

**UNIT-V**                                                                                          **12 Hours**
3D viewing – projections – viewing transformation –Implementation of viewing operations – Hidden surface and Hidden Line removal – back free removal, depth buffer and scan line methods – shading.

**TEXT BOOK**
1. Donald Hearn and M.Pualine Baker "Computer Graphics",PHI , 2$^{nd}$  Edition.


**REFERENCES**
1. 1.William M.Neuman and Robert F Sproul "Principles of Interactive computer Graphics" , McGraw Hill International Edition,2$^{nd}$ Edition.
2. Foley, van Dam, Feiner, and Hughes. Computer Graphics: Principles and Practice, 3rd edition in C.

**LIST OF PROGRAMS**
1. Generating lines using line drawing algorithms.

2. Generating circles using circle generation algorithms .
3. Generating ellipse using ellipse generation algorithms.
4. Filling shapes using filling algorithms.
5. Scaling, rotating and translating an object in 2D.
6. Clipping a line using line clipping algorithm.
7. Clipping a polygon using polygon clipping algorithm.
8. Animation program.

## SKILL ENHANCEMENT ELECTIVES

| BSI17R251 | COMMUNICATIVE SKILLS | L | T | P | C |
|---|---|---|---|---|---|
| | | 1 | 0 | 3 | 2 |

Pre-requisite: Communicative English

**Course Category :** Skill Enhancement Elective

**Course Type      :** Theory with Practical Course

**COURSE OBJECTIVES:**

The main objective of the course is to encourage the students to improve their communicative skills in English and speak english without fear.

**COURSE OUTCOMES**
After completing this course, the student will be able to:
**CO1:** Understand the barriers in communication and how to overcome it.
**CO2:** Know about parts of speech
**CO3:** Able to improve oral communication

**UNIT-I**                                          **20 hrs(5 T+15L)**
Language and Communication: Definition of Communication; Function and purpose of Communication; Process of Communication; Barriers of Effective Communication; Types of communication, Verbal communication, on-verbal communication; The Impact of Communication on Performance

**UNIT-II**                                         **20 hrs(5 T+15L)**
Remedial English: Parts of Speech; Sentences; Subject-Verb Agreement; Active Voice and Passive Voice; Degrees of Comparison; Direct and Indirect Speech; Question Tags

**UNIT-III**                                        **20 hrs(5 T+15L)**
Oral Communications: Advantages and disadvantages of oral communication; Improving oral communication; One-to-One oral communication; Oral Presentations. Listening Skills: What is listening; Types of Listening; Barriers of Effective Listening; Strategies for Effective Listening; Semantic Markers; Listening to Complaints.

**REFERENCE BOOKS**
1. Handbook of practical Communication skills - Chrisle W. JAICO
2. Basic Managerial Skills for all - S. J. McGrath - PHI
3. Reading to learn - Sheila Smith & Thomas M. Methuen(London)

4. Communication conversation Practice _ Tata McGraw Hill
5. Communication in English - R. P. Bharnagar & R. T. Bell - Orient Longman
6. Good English - G. H. Vallins - Rups & Co.

| BSI17R 252 | DESKTOP PUBLISHING | L | T | P | C |
|------------|--------------------|---|---|---|---|
| | | 1 | 0 | 3 | 2 |

**Pre-requisite:** Computer Fundamentals and Office Automation Tools (BSI17R101)

**Course Category :** Skill Enhancement Elective

**Course Type      :** Theory with Pratical Course

## COURSE OBJECTIVES

The main objective of the course is to teach the students to apply various software used for Desktop Publishing and would be able to create documents with text and graphics like news paper ad, visiting cards, greeting cards etc. using PageMaker

## COURSE OUTCOMES

After completing this course, the student will be able to:

**CO1:** Understand the basic concept of printing process

**CO2:** Know about various versions, concepts and applications of Adobe Page Maker

**CO3:** Understand the steps of creating a publication

## MAPPING OF COURSE OUTCOME(S)

| CO / PO | PO | | | | | | |
|---------|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | | M | | S | L | | |
| CO2 | | S | | S | M | | |
| CO3 | | S | | S | M | | |

**UNIT-I**                                                      **20 hrs(5 T+15L)**

**Printing Process:-**Introduction-History of Printing and Types-Comparative Analysis of various printing processes-**Typography -**Types(Fonts), Type sizes, Different families (Style)-Point system and other system of measuring.

**Hands On Practice of above topics**

**UNIT-II**                                                      **20 hrs(5 T+15L)**

**Adobe Page Maker -Basic concept:** Creating and opening publication, using the tool box, working with palettes, text and graphics, starting a publication from the template, saving and closing a publication-**Tutorial -** positioning ruler guides- typing text,-formatting graphics.-Creating columns,-creating styles- changing type style and alignment.-Rotating and moving of text block and graphics, placing text file, setting tab

**Hands On Practice of above topics**

**UNIT-III**                                                      **20 hrs(5 T+15L)**

**Creating a publication** setting up pages, changing document setup,-using master pages-choosing a measurement system and setting up rulers- adjusting layout, numbering pages,-arranging pages creating running header and footers importing text- threading text blocks, balancing columns,-edit story. Customizing the dictionary. Hyphenation,-leading frames layers,-locking, objects wrapping text around graphics cropping a graphic using- libraries assembling

publication into a book, indexing a publication -Creating table of contents , applying color, edit color creating custom color, color libraries table editor, importing, linking and exporting a graphic.

**Hands On Practice of above topics**

**TEXT BOOK:**
1. DTP Course Book,Vishnu P Singh,Asian Publishers.

| BCS17R252 | XML PROGRAMMING | L | T | P | C |
|-----------|-----------------|---|---|---|---|
|           |                 | 1 | 0 | 3 | 2 |

**Pre-requisite:** Basic knowledge of operating computer

**Course Category:** Skill Enhancement Elective

**Course Type:** Theory with Practical course

**COURSE OBJECTIVES**

The students will be familiar with various aspects of XML, and also will be able to develop complex XML applications.

**COURSE OUTCOMES**

Upon successful completion of this course, Students will be able to

**CO1**: To Write a XML application using structure and presentation technologies
**CO2:** Apply XML manipulation technologies such as XSLT, XPath, XLink and XQuery
**CO3:** Do Program Manipulation and Dynamic access through DOM architecture

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---------|----|----|----|----|----|----|----|
|         | 1  | 2  | 3  | 4  | 5  | 6  | 7  |
| CO1     |    | S  |    |    |    | S  |    |
| CO2     |    | S  | L  | L  |    | S  |    |
| CO3     |    | S  |    | L  |    | M  |    |

**UNIT- I**                                                                 **20 hrs(5 T+15L)**

Need of XML,History of Markup lang, What is XML, Role of XML, 3 XML Language basics, Revolution, XML Technology, Namespace, EDI, Simple XML file creation, Simple XML file creation

**EXERCISE**
1. In this exercise, student will practice identifying the structure of an information

   object. For the sample document provided below:

   Label the information structures you see, including containing structures.

   Draw a tree representation of the structure.

2. Deconstructing an XML Document

In this exercise, student will practice identifying the explicit structure within an XML document. In a sense, this is the reverse of what you did in Exercise #1. For the sample XML markup below, create a document-like representation (or a simple drawing) for the content contained within the XML tags:

<book>

<coverInfo>

<title>The XML Handbook</title>


<author>Charles F. Goldfarb</author>

<author>Paul Prescod</author>

<edition>Second</edition>

<description>The definitive XML resource: applications, products, and technologies. Revised and expanded—over 600 new pages.

</description>

</coverInfo>

</book>


**UNIT- II**                                                **20 hrs(5 T+15L)**
Simple XML document creation, XM structuring, XML well-formed documents, XML valid documents, XML validation using Schema, XML presentation using CSS, XML , XML presentation technologies


**EXERCISES**

1. Well-Formedness
This exercise checks your understanding of the constraints for well-formedness. Are the following document instances well-formed? Explain any NO answers.

<list><title>The first list</title><item>An item</list>

<item>An item</item><item>Another item</item>

<para>Bathing a cat is a <emph>relatively</emph> easy task as long as the cat is willing.</para>

<bibl><title>How to Bathe a Cat<author></title>Merlin Bauer<author></bibl>


**UNIT- III**                                               **20 hrs(5 T+15L)**
Other XML Concepts Scripting XML, XML as Data, Linking with XML., XML with Style: XSL –Style Sheet Basics,  XSL basics, XSL style sheets.

**EXERCISE**

1. In this exercise, create some XML markup based on the tree representation from Exercise #1 above, and the content from the original sample document.

2. Well Formedness
This exercise is a bit more challenging than the previous example. Here is a fragment of an XML document instance. Identify all the places where it fails to match the constraints for well- formedness.

<PROCEDURE><TITLEHow to Bathe a Cat</TITLE>

<OVERVIEW>

This procedure tells you how to bathe a cat. <WARNING></OVERVIEW>Cats don't like to take baths. You could get hurt doing this. Be sure to obtain all the required protective gear before you start. </WARNING><EQUIPEMENT><ITEM>Hockey Mask <ITEM>Padded Full-body Kevlar Armor</ITEM><ITEM>Tub full of warm water</ITEM><ITEM>Towels

</ITEM><ITEM>First Aidkit</ITEM><ITEM>CatShampoo</ITEM>

<EQUIPMENT><INSTRUCTIONS> <STEP> Locate the cat, who by now is hiding under the bed.</STEP><STEP>Place the cat in the tub of water.</STEP> <ITEM>Using the First Aid kit, repair the damage to your head and arms.</STEP> <STEP>Place the cat back in the tub and hold it down.</STEP> <STEP>Wash it really fast, then make an effort to dry it with the towels.</STEP> <STEP>Decide not to do this again. </STEP> </INSTRUCTIONS>

**TEXT BOOK**
1. Frank. P. Coyle - XML, Web Services and the data revolution, Pearson Education, 2002.
2. Gavin Powel, Beginning XML Databases, Wrox Press, 2007.

**REFERENCE BOOK**
1. Michael J. Young ,Step by Step XML , Microsoft Press, 2002
2. Ramesh Nagappan, Robert Skoczylas and Rima Patel Sriganesh, - Developing Java Web Services - Wiley Publishing Inc., 2004

| BCS17R253 | QUANTITATIVE APTITUDE DEVELOPMENT | L | T | P | C |
|-----------|-----------------------------------|---|---|---|---|
|           |                                   | 1 | 0 | 3 | 2 |

**Pre-requisite:** Basic Mathematical Skills

**Course Category :** Skill Enhancement Electives

**Course Type　 :** Theory with Practical course

**COURSE OBJECTIVES**
　　　The students will enable to improve their aptitude testing and they become confident to face any competitive exams.

**COURSE OUTCOMES**
　　　Upon successful completion of this course, Students will be able to
**CO1**: To solve problems on numbers, ratio and proportion, time and distance
**CO2:** To solve problems on trains, simple interest, clocks
**CO3:** To solve problems on permutation, probability and logical reasoning

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---|---|---|---|---|---|---|---|
| | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| **CO1** | | S | | | | S | |
| **CO2** | | S | L | L | | S | |
| **CO3** | | S | | L | | M | |

**UNIT- I**                                                                 **20 hrs(5 T+15L)**

Averages – Problems on numbers – Problems on Ages – Percentages – Profit and Loss - Ratio and Proportion – Partnership – Time and Work – Pipes and Distances – Time and distance
**Online Exam covering all topics**

**UNIT- II**                                                                **20 hrs(5 T+15L)**

Problems on Trains – Boats and Streams – Allegation – Simple Interest – Compound Interest Calendar – Clocks –
**Online Exam covering all topics**

**UNIT- III**                                                               **20 hrs(5 T+15L)**

Permutation – Combination – Probability -Direction sense test – Mathematical Operations – Logic – Problems on cubes – Problems on dice
**Online Exam covering all topics**

**TEXT BOOK**
1. R.S.Aggarwal, "Quantitative Aptitude for Competitive Examinations", 7th Revised Edition. S.Chand and Co. Ltd, New Delhi, 2005.

**REFERENCE BOOKS**
1. R.S.Aggarwal, "Verbal and Non Verbal Resanoning", S.Chand and Co. Ltd, New Delhi.
2. Barron's Guide for GMAT, Galgotia Publications, New Delhi, 2006.

| BCS17R254 | WORKING WITH COREL DRAW | L | T | P | C |
|---|---|---|---|---|---|
| | | 1 | 0 | 3 | 2 |
| **Pre-requisite:** Basic knowledge in GUI | | | | | |
| | Course Category: Skill Enhancement Electives | | | | |
| | Course Type: Theory with Practical course | | | | |

**COURSE OBJECTIVES**

The students will enable to work with COREL-DRAW and create their own designs

**COURSE OUTCOMES**

Upon successful completion of this course, Students will be able to
**CO1**: Create design templates with different shapes
**CO2:** Use toolbox for resizing the objects

**CO3:** Use Text Tool for resizing the text formats

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---------|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | | S | | | | S | |
| CO2 | | S | L | L | | S | |
| CO3 | | S | | L | | M | |

**UNIT- I**                                                                 **20 hrs(5 T+15L)**
    Introduction-Getting Started-Creating A New File - Title Bar-Menu Bar-Work Area-Printable Page Property Bar-Page Counter Bar-Colour Palette-Toolbox-Status Bar-Drawing Figures-Lines-Ellipse-Circles-Rectangle-Square-Polygon-Saving-Closing-Opening-Views-Normal View-Preview - Wire Frame View-Draft View-Zoom-View Manager-Creating a View.
**5-10 Exercises in creating designs using shapes**

**UNIT- II**                                                                 **20 hrs(5 T+15L)**
    Introduction - Toolbox-Selecting an Object-Resizing an Object-Moving an Object-Changing the Shape-Combining Two Objects-Skewing-Welding the Objects-Blending-Curve Lines-Straight Lines-Continuing a Line-View Mode-Changing-Media Tool-Rotating An Object-Grouping-Fill Tool Fly Out-Filling-Spray Mode.
**5-10 Exercises in changing objects in different ways**

**UNIT- III**                                                                 **20 hrs(5 T+15L)**
    Introduction-Text Tool-Entering Artistic Text-Entering Paragraph Text-Converting Text-Formatting Text-Changing the Font Size-Arranging Objects-Ordering The Objects-Changing the Font-Bullets-Decorating the Text-Webdings-Text Editor-Opening-Changing the Alignment-Type Style-Spell Checking-Grammer-Searching Synonyms-Find-Replace-Editing-Kerning-Formatting Characters.
**5-10 Exercises in changing texts in different ways**

**TEXT BOOK**
1. Vimal Pandya, Graphic Designing & Computer Application V, HK Arts College Publication, 2013.

**REFERENCE BOOK**
1. Bansal, S.K, Internet Technology and Globalization, A.P.H. Publishing Corporation, New Delhi 2001.

| BCS17R256 | SEARCH ENGINE OPIMIZATION | L | T | P | C |
|-----------|---------------------------|---|---|---|---|
| | | 1 | 0 | 3 | 2 |

**Pre-requisite:** Basic knowledge about search engines

**Course Category:** Skill Enhancement Elective
**Course Type:** Theory with Practical course

**COURSE OBJECTIVES:**

The students will enable to gain knowledge, search engines and search engine optimization

**COURSE OUTCOMES:**

Upon successful completion of this course, Students will be able to

**CO1**: Understand about different search engines
**CO2:** Understand about the page optimization,meta tags.
**CO3:** Understand about off page optimization and blog submission

**MAPPING OF COURSE OUTCOME(S):**

| CO / PO | PO | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| **1.** | | S | | | | S | |
| **2.** | | S | L | L | | S | |
| **3.** | | S | | L | | M | |

**UNIT- I**                                                    **20 hrs(5 T+15L)**

Domain, Portal and search engine, SEO, Types of SEO, Black Hat, White Hat- Introduction to Search Engines – Working, Examples, Google, Yahoo, Bing, AltaVista etc.
**Online Quiz covering all topics**

**UNIT- II**                                                   **20 hrs(5 T+15L)**

On Page optimization – Meta description and meta keywords, Headings, Bold Text, Domain names and suggestions- Canonical tag, Meta tags, Images and alt, Internal link, sitemap, Invisible text, SWOT   analysis

**Online Quiz covering all topics**

**UNIT- III**                                                  **20 hrs(5 T+15L)**

Off Page Optimization – Page Rank, Link Popularity, Link Building, Directory, Social bookmarks, Blog Submission
**Online Quiz covering all topics**

**TEXT BOOK:**

1.Adam Clarke,SEO 2017 -,Learn search engine optimization with smart internet marketing strategies.

**REFERENCES:**
1.Eric Enge, Stephan Spencer, Jessie Stricchiola,The Art of SEO, 3rd Edition Mastering Search Engine Optimization,2015.

| BCS17R351 | J2EE PROGRAMMING | L | T | P | C |
|---|---|---|---|---|---|

| | | 1 | 0 | 3 | 2 |
|---|---|---|---|---|---|
| | | | | | |

**Pre-requisite:** JAVA PROGRAMMING (BCS17R371)

**Course Category** : Skill Enhancement Elective

**Course Type**    : Theory with practical  course

## COURSE OBJECTIVES

This course is mainly for those who are just starting the programming in java. In this course we are covering all the fundamentals concepts in detail. The beginners will get good foundation of java programming after the course.

## COURSE OUTCOMES

On the completion of the course, students will be able to:

**CO1:** Understand java web applications and their components

**CO2**: Recognize architectural model for developing JSP and Servlet applications and Design reusable web application components using JavaBeans

**CO3:** Develop real-world applications with the advanced concepts

## MAPPING OF COURSE OUTCOME(S)

| CO / PO | PO | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | | S | | | | S | |
| CO2 | | S | L | L | | S | |
| CO3 | | S | | L | | M | |

## UNIT I

J2EE Overview and its Best practices, J2EE Multi-tier Architecture: Distributive System, The Tier, J2EE Multi-Tier Architecture, Client Tier Implementation, Web Tier Implementation, Enterprise JavaBeans Tier Implementation, Enterprise Information system tier Implementation.

**Exercises**

1. Write a JAVA Program to insert data into Student DATA BASE and retrieveinfo based on particular queries.
2. Write a JAVA Servlet Program to implement a dynamic HTML using Servlet(user name and password should be accepted using HTML and displayed usinga Servlet)
3. Write a JAVA Servlet Program to Download a file and display it on the screen(A link has to be provided in HTML, when the link is clicked corresponding filehas to be displayed on Screen)

## UNIT II

Enterprise Java Beans: The EJB Container, EJB classes, EJB Interfaces, Deployment Descriptors: The Anatomy of Deployment Descriptor, Environment Elements, Referencing EJB, Reference other Resources, Sharing Resources, Security Elements, Query Elements, Relationship Elements, Assembly Elements, Exclude List Elements, Session Java Bean: Stateless vs. Stateful, creating a session Java Bean, Entity Java Bean: Container-Manages Persistence, Bean-Manages Persistence, Message Driven Bean: Behind the scenes, Creating an MDB, The JAR File

**Exercises**

1. Write a JAVA Servlet Program to implement RequestDispatcher object (useinclude() and forward() methods).5.
2. Write a JAVA Servlet Program to implement and demonstrate get() and Postmethods(Using HTTP Servlet Class).6.
3. Write a JAVA Servlet Program to implement sendRedirect() method(usingHTTP Servlet Class).7.
4. Write a JAVA Servlet Program to implement sessions (Using HTTP SessionInterface).

## UNIT III

Java Server pages and J2EE Security, Java Server pages: JSP: Installation, JSP Tags: Variables and objects, Methods, Control Statements, Loops Tomcat, Request Strings: Parsing Other Information, User Sessions, Cookies, Session Objects. Security: J2EE Security Concepts, JVM Security, Security Management, JAVA API Security, Browser Security, Web Services Security

**Exercises**

1. Write a JAVA JSP Program to print 10 even and 10 odd number.b. Write a JAVA JSP Program to implement verification of a particular userlogin and display a welcome page.9.
2. Write a JAVA JSP Program to get student information through a HTML andcreate a JAVA Bean Class, populate Bean and display the same informationthrough another JSP.10.
3. Write a JAVA JSP Program which uses <jsp:plugin> tag to run a applet.11.
4. Write a JAVA JSP Program whch implements nested tags and also usesTagSupport Class.12.

**TEXT BOOK**
1. The Complete Reference, J2EE, Jim Keogh, Tata McGraw-Hill, 2008
2. The Complete Reference, J2ME, James Keogh, Tata McGraw-Hill

**REFERENCE BOOK**
1. Professional Java Server Programming, J2EE 1.3 Edition, Apress publications Authors: Subrahmanyam Allamaraju, Cedric Buest

| BSI17R352 | PROGRAMMING WITH PL/SQL | L | T | P | C |
|---|---|---|---|---|---|
| | | 1 | 0 | 3 | 2 |

**Pre-requisite:** Database System Concepts (BSI17R203)

**Course Category** : Program Skill Enhancement Electives

**Course Type**      : Theory course

**COURSE OBJECTIVES**

This course introduces students to PL/SQL, Oracle's procedural extension language for SQL and the Oracle relational database. Participants explore the differences between SQL and PL/SQL. They also examine the characteristics of PL/SQL and how it is used to extend and automate SQL to administer the Oracle database. This course culminates with a project that

challenges students to program, implement, and demonstrate a database solution for a business or organization.

## COURSE OUTCOMES

On the completion of the course, students will be able to:

**CO1:** To learn the techniques and tools to design, guild and extract information from a database.

**CO2**: To know the basic operations, Data types, exceptions in PL/SQL.

**CO3:** To learn the SQL Programming language to an advanced level.

## MAPPING OF COURSE OUTCOME(S)

| CO / PO | PO | | | | | | |
|---------|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | | S | L | S | M | | |
| CO2 | | M | | S | M | | |
| CO3 | | S | | S | S | | S |

## UNIT I

Working with Table: Data Management and Retrieval: DML – adding a new Row/Record – Customized Prompts – Updating and Deleting an Existing Rows/Records – retrieving Data from Table – Arithmetic Operations – restricting Data with WHERE clause – Sorting – Revisiting Substitution Variables – DEFINE command – CASE structure. Functions and Grouping: Built-in functions –Grouping Data. Multiple Tables: Joins and Set operations: Join – Set operations.

## EXERCISE

## [SQL COMMANDS]

1) SQL* formatting commands

2) To create a table, alter and drop table.

3) To perform select, update, insert and delete operation in a table.

4) To make use of different clauses viz where, group by, having, order by, union and intersection,

**5) To study different constraints.**

## UNIT II

PL/SQL: A Programming Language: History – Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Declaration – Assignment operation – Bind variables – Substitution Variables – Printing – Arithmetic Operators. Control Structures and Embedded SQL: Control Structures – Nested Blocks – SQ L in PL/SQL – Data Manipulation – Transaction Control statements. PL/SQL Cursors and Exceptions: Cursors – Implicit & Explicit Cursors and Attributes – Cursor FOR loops – SELECT…FOR UPDATE – WHERE CURRENT OF clause – Cursor with Parameters – Cursor Variables – Exceptions – Types of Exceptions.

1)SQL* formatting commands

2))To create a table, alter and drop table.

3) To perform select, update, insert and delete operation in a table.

4)To make use of different clauses viz where, group by, having, order by, union and intersection,

**5)** To study different constraints

## UNIT III

PL/SQL Composite Data Types: Records – Tables – Varrays. Named Blocks: Procedures – Functions – Packages –Triggers –Data Dictionary Views.

1)To understand working with PL/SQL

2)To implement Cursor on a table.

3)To implement trigger on a table

## TEXT BOOK
1. Database Systems using ORACLE – Nilesh Shah, 2nd edition, PHI.
2. Database Management Systems – Arun Majumdar & Pritimoy Bhattacharya, 2007, TMH.
3. Database Management Systems – Gerald V. Post, 3rd edition, TMH.

| BCS17R351 | PHP PROGRAMMING | L | T | P | C |
|-----------|-----------------|---|---|---|---|
| | | 1 | 0 | 3 | 2 |

**Pre-requisite:** Basic knowledge about web programming

**Course Category:** Skill Enhancement Electives

**Course Type:** Theory with Practical course

## COURSE OBJECTIVES
This course introduces students to the PHP programming language, and their basic syntax commonly used to create dynamic websites. Topics include PHP syntax, using phpMyAdmin, creating tables and queries using SQL, web application security, frameworks, and other related topics. It also includes basics of using content management systems for managing website content. (CSU)

## COURSE OUTCOMES
On the completion of the course, students will be able to:

**CO1:** To understand the general concepts of PHP scripting language for the development of Internet websites.

**CO2:** Use PHP logical and comparison operators, branching structures (if/switch), and loop structures (for, for each, do, do/while)

**CO3:** Use HTML form elements that work with any server-side language, and also Create a PHP web page that is unique to each visitor.

## MAPPING OF COURSE OUTCOME(S)

| CO / PO | PO | | | | | | |
|---------|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **CO4** | | S | | | | S | |
| **CO5** | | S | L | L | | S | |
| **CO6** | | S | | L | | M | |

**UNIT- I**                                                        **20 hrs(5 T+15L)**

PHP introduction, inventions and versions, important tools and software requirements, PHP with other technologies, scope of PHP, Basic Syntax, PHP variables and constants, Types of data in PHP , Expressions, scopes of a variable (local, global), PHP Operators : Arithmetic, Assignment, Relational , Logical operators, Bitwise , ternary and MOD operator, PHP operator Precedence and associativity

1. Write a Program to check and print whether a given number is even or odd.
2. Write a program to compute net amount from the given quantity purchased and rate per quantity. Discount @10% is allowed if the quantity purchased exceeds 100.
3. Write a program to find largest among three numbers using ternary operators.


**UNIT- II**                                                       **20 hrs(5 T+15L)**

PHP Functions,-Function, Need of Function - declaration and calling of a function- PHP Function with arguments- Default Arguments in Function- Function argument with call by value- call by reference- Scope of Function Global and Local-String Manipulation and Regular Expression- Creating and accessing String - Searching & Replacing String- Formatting- joining and splitting String - String Related Library functions.

1. Write a PHP program using Java Script to convert the decimal number to its binary equivalent. You must use a form to accept the number from the user.
2. Write a Menu-Driven program to implement a calculator which performs only addition, subtraction, multiplication and division. The operation should happen based on the user choice. (use switch case)
3. Write a function countWords ($str) that takes any string of characters and finds the Number of times each word occurs. You should ignore the distinction between capital and lowercase letters

**UNIT- III**                                                      **20 hrs(5 T+15L)**

Handling HTML form with PHP- Capturing Form Data- GET and POST form methods- Dealing with multi value fields- Redirecting a form after submission- PHP IF Else conditional statements ( Nested IF and Else), Switch case-  while ,For and  Do While Loop- Goto - Break ,Continue and exit
**Exercises(minimum 5 exercises)**
1. Create a form with a text box asking to enter your favorite city with a submit button when the user enters the city and clicks the submit button another php page should be opened displaying "Welcome to the city
2. Write a PHP code that define class Student with attributes RollNo, Name, Branch, and Year, create 3 instances of it, sets the values of each instance appropriately and print the values of all attributes.

**TEXT BOOK**
1. Tatroe, K., MacIntyre, P., & Lerdorf, R. *Programming Php*. " O'Reilly Media, Inc.".2013

**REFERENCE BOOK**

1. MacIntyre, P., Danchilla, B., Gogala, M., & Myer, T. *Pro PHP programming*. Apress. 2011
2. Holzner, S.. *PHP: the complete reference*. Tata McGraw-Hill Education.2007

| BCS17R353 | SOFTWARE TESTING CONCEPTS | L | T | P | C |
|-----------|---------------------------|---|---|---|---|
|           |                           | 1 | 0 | 3 | 2 |

**Pre-requisite:** Basic knowledge in mathematical formulas and matrix operations

**Course Category:** Skill Enhancement Electives

**Course Type:** Theory with Practical course

## COURSE OBJECTIVES

This course introduces students about Software testing concepts and tools used in industry for testing.

## COURSE OUTCOMES

On the completion of the course, students will be able to:

**CO1:** Understand SDLC models and different types of testing
**CO2:** Understand the basic concepts of black box testing and challenges in it.
**CO3:** Understand about functional and non functional testing and their types.

## MAPPING OF COURSE OUTCOME(S)

| CO / PO | PO | | | | | | |
|---------|----|----|----|----|----|----|----|
|         | 1  | 2  | 3  | 4  | 5  | 6  | 7  |
| CO7     |    | S  |    |    |    | S  |    |
| CO8     |    | S  | L  | L  |    | S  |    |
| CO9     |    | S  |    | L  |    | M  |    |

**UNIT- I**                                                                      **20 hrs(5 T+15L)**

Software Development Life Cycle models: Phases of Software project – Quality, Quality Assurance, Quality control – Testing, Verification and Validation – Process Model to represent Different Phases - Life Cycle models. White-Box Testing: Static Testing – Structural Testing – Challenges in White-Box Testing.

**Exercise**
1. Write a program that take three inputs (a,b &c) that represent the sides of a triangle, and the output is one of the below four:
   a. Not a triangle
   b. Scalene triangle
   c. Isosceles triangle
   d. Equilateral triangle
   Generate test cases using Boundary Value Analysis, Equivalence Class Partitioning and Decision Table Testing.
   Generate test cases using Basis path testing.
   Run code coverage tool.

**UNIT- II**                                          **20 hrs(5 T+15L)**

Black-Box Testing: What is Black-Box Testing? - Why Black-Box Testing? – When to do Black-Box Testing? – How to do Black-Box Testing? – Challenges in White Box Testing - Integration Testing: Integration Testing as Type of Testing – Integration Testing as a Phase f Testing – Scenario Testing – Defect Bash.

**Exercises**

1. Write a program that determines the nature of roots of a quadratic equation. Output should be one of the following:-

   - Not a quadratic equation.
   - Complex roots
   - Real roots
   - Single roots
   I. Generate test cases using Boundary Value Analysis, Equivalence Class Partitioning and Decision Table Testing.
   II. Generate test cases using Basis path testing.
   III. Run code coverage tool

2. Write a program that checks whether the number is even or odd. Run code coverage tool and find the amount of code being covered

**UNIT- III**                                          **20 hrs(5 T+15L)**

System and Acceptance Testing: system Testing Overview – Why System testing is done? – Functional versus Non-functional Testing - Functional testing - Non-functional Testing – Acceptance Testing – Summary of Testing Phases.

**Exercises**

1. Write a program that dynamically allocates memory to10 integers using malloc() or calloc() and
   - Donot free memory leading to memory leaks. Verify the same usingValgrind.
   - Now, free memory using free() at the end of the program to avoid memory leaks. Verify the same using Valgrind.

2. Use LoadUI load testing tool to test the web application performance.

**TEXT BOOK**

1. Software Testing Principles and Practices, Srinivasan Desikan & Gopalswamy Ramesh, 2006, Pearson Education.

**REFERENCE BOOKS**

1. Effective Methods of Software Testing, William E. Perry, 3 rd ed, Wiley India. 2. Software Testing, Renu Rajani, Pradeep Oak, 2007, TMH.

| BCS17R 354 | ANDROID PROGRAMMING | L | T | P | C |
|---|---|---|---|---|---|
| | | 1 | 0 | 3 | 2 |

**Pre-requisite:** JAVA PROGRAMMING(BCS17R371)

**Course Category**: Skill Enhancement Elective

**Course Type**: Theory with Practical course

## COURSE OBJECTIVES

This course introduces mobile application development for the Android platform. Students will learn skills for creating and deploying Android applications, with particular emphasis on software engineering topics including software architecture, software process, usability, and deployment.

## COURSE OUTCOMES

Upon successful completion of this course, Students will be able to
**CO1:** Know the basic concepts and technique of developing applications for the Android mobile environment.
**CO2**: Able able to use the SDK and other development tools. And the basic concepts of Android phone features and capabilities.
**CO3:** Be able to understand Java programming as it related to application development for the Android platform..

## MAPPING OF COURSE OUTCOME(S)

| CO / PO | PO | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO10 | | S | | | | S | |
| CO11 | | S | L | L | | S | |
| CO12 | | S | | L | | M | |

**UNIT- I**                                                                              **20 hrs(5 T+15L)**

**Introduction:** History of Android, Introduction to Android Operating Systems, Android Development Tools, Android Architecture.**Overview of object oriented programming using Java:** OOPs Concepts: Inheritance, Polymorphism, Interfaces, Abstract class, Threads, Overloading and Overriding, Java Virtual Machine.

**Exercise**

1. Create "Hello World" application. That will display "Hello World" in the middle of the screen in the emulator. Also display "Hello World" in the middle of the screen in the Android Phone.
2. Create an application with login module. (Check username and password).
3. Create spinner with strings taken from resource folder (res >> value folder) and on changing the spinner value, Image will change.

**UNIT- II**                                                                            **20 hrs(5 T+15L)**

**Development Tools,** Installing and using Eclipse with ADT plug-in, Installing Virtual machine for Android sandwich/Jelly bean (Emulator), configuring the installed tools, creating a android project – Hello Word, run on emulator, Deploy it on USB-connected Android device.

**Exercise**

1. Create and Login application as above. On successful login, pop up the message.
2. Create an application to Create, Insert, update, Delete and retrieve operation on the database.

**UNIT- III**                                                         **20 hrs(5 T+15L)**
     **User Interface Architecture** Application context, intents, Activity life cycle, multiple screen sizes. **User Interface Design:** Form widgets, Text Fields, Layouts, Button control, toggle buttons, Spinners (Combo boxes), Images, Menu, and Dialog. **Database**, Understanding of SQLite database, connecting with the database.

 **Exercise**
1. Create a menu with 5 options and and selected option should appear in text box.
2. Create a list of all courses in your college and on selecting a particular course teacher-in-charge of that course should appear at the bottom of the screen.
3. Create an application with three option buttons, on selecting a button colour of the screen will change.

**TEXT BOOK**
1. Android application development for java programmers. By James C. Sheusi. Publisher: Cengage Learning, 2013.

**REFERENCE BOOK**
1. Burnette, Ed. (2010) Hello, Android. Introducing Google's Mobile Development Platform (3rd Edition). [Covers Android 2] Pragmatic Bookshelf, Dallas TX. ISBN: 978-1-93435-656-2. Book Information: http://pragprog.com/titles/eband3/hello-android

| BCS17R 356 | OPEN SOURCE SOFTWARE | L | T | P | C |
|---|---|---|---|---|---|
| | | 1 | 0 | 3 | 2 |
| **Pre-requisite:** Preliminary knowledge programming and usage of licensed software. | | | | | |
| **Course Category:** Skill Enhancement Elective | | | | | |
| **Course Type**: Theory with Practical course | | | | | |

**COURSE OBJECTIVES**
     The objective of this course is to utilize and contribute to open source projects. To make the students to gain experience using open source tools, languages and frameworks to prepare for careers in software development.

**COURSE OUTCOMES**
     Upon successful completion of this course, Students will be able to
**CO1:** Understand the Open source Principles and Free software
**CO2:** Get knowledge about the methodology and Languages used to develop open source products
**CO3:** Acquire knowledge about open source desktop and different type of vendors and database approaches.

**MAPPING OF COURSE OUTCOME(S)**

| CO / PO | PO | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| CO1 | | S | | | | S | |
| CO2 | | S | L | L | | S | |
| CO3 | | S | | L | | M | |

**UNIT- I**                                                   **20 hrs(5 T+15L)**

Introduction to Open sources – Need of Open Sources – Advantages of Open Sources– Application of Open Sources. Open source operating systems: LINUX: Introduction – General Overview – Kernel Mode and user mode – Process – Advanced Concepts – Scheduling – Personalities – Cloning – Signals – Development with Linux. .

**Exercises**
1. Kernel configuration, compilation and installation
2. Virtualisation environment
3. Compiling from source
4. Getting started with Linux, learn basic commands and directory structure, execute file and directory operations

**UNIT- II**                                                   **20 hrs(5 T+15L)**

PHP: Introduction – Programming in web environment – variables – constants – data;types – operators – Statements – Functions – Arrays – OOP – String Manipulation and regular expression – File handling and data storage – PHP and SQL database – PHP and LDAP – PHP Connectivity – Sending and receiving E-mails – Debugging and error handling – Security – Templates.

**Exercises**
1. Running PHP : simple applications like login forms after setting up a LAMP stack
2. Simple PHP programs using operators
3. User Authentication System Using PHP
4. PHP program that demonstrate form element

**UNIT- III**                                                   **20 hrs(5 T+15L)**

MySQL: Introduction – Setting up account – Starting, terminating and writing your ownSQL programs – Record selection Technology – Working with strings – Date and Time– Sorting Query Results – Generating Summary – Working with metadata – Using sequences – MySQL and Web.

**Exercises**
1. Performing database operations using PHP and MYSQL
2. Student registration form using PHP and MYSQL
3. Library management system using PHP and MYSQL

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