

For the candidates admitted from the academic year 2019-2020

| Sem          | Part                 | Course                             | Course Title                                       | Credits    | Marks       |             |             | Hrs/<br>week | Exam<br>Duration                           |
|--------------|----------------------|------------------------------------|--|------------|-------------|-------------|-------------|--------------|--|
|              |                      |                                    |  |            | CAM         | TEE         | Total       |              |  |
| I            | I                    | Language                           | Tamil I / Hindi I / French I / Malayalam I         | 3          | 25          | 75          | 100         | 5            | Theory TEE : 3 hrs : Practicals TEE : 3hrs |
|              | II                   | English                            | English I  | 3          | 25          | 75          | 100         | 5            |  |
|              | III                  | Core                               | C Programming                                      | 4          | 25          | 75          | 100         | 5            |  |
|              | III                  | Allied                             | Mathematical Foundations for Computer Applications | 5          | 25          | 75          | 100         | 6            |  |
|              | III                  | Core                               | C Programming Lab                                  | 2          | 40          | 60          | 100         | 6            |  |
|              | IV                   | Skilled Based Subject              | General Awareness                                  | 2          | 25          | 75          | 100         | 3            |  |
| II           | I                    | Language                           | Tamil II / Hindi II / French II / Malayalam II     | 3          | 25          | 75          | 100         | 5            |  |
|              | II                   | English                            | English II   | 3          | 25          | 75          | 100         | 5            |  |
|              | III                  | Core                               | Computer Organisation and Architecture             | 4          | 25          | 75          | 100         | 5            |  |
|              | III                  | Allied                             | Computer Based Optimization Techniques             | 5          | 25          | 75          | 100         | 5            |  |
|              | III                  | Core                               | Data Structures                                    | 4          | 25          | 75          | 100         | 4            |  |
|              | III                  | Skilled Based Subject              | Data Structures Lab                                | 2          | 40          | 60          | 100         | 4            |  |
|              | IV                   | Environmental Studies              | Environmental Awareness                            | 2          | 25          | 75          | 100         | 2            |  |
| III          | IV                   | Basic Tamil /Advanced Tamil        | Basic Tamil I/Advanced Tamil I                     | 2          | 100         | NA          | 100         | 2            |  |
|              |                      | Non major Elective                 | Personality Development and Softskills             |            | 40          | 60          |             |              |  |
|              | III                  | Core                               | Computer Networks                                  | 4          | 25          | 75          | 100         | 5            |  |
|              | III                  | Core                               | Operating Systems                                  | 4          | 25          | 75          | 100         | 5            |  |
|              | III                  | Core                               | Java Programming                                   | 4          | 25          | 75          | 100         | 5            |  |
|              | III                  | Allied                             | Embedded System and its Applications               | 5          | 25          | 75          | 100         | 5            |  |
|              | III                  | Core                               | Java Programming Lab                               | 2          | 40          | 60          | 100         | 4            |  |
|              | IV                   | Skilled Based Subject              | Professional Communication                         | 2          | 25          | 75          | 100         | 4            |  |
| V            | Extension Activities | NSS / Computer Awareness Programme | 1  | Grade **   |             |             | -           |              |  |
| IV           | IV                   | Basic Tamil /Advanced Tamil        | Basic Tamil II /Advanced Tamil II                  | 2          | 100         | NA          | 100         | 2            |  |
|              |                      | Non major Elective                 | Basic in Business Process Outsourcing              |            | 40          | 60          |             |              |  |
|              | III                  | Core                               | Relational Database Management System              | 4          | 25          | 75          | 100         | 5            |  |
|              | III                  | Core                               | Open Source Software                               | 4          | 25          | 75          | 100         | 5            |  |
|              | III                  | Core                               | Python Programming                                 | 4          | 25          | 75          | 100         | 5            |  |
|              | III                  | Allied                             | Underwater Communications                          | 5          | 25          | 75          | 100         | 5            |  |
|              | III                  | Core                               | Open Source Software Lab                           | 2          | 40          | 60          | 100         | 5            |  |
|              | IV                   | Value Education                    | Indian Society, People and Culture.                | 2          | 25          | 75          | 100         | 3            |  |
| V            | III                  | Core                               | Object Oriented Analysis and Design                | 4          | 25          | 75          | 100         | 4            |  |
|              | III                  | Core                               | Web Design and Markup Language                     | 4          | 25          | 75          | 100         | 5            |  |
|              | III                  | Core                               | Software Engineering                               | 4          | 25          | 75          | 100         | 5            |  |
|              | III                  | Core                               | .NET Programming                                   | 5          | 25          | 75          | 100         | 5            |  |
|              | III                  | Core                               | .NET Programming and Web Design Lab                | 2          | 40          | 60          | 100         | 4            |  |
|              | III                  | Elective                           | Elective - I                                       | 5          | 25          | 75          | 100         | 4            |  |
|              | IV                   | Skilled Based Subject              | Aptitude*  | 2          | 25          | 75          | 100         | 3            |  |
| VI           | III                  | Core                               | Cyber Security                                     | 4          | 25          | 75          | 100         | 4            |  |
|              | III                  | Core                               | Mobile Application Development                     | 5          | 25          | 75          | 100         | 4            |  |
|              | III                  | Core                               | Mobile Application Development Lab                 | 2          | 40          | 60          | 100         | 4            |  |
|              | III                  | Elective                           | Elective - II                                      | 5          | 25          | 75          | 100         | 4            |  |
|              | III                  | Core                               | Project and Viva Voce                              | 7          | 25          | 75          | 100         | 12           |  |
|              | IV                   | Skilled Based Subject              | Soft Skills *                                      | 2          | 25          | 75          | 100         | 2            |  |
| <b>Total</b> |                      |                                    |  | <b>140</b> | <b>1120</b> | <b>2880</b> | <b>4000</b> | <b>180</b>   |  |

\* Both CAM and TEE marks will be evaluated internally.

Basic Tamil/Advanced Tamil - 100 Marks CA only.

G. P. Reddy

BI-02  
2019-20

**Elective List**

**Elective I**

- 1 Information Security
- 2 Data Mining
- 3 Artificial Intelligence and Expert Systems
- 4 Integrating SOA and Web Services
- 5 Cloud Computing

**Elective II**

- 1 Mobile Communications
- 2 Network Security
- 3 Introduction to Internet of Things
- 4 Enterprise Resource Planning
- 5 Air and Sea Navigation

| Project & Viva Voce Split up |     |    |
|------------------------------|-----|----|
|                              | CA  |    |
| Review I                     |     | 10 |
| Review II                    |     | 15 |
|                              | TEE |    |
| Viva                         |     | 50 |
| Documentation                |     | 25 |

G. P. Reddy

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**Dr G R DAMODARAN COLLEGE OF SCIENCE (Autonomous), COIMBATORE - 14  
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**Effective from the academic year: 2019-2020**

**FIRST SEMESTER  
CORE: C PROGRAMMING**

**Objective of the subject:** This paper provides a brief introduction to C language. It gives detailed description about syntax and semantics of C Languages along with concepts like pointers, files and pre processor directives.

**UNIT I**

**(9 Hrs)**

Introduction to C Programming Language-Data types – Identifiers – Variables - Scope of variables - Type Qualifiers - Storage class specifiers - Variable Initialization - Constants. Operators – Assignment – Arithmetic - Increment/Decrement – Relational - logical-Bit wise-Ternary- Address and pointer operator - SizeOf – Comma – Dot - Arrow operator -The [] and () operators – Expressions.

**UNIT II**

**(10 Hrs)**

Selection statements - Iteration Statements - Jump Statements - Expression Statements -Block Statements - Functions - General form of Functions - Function prototypes - Function Arguments - Arguments to main function - Return Statement – Recursion -Declaring variable length parameter list.

**UNIT III**

**(11 Hrs)**

Arrays - Single dimension - Generating a pointer to an array - Passing Single dimension arrays to functions – Strings - Two dimensional arrays - Arrays of strings - Multidimensional Arrays - Indexing Pointers - Array Initialization - Variable length arrays - Structures-Array of Structures - Passing structures to functions - Structure pointers - Arrays and structures within structures – Unions - Bit fields – Enumerations –Typedef.

**UNIT IV**

**(10 Hrs)**

Pointers - Pointer Expressions - Pointers and arrays - Multiple indirection - Initializing pointers - Pointers to Functions - Dynamic memory allocation.

**UNIT V**

**(10 Hrs)**

Files - File system basics - fseek() and random access I/O - fscanf() and fprintf() - Preprocessor-#define, #error, #include - comments.

**TEXT BOOKS**

1. C The Complete Reference, Herbert Schildt, Tata McGraw-Hill, Fourth Edition, 2008.
2. Programming in ANSI C, E.Balagurusamy, Tata McGraw-Hill, Sixth Edition, 2012.
3. C Programming, Ashok Kamthane, Pearson Education, Second Edition, 2011.
4. Programming with C - Schaum's Outlines Series, Byron Gottfried, Third Edition, Tata McGraw Hill, 2011

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**Effective from the academic year: 2019-2020**

**FIRST SEMESTER**

**Allied: MATHEMATICAL FOUNDATIONS FOR COMPUTER APPLICATIONS**

**Objective of the subject:** Provides an introduction to the conceptual and mathematical foundations of computer science and its applications in functional programming as well as reasoning techniques based on propositional logic and mathematical induction.

**UNIT I (12 Hrs)**

Numerical Methods: Solving simultaneous linear algebraic equations: Gauss Elimination – Gauss Siedel methods. Interpolation: Newton's forward and backward interpolation formula - Lagrange's interpolation. Numerical Integration: Trapezoidal rule and Simpson's  $1/3^{\text{rd}}$  rule.

**UNIT II (8 Hrs)**

Probability & Statistics: Sample space and events, axioms of probability. Baye's theorem. Correlation – Karl Pearson's co-efficient of correlation. Regression – Regression equations and its coefficient – Curve fitting by the method of least squares (fitting straight lines only).

**UNIT III (10 Hrs)**

Mathematical Logic: Connectives – Truth Tables, Well-formed formula, Tautology, Equivalence of formulas, duality law, Normal forms, Inference theory for statement calculus(direct and indirect method).

**UNIT IV (10 Hrs)**

Relations And Functions: Binary relations, Composition of relations, Equivalence of Relations, Composition of Functions, Inverse functions, One-to-one, Onto, One to one-on-to functions.

**UNIT V (10 Hrs)**

Formal Languages And Automata: Grammars, phrase-structure grammar, context-sensitive grammar, context-free grammar, regular grammar and finite state automata: Deterministic finite automata- non-deterministic finite-state automata – conversion of non-deterministic finite automata to deterministic finite state automata.

**TEXT BOOKS**

1. Numerical Methods in Science and Engineering, M.K.Venkatraman, the National Publishing Company, 5<sup>th</sup> Edition 2007. (For UNIT I)
2. Statistical Methods, S.P.Gupta, S.Chand&Sons, 36<sup>th</sup> Revised Edition, 2009. (For UNIT II)
3. Discrete Mathematical Structures with Applications to Computer Science, J P Tremblay and R P Manohar, McGraw Hill, 27<sup>th</sup> Reprint, 2006. (For Units III, IV & V)

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**Effective from the academic year: 2019-2020**

**FIRST SEMESTER**

**CORE: C PROGRAMMING LAB**

**Objective of the subject:** The programming paper gives an experience on working with arrays, functions, structures, pointers, files, preprocessor directives using C Language.

1. Simple Input / Output, Variables & Expression Statements
2. Selection statements
3. Iteration Statements
4. Single & Multi dimensional Array
5. Functions & Recursive Functions
6. Structures
7. Pointers
8. Files
9. Preprocessor directives
10. Command Line Arguments



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**Effective from the academic year: 2019-2020**

**SECOND SEMESTER**

**CORE: COMPUTER ORGANISATION AND ARCHITECTURE**

**Objective of the subject:** To provide the basic knowledge on computer arithmetic, machine language instruction set, counters, Input/Output , System Bus Design and memory systems. The objective is to provide the students an insight into the fundamental building blocks of a computer.

**UNIT I (10 Hrs)**

Number Systems: Decimal, Binary, Octal, Hexadecimal - Conversion from one to another – complements - Binary codes - Basic Logic Gates – Basic Theorems and Properties of Boolean Algebra - Sum of products - Product of sums - Karnaugh map - Don't care conditions.

**UNIT II (9 Hrs)**

Combinational Logic circuits Design: Adders - Half Adder, Full Adder - Subtractor – Half Subtractor - Full Subtractor - Decoders - Demultiplexers – Encoders - Multiplexers- Flip Flops: RS, JK Flip Flops.

**UNIT III (10 Hrs)**

Ripple Counters – Synchronous Counters - Register Transfer - Arithmetic Micro Operations : Binary Adder Subtractor - Logic Microoperations – Shift Microoperations - Arithmetic Logic Shift Unit - Stack Organization - Instruction formats.

**UNIT IV (10 Hrs)**

Input - Output organization: Peripheral Devices-Asynchronous Data Transfer (Strobe & Handshaking Method) - Modes of Transfer - DMA.

**UNIT V (11 Hrs)**

Memory Organization: Memory Hierarchy – Main Memory - Auxiliary Memory - Cache Memory .

#### **TEXT BOOKS**

1. Computer System Architecture, M Morris Mano, Prentice-Hall India, 2007
2. Digital Logic and Computer Design, M Morris Mano Prentice-Hall India, 2016.

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Effective from the academic year: 2019-2020

SECOND SEMESTER

Allied: COMPUTER BASED OPTIMIZATION TECHNIQUES

(No Derivations; problems only)

**Objective of the subject:** This subject highlights on the various optimization techniques and the methodologies that includes Linear Programming, Transportation & Assignment Problem, Games & Strategies, Replacement Problem, Queuing Theory, CPM/PERT Method.

**UNIT I** (12 Hrs)

**Linear Programming Problem:** Mathematical Formulation of the problem – Graphical Solution Method - Simplex method - Big-M method –Dual Simplex Method.

**UNIT II** (10 Hrs)

**Transportation Problem:** Introduction – Finding an Initial basic feasible solution (North – West Corner Method, Least-Cost Method & Vogel's Approximation Method) – Test for Optimality. **Assignment Problem:** Introduction - Hungarian Method.

**UNIT III** (10 Hrs)

**Games and Strategies:** Introduction – Two-Person Zero-Sum games – Some basic terms – The Maximin-Minimax Principle – Games without saddle point-Mixed Strategies – Graphic Solution of  $2 \times n$  and  $m \times 2$  games.

**Replacement Problem:** Introduction – Replacement of equipment/asset that deteriorates gradually: Replacement policy when value of money does not changes with time - Replacement policy when value of money changes with time

**UNIT IV** (8 Hrs)

**Queueing Theory:** Introduction – Queueing system – Elements of a queueing system – Operating characteristics of a queueing system- Poisson queueing systems-  $\{(M/M/1):(\infty/FIFO)\}$  and  $\{(M/M/1): (N/ FIFO)\}$ .

**UNIT V** (10Hrs)

**Network Scheduling by PERT/CPM:** Network: Basic Components – Rules of network construction – Numbering the events – Critical path analysis: Forward & Backward Pass Calculations. Probability considerations in PERT: Probability of meeting the schedule time – PERT Calculation.

#### TEXT BOOKS

1. Operations Research- Kanti Swarup, P.K.Gupta, Manmohan, Sultan Chand & Sons, 16th Edition, 2012.
2. Problems in Operations Research, P.K.. Gupta, Dr.D.S.Hira, S. Chand & Company, Reprint 2007.
3. Operations Research, A.C.S.Kumar, Published by Yesdee, Revised edition, 2015.

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**Effective from the academic year: 2019-2020  
SECOND SEMESTER**

**CORE: DATA STRUCTURES**

**Objective of the subject:** To provide the students with the basic understanding of data structures for more efficient program writing. This paper focuses on various data storage and manipulation structures like arrays, records, stacks, queues, recursion, trees and sorting techniques.

**UNIT I**

**(12 Hrs)**

Introduction and Overview: Basic terminology – Data structures – Data structure operations .  
Arrays, Records: Linear arrays – Representation of linear arrays – Traversing linear array –  
Inserting and deleting – Linear search – Multidimensional arrays – Records.

**UNIT II**

**(10 Hrs)**

Sorting: Sorting - Bubble sort – Quick sort – Insertion sort – Selection Sort.  
Linked list: Linked lists – Representation in memory – Traversing linked list – Garbage  
collection – Insertion and deletion in linked list - Header linked lists – Two-way lists.

**UNIT III**

**(10 Hrs)**

Stacks, Queues and Recursion: Stacks – Array representation of stacks – Linked  
representation of stack – Arithmetic expressions – Recursion – Tower of Hanoi – Queue –  
Linked representation of Queues.

**UNIT IV**

**(8 Hrs)**

Trees: Introduction – Binary trees – Representing binary trees in memory – Traversing binary  
trees – Binary search trees – Searching, Inserting and Deleting in a binary search tree.

**UNIT V**

**(10 Hrs)**

Graphs and Applications: Graph theory terminology – Sequential representation of graph –  
Adjacency matrix – Linked Representation of Graph - Operations on graph – Traversing a  
graph.

**TEXT BOOKS**

1. Data Structures Schaum's Outlines, Seymour Lipschutz, G.A Vijayalakshmi Pai, Tata McGraw-Hill Companies, Indian Adapted Edition, 2006.
2. Fundamentals of Data Structures, Ellis Horowitz and Sartaj Sahni, Galgotia Publication Pvt. Ltd., 2012.

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**Effective from the academic year: 2019-2020**

**SECOND SEMESTER**

**SKILL BASED SUBJECT: DATA STRUCTURES LAB**

**Objective of the subject:** The programming paper gives an experience on working with stacks, queues, and linked lists; searching and sorting techniques.

1. Stack Operations
2. Queue Operations
3. Singly linked list
4. Linear Search
5. Binary Search
6. Infix to Postfix Notation
7. Bubble Sort
8. Selection Sort
9. Quick Sort
10. Insertion Sort

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**Effective from the academic year: 2019-2020**

**THIRD SEMESTER**

**CORE: COMPUTER NETWORKS**

**Objective of the subject:** This subject helps in understanding the concepts and mechanisms of Telecommunication and Computer Network Engineering which includes details about Signaling, Encoding, Modulating, Error Detection and Data transfer.

**UNIT I (8 Hrs)**

Introduction: Data communications - Networks- Protocols and standards. Network Models: Layered tasks - The OSI model - Layers in the OSI model.

Switching systems: Circuit switching – message switching – Packet switching- Network Ports: Connectors – Switch – Jack - Network Boosters. Critical areas of the Network: Security – Traffic Management – Real-Time monitoring – Scalability

**UNIT II (10 Hrs)**

TCP/IP protocol suite - Addressing. Data and signals: Analog and digital -Transmission impairment- Performance. Multiplexing - Transmission media: Guided media – Unguided media - Virtual circuit networks.

**UNIT III (12 Hrs)**

Error Detection and Correction: Introduction – Block coding – Checksum. Network layer: Delivery – forwarding – Unicast routing protocols-Multicast routing protocols. Congestion Control and Quality of service: Data traffic –Congestion –Congestion control.

**UNIT IV (10 Hrs)**

Transport layer: Process to Process Delivery: Client/Server Paradigm - Multiplexing and Demultiplexing – Connectionless Versus Connection Oriented Service – Reliable versus Unreliable- Protocols. TCP.

**UNIT V (10 Hrs)**

Application Layer: Domain Name system: Name space- Domain name space - Distribution of name space-Resolution. Electronic mail. Cryptography: Introduction – Symmetric key cryptography - Asymmetric key cryptography – Software Defined Networks: Introduction.

**TEXT BOOKS**

1. Data Communication and Networking, Behrouz A Forouzan, Tata McGraw Hill, Fifth edition, 2013.
2. Computer Networks, Andrew S. Tanenbaum & David J. Wetherall, Pearson Education, 5<sup>th</sup> Edition, 2012.
3. SDN: Software Defined Networks: An Authoritative Review of Network Programmability Technologies, Thomas D. Nadeau & Ken Gray, O'Reilly, First Edition, 2013

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**BCA**  
**Effective from the academic year: 2019-2020**  
**THIRD SEMESTER**

**CORE: OPERATING SYSTEMS**

**Objective of the subject:** The objective is to emphasize the need and the functionality of the operating system, to discuss the components and responsibilities of the operating systems like CPU scheduler, memory management system, secondary memory management, handling concurrent processes.

**UNIT I (8 Hrs)**

Introduction to Operating Systems: Definition of OS - Early History - Process Concepts: Definition of process – Process states – Process Management- Interrupt – Interprocess communication- Mutual exclusion – Semaphores – Deadlock and indefinite postponement.

**UNIT II (12 Hrs)**

Real Memory Organization and Management: Memory Organization- Memory Management - Memory Hierarchy - Memory Management Strategies - Contiguous Vs Non-contiguous storage allocation – Single user contiguous storage allocation – Fixed partition multiprogramming – Variable partition multiprogramming – Multiprogramming with storage swapping.

**UNIT III (10 Hrs)**

Virtual Memory Management: Basic Concepts - Paging – Demand Paging- Anticipatory Paging - Page replacement strategies – Working set Model, Page size – Segmentation. Processor Scheduling: Scheduling Levels - Preemptive Vs non-preemptive scheduling – Priorities – Scheduling Algorithms– Deadline Scheduling- FIFO – RR – SPF – SJF – SRT – HRRN.

**UNIT IV (10 Hrs)**

Disk Performance Optimization: Characteristics of moving head disk storage – Need for disk scheduling – Disk Scheduling Strategies – FCFS – SSTF – SCAN – C-SCAN.

**UNIT V (10 Hrs)**

File and Database Systems: Data Hierarchy – Files - File system – File Organization – File Allocation – Free space Management – Access Control Matrix.

**TEXT BOOKS**

1. Operating System, Harvey M. Deital, Paul J. Deitel, David R. Choffnes, 3<sup>rd</sup> Edition, Pearson Education, 2007

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**Effective from the academic year: 2019-2020**  
**THIRD SEMESTER**

**CORE: JAVA PROGRAMMING**

**Objective of the subject:** The objective is to learn the Java programming language along with its syntax, idioms, patterns, and styles. To understand object oriented programming and to learn the essentials of the Java class library and event driven Graphical User Interface (GUI) programming.

**UNIT I (8 Hrs)**

Introduction to Java - Importance of Java – Bytecode – Buzzwords. Overview of Java: Object oriented programming-Simple program-Lexical issues. Data types, Variables and Arrays-Operators.

**UNIT II (10 Hrs)**

Control statements-Introduction to Classes: class fundamentals - declaring objects - constructors-This keyword - Garbage Collection - finalize() method - Overloading Methods - Recursion-access control - static – final - nested and inner class - command line arguments - Inheritance.

**UNIT III (10 Hrs)**

Packages and Interfaces: Definition - Importing Packages - Interfaces. Exception Handling - try and catch - nested try statements. Multithreading Programming: Creating a thread and multiple thread – priorities – synchronization - interthread communication.

**UNIT IV (10 Hrs)**

String Handling: constructors – operations – comparison – extraction – searching - string buffer. Applet Class: basics – architecture – skeleton – repainting - APPLET tag - passing parameters -getDocumentBase() - getCodeBase() - AppletContext and showDocument() - AudioClip and AppletStub Interface - outputting.

**UNIT V (12 Hrs)**

AWT classes: Windows fundamentals - frame window - working with graphics – colour - fonts -Managing text output using Font metrics. AWT controls: labels – buttons - check boxes – lists -scroll bars - text field - text area.

**TEXT BOOK**

1. Java The Complete Reference, Herbert Schildt, Tata McGraw-Hill, Eighth edition, 2011.
2. [www.spoken-tutorial.org/](http://www.spoken-tutorial.org/)

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**Effective from the academic year: 2019-2020**

**THIRD SEMESTER**

**ALLIED: EMBEDDED SYSTEM AND ITS APPLICATIONS**

**Objective:** The objective of this paper is to provide an insight on basic electronic components, microcontrollers, sensors, robotics and give awareness to the students about their applications in the real-time environment.

**UNIT I (10 HRS)**

Basic Electronics: Components and Devices: Capacitors – Resistors – Transistors – Diodes – LEDs - Breadboard – AC Motors – DC Motors - Servo Motors - Measuring Instruments – Circuits – Power Units

**UNIT II (10 HRS)**

Introduction to Microcontrollers and Embedded Systems: Introduction to PCB – Microprocessors Vs. Microcontrollers – Types of Microcontrollers, Advanced Microcontroller Chips: ATMega, Atmel - Arduino IDE

**UNIT III (10 HRS)**

Fundamentals of Sensors – Types - functional characteristics of sensors – IR Sensors – Temperature Sensors – Light Sensors - Actuators – Sensors and actuators for Biosciences – Tactile Sensors – Strain gauges - UAV flight control system, Applications of Embedded systems in Air surveillance.

**UNIT IV (10 HRS)**

Introduction to Robots – Types of Robots – Operating Principles and functions – Black Line follower robot – Edge detector robot – Obstacle sensing – Automation of Traffic signals.

**UNIT V (10 HRS)**

Applications: Robotics applications in Agriculture, Biotechnology, Information and Communication Technology, Navigation.

**TEXT BOOKS**

1. V.K.Mehta, Basic Electronics, S Chand & Co,
2. Arduino Tutorial: <http://www.ladyada.net/learn/arduino/>



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**Effective from the academic year: 2019-2020  
THIRD SEMESTER**

**CORE: JAVA PROGRAMMING LAB**

**Objective of the subject:** This paper gives a hands-on experience on implementing the OOPS concepts like overloading, inheritance, applets, packages, exception handling and file concepts using Java.

Write Programs using the following concepts.

1. Inheritance.
2. String manipulation.
3. Method overloading.
4. A Java Program for Interface.
5. A Java Program for User defined Packages.
6. Exception handling.
7. Java program for handling threads.
8. File Operations.
9. Simple Java Applet.
10. AWT Controls.



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**Effective from the academic year: 2019-2020**  
**FOURTH SEMESTER**

**CORE: RELATIONAL DATABASE MANAGEMENT SYSTEM**

**Objective of the subject:** This course focuses on the design of a database starting from the conceptual design to the implementation of a database schema and user interfaces to the database. Students will learn about database design concepts, Entity-Relationship and Relational Model.

**UNIT I (10 Hrs)**

Introduction: Database System Applications- Purpose of Database systems- View of Data – Database Languages – Transaction Management – Database Architecture - Database Users and Administrator.

**UNIT II (10 Hrs)**

Database design and the E-R model: The Entity Relationship model – Constraints – Removing Redundant attributes in Entity sets - E-R diagram - Extended E-R features.

**UNIT III (8 Hrs)**

Introduction to the Relational model: Structure of Relational Databases – Database Schema – Keys – Relational Query Languages - Relational operations. Formal Relational Query Languages – Relational Algebra – Tuple Relational Calculus – Domain Relational Calculus.

**UNIT IV (10 Hrs)**

Relational databases: Basic Structure – Set operations - Aggregate Functions - Null Values - Nested Sub queries - Views – Modification of the database - Joined Relations - Data Definition Language.

**UNIT V (12 Hrs)**

Relational database design: Atomic Domains and First Normal Form – Decomposition Using Functional Dependencies: Keys and Functional Dependencies - Boyce-Codd Normal form - BCNF and Dependency Preservation - Third Normal form – Higher Normal Form- Case Study on Normalization.

**TEXT BOOKS**

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, “Database System Concepts”, Fifth Edition 2006.
2. Bipin C.Desai, “An Introduction to Database Systems”, Galgotia Publications Pvt Ltd, Revised Edition 2006.

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**Effective from the academic year: 2019-2020**

**FOURTH SEMESTER**

**CORE: OPEN SOURCE SOFTWARE**

**Objective:** The course is designed to provide an insight on the open source licensing and policies, Open source softwares Linux, MySQL and PHP .

**UNIT I**

**(8 Hrs)**

Open Source – Definition of Terms – Open Source Operating systems – Contents –Open Source Desktop applications – Introduction – Graphical Desktops – Web browsers – The Open Office Suite.

Introduction to Linux : Linux Distributions – Operating Systems and Linux – History of Linux and Unix – Linux Overview – Open Source Software – Online Linux Information Resources. Linux Shell and File Structure : The Command Line – Jobs:Background, Kills and Interruptions – Ending Processes: ps and kill – Linux Files – The File Structure – Listing, Displaying and Printing Files – Managing Directories – File and Directory Operations.

**UNIT II**

**(8 Hrs)**

MySQL Data types – Working with Database and Tables: Creating Databases, Selecting Database for use – Deleting Databases – Creating Tables – Copying Tables – Modifying Tables – Deleting Tables. Working with Data: Inserting, updating and deleting records – Retrieving records – Copying, Importing and Exporting records – Subqueries.

**UNIT III**

**(12 Hrs)**

PHP : Writing PHP Programs: Simple PHP program – Web communications – Using variables in PHP – Operators and Expressions. HTML Primer – Accessing PHP and HTML Data – Links – Query Strings – HTML (Web) forms. Decision, Loops and Arrays: Conditional or Branching statements - Loops and Arrays.

**UNIT IV**

**(10 Hrs)**

Writing User defined functions in PHP : The structure of functions – Switching functions - Scope of variables – Global and Local variables – Creating static function variables – Nesting - Recursion – The Include and Require statements. File and directory Handling: Working with files – Reading and writing characters in Files – Reading Entire files – Random Access to file data - Working with directories – Uploading Files.

**UNIT V**

**(12 Hrs)**

Connecting to MySQL from PHP – PHP MySQL Connectivity - Retrieving data from MySQL using PHP: Retrieving data using PHP- SQL statements for Retrieving data. Using

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PHP to manipulating MySQL: Inserting Records using PHP – Updating and deleting records in Tables – Working with Date and Time Type fields- Getting information on database tables.

### **TEXT BOOKS**

1. Paul Kavanagh, Open Source Software, Elsevier Digital Press, 2004, 1<sup>st</sup> Edition. (Unit I)
2. Linux : The Complete Reference, Richard Peterson, 6<sup>th</sup> Edition, McGraw-Hill,. (Unit I)
3. Vikram Vaswani, MySQL: The Complete Reference, Tata McGraw Hill, 2004. (Unit II)
4. Beginning PHP5, Dave Mercer et al., Wrox Press, 2004 ( Unit III, IV, V).
5. [www.spoken-tutorial.org/](http://www.spoken-tutorial.org/)

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Dr G R DAMODARAN COLLEGE OF SCIENCE (Autonomous), COIMBATORE - 14  
BCA

Effective from the academic year: 2019-2020

FOURTH SEMESTER

CORE: PYTHON PROGRAMMING

**Objective:**

The course is designed to provide an introduction to the Python programming language. The focus of the course is to provide students with an introduction to programming, , Install and run the Python interpreter - I/O – Tuples – Files using the Python programming language.

**Unit I**

(8 Hours)

**Introduction to Python:** Python - Features – Execution - Viewing the Byte Code - Flavors of Python - Python Virtual Machine (PVM) - Frozen Binaries - Memory Management in Python - Garbage Collection in Python - Comparisons between C and Python - Comparisons between Java and Python.

**Writing Our First Python Program:** Installing Python for Windows - Setting the Path to Python - Executing a Python Program.

**Unit II**

(8 Hours)

**Datatypes in Python:** Comments – Docstrings – Variables - Datatypes – Built-in datatypes - bool Datatype - Sequences – Sets - Literals – Characters – User defined Datatypes - Constants - Identifiers and Reserved words - Naming Conventions.

**Operators in Python:** Operator - Arithmetic - Assignment - Unary Minus - Relational - Logical - Boolean - Bitwise - Membership - Identity - Operator Precedence and Associativity.

**Input and Output:** Output statements - Input Statements - Command Line Argument.

**Unit III**

(12 Hours)

**Control Statements:** if - A Word on Indentation - if ... else - if ... elif ... else - while - for - Infinite - Nested - else - break - continue - pass - assert - return.

**Arrays in Python:** Array – Advantages – Creation - Importing the Array Module - Indexing and Slicing on Arrays - Processing the Arrays - Types of Arrays - Working with Arrays using numpy - Creating Arrays using array() - Creating Arrays using linspace - Creating Arrays using logspace - Creating Arrays using arange() – Function - Creating Arrays using zeros() and ones() Functions - Mathematical Operations on Arrays - Comparing - Aliasing - Viewing and Copying Arrays - Slicing and Indexing in numpy Arrays - Dimensions of Arrays - Attributes of an Array - Working with Multi-dimensional Arrays - Indexing in Multi-dimensional Arrays - Slicing the Multi-dimensional Arrays.

**Unit IV**

(12 Hours)

**Strings and Characters:** Creating Strings – String functions - String Testing Methods - Formatting the Strings - Working with Characters.

**Functions:** Difference between a Function and a Method - Defining and Calling a Function - Returning from a Function - Functions are First Class Objects - Pass by Object Reference –

Formal and Actual Arguments - Positional Arguments - Keyword Arguments - Default Arguments - Variable Length Arguments - Local and Global Variables - The Global Keyword

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- Passing a Group of Elements to a Function - Recursive Functions - Anonymous Functions or Lambdas - Function Decorators.

#### **Unit V**

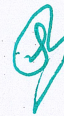
**(10 Hours)**

**Lists and Tuples:** List - Creating Lists using range() Function - Updating the Elements of a List - Concatenation of Two Lists - Repetition of Lists - Membership in Lists - Aliasing and Cloning Lists - Methods to Process Lists - Nested Lists - Nested Lists as Matrices. Tuples: Creating Tuples - Accessing the Tuple Elements - Basic Operations on Tuples - Functions to Process Tuples - Nested Tuples.

**Files:** Persistence - Opening files - Text files and lines - Reading files - Searching through a file - Using try, except, and open - Writing files.

#### **TEXT BOOKS:**

1. Dr. R. Nageswara Rao, "Core Python Programming", Dreamtech Press October 2016.
2. Python for Everybody, Exploring Data Using Python, Charles Severance, kindle Publication, 2016.



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**Dr G R DAMODARAN COLLEGE OF SCIENCE (Autonomous), COIMBATORE.**  
**BCA**  
**Effective from the academic batch: 2019 -2020**  
**FOURTH SEMESTER**

**ALLIED: UNDERWATER COMMUNICATIONS**

**Objective of the subject:** This paper covers the basic concepts of Under Water digital technology, underwater network communications and Software oriented Case studies.

**UNIT I:** (10 Hrs)

Underwater Acoustics: The Development – Exploring the Underwater Environment - Historical Highlights – The pioneers – Civilian developments – The Basic Oceanography – Depth variations. Outline of Underwater Applications: Military applications – Civilian applications.

**UNIT II:** (12 Hrs)

Underwater Networking Basics: Underwater Acoustic Infrastructure – Offshore Terrestrial Station - Radar Networks –Data Handling of an Underwater Network – Data Tabulation. Types of Signals – Acoustic Modem – Boosters – Antennas – Receivers – Surface Buoy – Gliders – Yatch/Sailing Boats - Networking of submarines. Underwater electro acoustic transducers –Transducer modeling and design – installation.

**UNIT III:** (10 Hrs)

Underwater Sensor Networks: Ocean Sampling Networks, Pollution Monitoring, Environmental Monitoring and Tactical surveillance systems, Major challenges in design of Underwater Sensor Networks - Factors that affect the UWSN-Sensor Node Architecture- GIBS, VRAP, DABSRAPT.

Underwater Communication Protocols: Routing Protocols – GPS. Autonomous Underwater Vehicles – Topologies – Servers and Databases - Network Coding – Security issues.

**UNIT IV:** (10 Hrs)

Water Column Applications: Navigation – Military applications – Fishery Acoustics – Physical Oceanography – Tsunami Applications - Underwater Intervention. Marine Animal Acoustics: Marine mammal bioacoustics Fish bioacoustics – Acoustic Pollution of the Ocean. Autonomous Underwater Vehicles.

**UNIT V:** (8 Hrs)

Case Study: Under Water Acoustic Software: AcTUP V2.2 L – Underwater Sound Recorder – SailTool Software – Sail Imaging Software.

**TEXT BOOKS:**

1. Introduction to Underwater Acoustics: Principles and Applications, Lurton and Xavier, Springer Publications, 2010.
2. Underwater Acoustic Sensor Networks, Yang Xiao, CRC Press Publications, 2016

**Web Resources :** Curtin University : <http://cmst.curtin.edu.au/products/underwater/>

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**BCA**

**Effective from the academic batch: 2019 -2020**

**FOURTH SEMESTER**

**CORE: OPEN SOURCE SOFTWARE LAB**

**Objective of the subject:**

This course brings in the knowledge of open source software and to implement various functions of PHP, MySQL and Python practically.

### **LINUX**

1. LINUX Basic commands

**Write programs using the following concepts.**

### **PYTHON**

2. Looping
3. Branching
4. Arrays
5. Functions
6. File Handling

### **PHP**

7. Looping
8. Branching
9. Arrays
10. User defined functions.

### **MySQL**

11. Simple Queries of DDL, DML and DCL. (MySQL Database).
12. Create a Dynamic Web page with PHP by accessing data from MySQL.

**Note:** Develop a project / case study using the above applicable concepts

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**Effective from the academic year: 2019-2020  
FIFTH SEMESTER**

**CORE: OBJECT ORIENTED ANALYSIS AND DESIGN**

**Objective of the subject:** This subject gives guidance on the construction of object oriented systems. It helps in understanding the fundamental concepts and notations of object oriented analysis and design.

**UNIT I**

**(10 Hrs)**

An Overview Of Object Oriented Systems Development : Object Basics: Object oriented philosophy – objects – classes – attributes - object behavior and methods -encapsulation and information hiding - class hierarchy – polymorphism - object relationships and associations - aggregations and object containment. Case study – object and identity - object persistence. Object oriented systems development life cycle: Software development process - building high quality software - use- case driven approach - reusability.

**UNIT II**

**(12 Hrs)**

Object Oriented Methodologies: Rumbaugh et al.'s object modeling technique - Booch methodology - Jacobson et al Methodologies – patterns - frameworks - the Unified Approach. Unified modeling language: Static and dynamic models - UML diagrams - UML class diagrams - use-case diagrams - UML dynamic modeling – packages - UML extensibility and UML Meta-Model.

**UNIT III**

**(10Hrs)**

Object Oriented Analysis process : Identifying use cases - Business object analysis - use-case driven object oriented analysis - business process modeling - Use-case model - Developing effective documentation . Classification - Classification theory - Noun Phrase approach - common class patterns approach - Use-case driven approach - classes, responsibilities, and collaborators - Naming classes.

**UNIT IV**

**(8 Hrs )**

Identifying Object Relationships, Attributes And Methods. Associations - Super-Subclass relationships - A-part of relationships - Class Responsibility - Object responsibility. The Object oriented design process and design axioms: Corollaries - Design patterns.

**UNIT V**

**(10 Hrs)**

Designing Classes, UML object constraint languages - Designing classes - Class visibility - Refining attributes - Designing methods and protocols - Packages and managing classes. Access Layer: Designing Access layer classes - View layer: User Interface design as a creative process - Designing view layer classes - Macro level process – Micro Level Process – The purpose of a view layer interface.

**TEXT BOOKS**

1. Object Oriented Systems Development using the Unified Modeling Language, Ali Bahrami, McGraw Hill, Publication, 1999, Reprint 2008.

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BCA**

**Effective from the academic year: 2019-2020**

**FIFTH SEMESTER**

**CORE: WEB DESIGN AND MARKUP LANGUAGE**

**Objective of the subject:** The goal of this course is to present an overview of the Internet as a global resource for the people and provides the basic knowledge for designing a web page or websites using HTML and XML. The concept of style sheets is also discussed for formatting the XML documents.

**UNIT I (8 Hrs)**

Getting started: Internet-Web Browser-Web Server-Designing the Web site-Creating a web page with HTML basics: Basic elements-lists.

**UNIT II (12 Hrs)**

Creating a web page with HTML Linking - Creating web page with HTML text formatting: text formatting and alignment- character styles-font and sizes-using colors for web-preformatted text-horizontal lines-line break-displaying special characters-Images in HTML-Tables.

**UNIT III (10 Hrs)**

Frames: Creating frames-attributes and linking-complex framesets-inline frames- Image maps-forms and CGI Scripts. DHTML - CSS.

**UNIT IV (10 Hrs)**

Introduction to XML-XML Basics: tag format-declaration-elements-attributes-comments-character entities-CDATA blocks-example document. Document Type Definition-XML Schema simple types- XML Schema complex types- XML namespaces.

**UNIT V (10 Hrs)**

XSL transformation-XPath language -Cascading Style Sheets-XLink and XPointer: Simple links-extended links-displaying the links-linking by element identity, position and hierarchy.

**TEXT BOOKS**

1. Web Publishing, Monica D' Souza, Jude D' Souza, Tata McGraw-Hill Publications, Edition 2001.
2. XML – How to Program, H.M. Deitel, J.M. Deitel, T.R. Nieto, T.M. Lin,P. Sadhu, Pearson Education, 2013.
3. XML in Easy Steps, Mike Mcgrath Dreamtech Press Publicatios, Reprint Edition 2012.

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BCA**

**Effective from the academic year: 2019-2020**

**FIFTH SEMESTER**

**CORE: SOFTWARE ENGINEERING**

**Objective of the subject:** This subject mainly concentrates on software engineering concepts along with some of the methodologies of Testing. This paper highlights on the characteristics of software, software evolution, software models, the various phases in software design and user interface design, different types of software testing techniques.

**UNIT I**

**(10 Hrs)**

**Introduction to software engineering:** The Evolving Role of software. Software. The changing nature of software. Legacy software. A Generic view of software: Software Engineering-A Layered Technology. A Process Framework. The Capability Maturity Model Integration (CMMI). Process Partners. Process Assignment. Personal and Team Process Models. Process Technology.

**UNIT II**

**(10 Hrs)**

**Process Models:** Prescriptive Models. The Waterfall Model. Incremental Process Model. Evolutionary Process Models. Specialized Process Models. The Unified Process.

**UNIT III**

**(10 Hrs)**

**An Agile View of Process:** Agility. Agile Process. Agile Process Models. Software Engineering Practice. Communication Practices. Planning Practices. Modeling Practices.

**UNIT IV**

**(10 Hrs)**

**Software Testing :** Creating an environment supportive for software testing: Minimizing risks – Writing a policy for software testing – Economics of Testing – Testing an Organizational issue – Management support for software testing – Building a Structures Approach to software testing – Developing a test strategy. Building the software testing process: Software Testing Guidelines – Workbench Concept – Customizing Software testing process.

**UNIT V**

**(10 Hrs)**

**The seven step testing process:** Overview of the software testing process: The cost of computer testing – The Seven step software testing process – Workbench Skills. **Organizing for testing :** Objective – Workbench – Input – Do procedures – Check Procedures – Output. **Developing the test plan:** Objective – Concerns - Workbench – Input – Do procedures – Check Procedures – Output. **Case Study :** Testing a Data warehouse – Testing Web based Systems.

**TEXT BOOKS**

1. Software Engineering –A Practitioner’s Approach. Roger S. Pressman, Tata McGraw-Hall Edition. Tenth Edition, 2013.
2. Software Engineering, Ian Sommerville, Pearson Education, Ninth Edition, 2011.
3. Effective Methods for Software Testing, William.E.Perry, 2006, Willey India, 3rd Edition.

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**Effective from the academic year: 2019-2020**

**FIFTH SEMESTER**

**CORE: .NET PROGRAMMING**

**Objective of the subject :** This subject highlights on Introduction to .NET Framework, .NET Languages, Introduction to VB.Net, Controls in VB.Net, Structure of ASP.NET ,Web Controls , State Management - Rich Text Controls . It also focuses on Data Source Binding and how to work with Data Grid.

**UNIT I (10 Hrs)**

Introducing the .NET Framework : The Evolution of Web Development – The .NET Framework - The Common Language Runtime - .NET Class Library - .NET Languages - Variables and Datatypes - Operations - Methods - Basics of Classes - Building a Basic Class - Passing Parameters by Reference and by Value - Understanding Namespaces and Assemblies.

**UNIT II (10 Hrs)**

Introduction to Visual Basic.Net : The Windows Graphical User Interface - The Object Model - The Three Step Process - The Visual Studio Environment - Writing the First Visual Basic program. Controls : Introducing Controls, Working with Multiple Controls, Designing Applications for User Convenience, Coding for Control - Data: Variables and Constants - Calculations - Formatting Data - Handling Exceptions - Displaying Messages in Message Boxes.

**UNIT III (10 Hrs)**

Developing ASP.NET Applications : Creating Websites - Anatomy of a Web Form - Visual Studio Debugging - Anatomy of an ASP.NET Applications - Introducing Server Controls - The Page Class - Application Events - ASP.NET Configuration. Web Controls : Stepping Up to Web Controls - The WebControl Base Class - Enumerations - List Controls - Table Controls - Web Control Events and AutoPostBack - Logging Exceptions - Page Tracing.

**UNIT IV (10 Hrs)**

Validation: The Validation Controls - Server-Side Validation - Client-Side Validation - Validating with Regular Expressions. Rich Controls: The Calendar - The AdRotator - Creating a Simple User Control - User Control Events - Website Navigation : Defining a Site Map - Binding an Ordinary Page & a Master Page to a Site Map - URL Mapping and Routing - Menu Styles - Menu Templates.

**UNIT V (10 Hrs)**

Working with Data : Understanding Databases - Configuring Database - SQL Basics - The Data Provider Model - Direct Data Access. Data Binding: Introducing Data Binding - Single-Value Data Binding - Repeated-Value Data Binding. The Data Controls: The GridView - Formatting the GridView - Sorting and Paging the GridView - Using GridView Templates.

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**TEXT BOOKS**

1. Programming in Visual Basic.Net, Julia Case Bradely, Anita C. Millspaugh ,Tata McGraw- Fifth Reprint ,2008
2. Beginning ASP.NET 4.0 in VB 2010, Matthew MacDonald, Apress, Berkeley, CA, USA, Second Edition, 2011.

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**BCA**  
**Effective from the academic year: 2019-2020**  
**FIFTH SEMESTER**  
**CORE: .NET PROGRAMMING AND WEB DESIGN LAB**

**Objective of the subject:**

This paper provides an experience on creating Windows application in VB.NET and Web application in ASP.NET. Demonstration of various controls such as Menus, Rich web controls, Validation Controls and interactive report generation are emphasized and introduces the concept of web designing.

**VB.NET:**

1. Create a login form to check the authentication of the user.
2. Design an application using basic controls.
3. Design a form to manipulate the dataset.
4. Generation of a Report from the database.

**ASP.NET:**

5. Create a Web Application for manipulation of Basic Web Controls
6. Create a Web Application for manipulating Rich Web Controls
7. Create a Web Application for the manipulation of Validation controls
8. Develop a Web application for database manipulation using SQL Server Database.

**WEB DESIGN:**

9. Design a web page with images, links and tables.
10. Design a web page using CSS.
11. Create a XML document for a database using DTD.
12. Design a XML Schema for a student database.

Note

Develop a project/case study using the above applicable concepts.

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**Effective from the academic year: 2018-19  
SIXTH SEMESTER**

**ELECTIVE I - INFORMATION SECURITY**

**Objective of the Subject:** This paper covers the concepts regarding to Security in Computing, network and software.

**Unit I**

**(10 Hrs)**

Introduction to computer security: Basic concepts, threat models common security goals. Cryptography and cryptographic protocols, including encryption, authentication, message authentication codes, hash functions, one-way functions, public-key cryptography, secure channels, zero knowledge in practice, cryptographic protocols and their integration into distributed systems and other applications.

**Unit II**

**(10 Hrs)**

Operating system security: Memory protection, access control, authorization, authenticating users, enforcement of security, security evaluation, trusted devices, digital rights management.

**Unit III**

**(10 Hrs)**

Network Security: Firewalls, intrusion detection systems, viruses and worms, web security. Case studies: DNS, IPsec.

**Unit IV**

**(10 Hrs)**

Software Security: Secure software engineering, defensive programming, buffer overruns and other implementation flaws.

**Unit V**

**(10 Hrs)**

Language-based security: Analysis of code for security errors, safe languages, and sand boxing techniques. Case Studies: Privacy, mobile code, digital rights management and copy protection, trusted devices, denial of service and availability, network based attacks, security and the law, electronic voting.

**TEXT BOOKS**

1. Charles P Pfleeger and Shari Lawrence Pfleeger, "Security in Computing", Fifth Edition, Prentice Hall, 2015.
2. Ross j. Anderson and Ross Anderson, "Security Engineering: A Guide to Building Dependable Distributed Systems", Willey, 2001.
3. Debby Russell and Sr.G.T.Gangemi, "Computer Security Basics(Paperback)", 2<sup>nd</sup> edition, O'Reilly Media, 2006.
4. Thomas R. Peltier and John Blackley, "Information Security Fundamentals", 2<sup>nd</sup> Edition, Prentice Hall, 1996.

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BCA**

**Effective from the academic year: 2019-2020**

**FIFTH SEMESTER**

**ELECTIVE I - DATA MINING**

**Objective of the subject:** This course covers introduction to data mining, data mining applications and various techniques used to discover knowledge from data.

**UNIT I**

**(10 Hrs)**

Introduction : What is data mining?- Motivating challenges – The origins of Data Mining – Data Mining Tasks - Data: Types of Data – Data Quality – Data Preprocessing - Measures of similarity and dissimilarity.

**UNIT II**

**(10 Hrs)**

Classification: General Approach to solving classification problem – Decision tree induction – Rule-Based classifier – Nearest Neighbor classifiers – Artificial Neural Network.

**UNIT III**

**(10 Hrs)**

Association Analysis: Problem definition – Frequent itemset generation – Rule generation – Compact representation of frequent itemsets – Alternative methods – FP-growth algorithm – Decision Trees – Construction Algorithms – Presorting.

**UNIT IV**

**(10 Hrs)**

Cluster Analysis: What is cluster analysis? – Different types of clustering – k-means algorithm – Hierarchical clustering – Density-based clustering – Grid-based clustering – Partitioning Algorithms – Categorical Clustering – k-Medoid Algorithms.

**UNIT V**

**(10 Hrs)**

Data Mining Applications: Text Mining – Multimedia Mining – Spatial Data Mining – Business Intelligence - Applications of Business Intelligence - Some open source tools for data mining: Weka – RapidMiner.

**TEXT BOOKS**

1. Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, Pearson Education, First Edition, 3<sup>rd</sup> impression 2009.
2. Arun K.Pujari, Data Mining Techniques, Universities Press, 2<sup>nd</sup> Edition, 2010.

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**Effective from the academic year: 2019-2020  
FIFTH SEMESTER**

**ELECTIVE I: ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS**

**Objective of the subject:** This subject helps in understanding the concepts and mechanisms of Artificial Intelligence which includes details about Search process, game playing, Knowledge Representation, Expert System.

**UNIT I**

**(10 Hrs)**

Introduction to Artificial Intelligence (AI): Computerized reasoning-Artificial Intelligence- Characteristics of an AI problem – Problems representation in AI- State space representation - Problem reduction

**UNIT II**

**(10 Hrs)**

Search process: AI and search process - Brute force search techniques, Hill climbing- best first - A\* algorithm - Beam search – Constraint satisfaction.

**UNIT III**

**(10 Hrs)**

AI and game playing – Major components of game playing program –Plausible move generator – Static evaluation – Function generator – Minimax Strategy –Alpha - Beta techniques- Problems on Computer game playing program.

**UNIT IV**

**(10 Hrs)**

Knowledge Representation: Logic, Propositional logic – Tautology – Contradiction and contingencies – Normal form – Predicate logic - Form-Rules of inference – Resolution - Unification algorithm.

**UNIT V**

**(10 Hrs)**

Introduction to Expert System: Definition – Characteristics, Architecture and descriptions of various modules. Knowledge engineering – Expert system life cycle – Difficulties in knowledge acquisition – Knowledge acquisition – Strategies – Expert systems – Major application areas. Qualitative study of Expert system like DENDRAL, MYCIN and R1.

**TEXT BOOKS**

1. Foundation of Artificial Intelligence & Expert System, K Sarukesi, V. Janakiraman, Macmillan Ltd, 2005
2. Artificial Intelligence, Elaine Rich, Kevin Knight, Shivashankar. B. Nair, Tata Mc-Graw Hill, 2010.

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FIFTH SEMESTER

ELECTIVE I: INTEGRATING SOA AND WEB SERVICES

**Objective of the subject:** The objective of the course is to highlight on Integration and realization of Service Oriented Architecture with Web Services. The syllabus also focuses on topics like SOA Governance, Business Process Management, Integration of SOA and Web Services.

**UNIT I :** (10 Hrs)

**Introduction to SOA and Web Services:** Evolution of SOA Web Services Service -Oriented Enterprise-Service Oriented Architecture-Understanding Web Services-Integrating Web Services with SOA.

**The Service Architecture:** SOA services-Service Lifecycle-SOA Models-Principles of SOA-SOA Mapping Components

**UNIT II :** (10 Hrs)

**SOA Governance:** Governance-Overview of SOA Governance-Organization of SOA Governance-Governance Policies-Governing Analysis Process-Governing Run-Time Behavior .

**UNIT III :** (10 Hrs)

**SOA and Business Process Management:** Business Process Management Concepts-Role of Business Process Management in SOA-Working with Dynamic BPM and SOA environment-Co-ordinating BPM, SOA and Web Services

**UNIT IV :** (10 Hrs)

**Web Service Architecture & its Specifications:** Application Components-Elements of Web Services-Web Service Models-REST Architecture.

**Web Service Protocols and Technologies:** XML-SOAP-WSDL-UDDI-ebXML

**UNIT V :** (10 Hrs)

**Integrating SOA and Web Services:** Overview of Integration-Design and development of SOA for integration-The role of XML and Web Services in SOA for integration-Building integration and interoperability using XML and Web Services-J2EE and .NET interoperability.

**TEXT BOOK**

1. N.Sudha Bhuvaneshwari and S.Sujatha, **Integrating SOA and Web Services**, River Publishers Series in Information Science and Technology, Denmark, First Edition, 2012.

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Effective from the academic year: 2019-2020  
FIFTH SEMESTER  
ELECTIVE I: CLOUD COMPUTING

**Objective of the subject:** The paper introduces cloud computing and makes students familiar with the concept of Cloud Computing. The paper includes the core issues of cloud computing, infrastructure and virtualization.

**UNIT I (10 Hrs)**  
First Drive: Introduction-Essentials-Benefits- Need for Cloud-Business and IT perspective- Cloud and Virtualization-Cloud Services Requirements-Cloud and Dynamic Infrastructure-Cloud Computing Characteristics-Cloud Adoption-Cloud Rudiments. Cloud Deployment Models-Introduction-Cloud Characteristics-Measures Service- Cloud Deployment Models-Security in Public Cloud-Public versus Private Cloud-Cloud Infrastructure Self-Service.

**UNIT-II (10 Hrs)**  
Cloud as a service: Introduction- Gamut of Cloud Solutions-Principal Technologies-Cloud Strategy- Cloud Design and Implementation Using SOA-Conceptual Cloud- Cloud Service Defined. Cloud Solutions: Introduction-Cloud Eco system-Cloud Business Process Management-Cloud Service Management-On-Premise Cloud Orchestration and Provisioning Engine-Computing on Demand(CoD)-Cloud sourcing.

**UNIT-III (10 Hrs)**  
Cloud offerings: Introduction-Information storage, Retrieval, Archive and Protection-Cloud Analytics-Testing Under cloud-Information Security-Virtual Desktop Infrastructure- Storage Cloud. Cloud Management: Introduction: Resiliency-Provisioning-Asset Management- Cloud Management-High availability and disaster recovery-Charging Models, Usage Reporting, Billing and Metering.

**UNIT-IV (10 Hrs)**  
Cloud virtualization technology-Virtualization defined-Virtualization Benefits-Server Virtualization- Virtualization for x86 Architecture-Hypervisor Management Software- Virtual Infrastructure Requirements.

**UNIT-V (10 Hrs)**  
Cloud Infrastructure: Introduction-Storage Virtualization-Storage Area Networks-Network Attached Storage-Cloud Server Virtualization- Networking Essential to Cloud. Application of Cloud in Remote Healthcare.

**TEXT BOOK**

1. Dr.Kumar Saurabh, **Cloud Computing**, Wiley India, 2<sup>nd</sup> Edition, 2012 Reprint.

**References:**

- <https://www.omicsonline.org/open-access/cloud-computing-and-healthcare-services-2155-6210-1000220.php?aid=79634>

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- <https://www.iiests.ac.in/index.php/iiest-research-highlights/5312-remote-health-a-framework-for-healthcare-services-using-mobile-and-sensor-cloud-technologies>
- <https://telemedicine.arizona.edu/blog/cloud-based-telehealth-defined-advantages-applications-and-security>

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**Effective from the academic year: 2019-2020  
FIFTH SEMESTER**

**Skill Based Subject: APTITUDE**

**Objective of the subject:** This subject highlights on improving the aptitude ability of the student and to understand technical and logical work outs like ratio and proportion, Profit and Loss, Probability, C Programming and OOPS concepts.

**UNIT I:**

**(6 Hrs)**

Operation on numbers: Introduction -Face value -Place value - BODMAS rule. Ratio and Proportion: Ratio -Proportion- Indices – Logarithms – Average - Simple Problems.

**UNIT II:**

**(6 Hrs)**

Problems on Ages: Problems on Ages – Clocks and Calendars – Mixtures and Alligations – Time and Work – Time and Distance. Profit and loss: Introduction – Cost price – Selling price – Profit and loss – Simple Problems.

**UNIT III:**

**(6 Hrs)**

Statistical description of data: Textual - Tabular and Diagrammatic representation of data – Data Sufficiency – Probability: Concept of percentage – Probability - Simple Problems

**UNIT IV:**

**(6 Hrs)**

Problem Solving techniques in C - Data types – Type casting – Bitwise Operators – Arithmetic expressions, Relational Operators - Logical Expressions - Functions and Parameter Passing by Value - Passing Arrays to Functions, Call by value - Call by Reference – Recursion -Structures and Pointers.

Object Oriented C++ - Classes – Objects – Object oriented Paradigms: Data Abstraction - Encapsulation – Inheritance – Polymorphism – Abstract Classes – Virtual classes

**UNIT V:**

**(6 Hrs)**

Java: Language Fundamentals, Operators and Assignments, Exceptions, Inner Classes, Garbage Collections, Java Packages, Inheritance, Interfaces, Java.util class, Java.io class, Threads.

Python: variables, expressions, math function, Function calls, Type conversion functions, Parameters and arguments, Debugging, Conditionals and recursion, Lists, Dictionaries, Strings, Tuples, files, Classes and Objects

**TEXT BOOKS**

1. Quantitative Aptitude, R.S.Aggarwal, S. Chand, 20th edition, 2013.
2. Quick Arithmetic, Ashish Aggarwal, S. Chand & Company Ltd, 2007.
3. C Programs with Solutions, S.Anadhamurugan, University Science Press, First Edition, 2011
4. Let us C++, Kanetkar, Yashavant P, BPB Publications, 2010.



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5. "The Java Complete Reference", Herbert Schildt, Tata McGrawHill, Publishers, 7<sup>th</sup> Edition, 2007.
6. "Think Python", Allen Downey, 2<sup>nd</sup> Edition, Green Tea Press, Massachusetts, 2012.

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**Dr G R DAMODARAN COLLEGE OF SCIENCE (Autonomous), COIMBATORE – 14  
BCA**

**Effective from the academic year: 2019-2020  
SIXTH SEMESTER**

**CORE: CYBER SECURITY**

**Objective of the subject:** This paper helps the students to understand the different types of Threats, Cyber Crimes, Cyber Risks and also discusses on the necessity of Threat Intelligence for a better Cyber Management and supportive Architecture.

**UNIT I**

**(10 Hrs)**

**Cyber Threats:** Cyber Security and its importance-Cyber Threats -Organized Crime - Proliferation of Weapons of Mass Destruction- Background, Sources and Types of Cyber Threats- Potential Risk factors of Cyber Threats- **Cyber Crime:** Overview-Origin and evolution of Cyber Crime-Criminalization-Cyber Crime Classifications-Conducting Cyber Investigations-Economical crisis - Challenges faced in Cyber Crimes.

**UNIT II**

**(8 Hrs)**

**Cyber Threat Intelligence-** An Overview of Threat Intelligence- Key Characteristics- Need for Threat Intelligence- Impact of Threat Intelligence-Applicability of Threat Intelligence. Threat Detection Rules -Risk Reduction through Threat Intelligence – Understanding and Implementing Threat Intelligence.

**UNIT III**

**(11 Hrs)**

**Cyber Management -Cyber Risk-** Analyzing and Managing Cyber Risks- Risk Management Principles: Principles of Risk Management-Risk Management Process- Dealing with Risks- Risk Analysis - Evaluating cyber risks: Assessing the IT security- Quantifying the Risks- Evaluation of the existing Insurance Policies-Improve security and overall Risk Strategy- Prepare your organization- Coverage Review- Benefits of Risk Management- Cyber Risk Management Frameworks-Governance of Cyber Security Risks.

**UNIT IV**

**(11 Hrs)**

**Cyber Security Challenges –Fundamentals-Evolution-Strategic Cyber Security-Preventing Cyber Attacks-Methods of Securing Next Generation Internet Services. Cyber Security Architecture-** Planning, Design and Implementation Issues of Security Architecture- Implementation Issues of the Security Architecture- Global Architectural Approach- Multifaceted Cyber Security.

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**UNIT V**

**(10 Hrs)**

**Cyber Defense Mechanisms-** Cyber Self Defense- Cyber Attack Techniques and Defense Mechanisms- Cyber Defense Planning Model- Cyber Supply Chain Security- DDOS Attacks and Cyber Defense: Securing Industrial Control Systems - Case Studies on Cyber Crime in Indian Perspective.

**TEXT BOOK**

1. Combating Cyber Threats through Cyber Security Intelligence, Dr.S.Sujatha, Dr.N.Sudha Bhuvanewari, Kalaikathir Publications, 2017.

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Dr G R DAMODARAN COLLEGE OF SCIENCE (Autonomous), COIMBATORE - 14  
BCA  
Effective from the academic year: 2019-2020  
SIXTH SEMESTER

**CORE: MOBILE APPLICATION DEVELOPMENT**

**Objective of the subject:** This paper deals with the Mobile Application Development in Android Operating System. The students will learn the User Interface design, the basic activities, creating the interfaces and Messaging.

**UNIT I (10 Hrs)**

**Getting Started with Android Programming:** Android: Versions-Features-Architecture-Android devices — Creating the First Android Application - Anatomy of an Android Application.

**UNIT II (10 Hrs)**

**Activities, Fragments and Intents:** Understanding Activities - Linking Activities Using Intents: Resolving Intent filter collision-Returning results from intent-Passing data using an Intent object- Calling Built-in Applications Using Intents - Displaying Notifications.

**UNIT III (10 Hrs)**

**Getting to know the Android User Interface:** Understanding the Components of a Screen: Views and View groups-linear-relative-Absolute-Table-Frame layouts-Scroll view -Adapting to display Orientation: Anchoring views-Resizing and Repositioning- Managing Changes to Screen Orientation.

**UNIT IV (10 Hrs)**

**Designing Your User Interface with Views:** Using Basic Views - Using Picker Views - Using List Views to Display Long Lists. **Data Persistence:** Saving and Loading User Preferences - Persisting Data to Files – Creating and Using Databases. **Content Providers:** Using a Content Provider - Creating Your Own Content Provider - Using the Content Provider.

**UNIT V (10 Hrs)**

**Messaging: SMS Messaging:** Sending SMS messages programmatically-Getting feedback after Sending a message-Sending SMS messages using Intent-Receiving SMS messages - Sending E-Mail. **Location-Based Services:** Displaying Maps - Getting Location Data.

**TEXT BOOK**

1. "Beginning ANDROID 4 Application Development" Wei-Meng Lee, Wiley Publications, 2015 Edition.
2. "Android A Programmer's Guide", Jerome (J.F.) DiMarzio, McGraw-Hill Education, 2008

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**BCA**  
**Effective from the academic year: 2019-2020**  
**SIXTH SEMESTER**

**CORE: MOBILE APPLICATION DEVELOPMENT LAB**

**Objective of the subject:** To develop User Interfaces, Activities and Views in the Android Operating System. It also highlights the location identification, SMS Messaging and e-mail.

**Implementation of the following programs in ANDROID Operating System.**

1. Write a program to implement the Activities.
2. Write a program to implement the Intent Filters.
3. Write a program to implement the User Interface.
4. Write a program to implement the Image Views.
5. Write a program to create a database to store the values.
6. Write a program to store the data in SD Card.
7. Write a program to implement the Content Providers.
8. Write a program to implement the SMS Messaging.

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BCA**

**Effective from the academic year: 2019-2020  
SIXTH SEMESTER**

**ELECTIVE II – MOBILE COMMUNICATIONS**

**Objective of the subject:** This paper orients wireless communication, Tele-communication systems, broadcast systems and Mobile IP.

**UNIT I (10 Hrs)**

Introduction-history of Wireless communication-Applications-Market for Mobile communications-Characteristics of Wireless Technologies-Cellular System infrastructure-A simplified reference model. Medium access control – Motivation for a specialized MAC-SDMA-FDMA-TDMA-CDMA.

**UNIT II (10 Hrs)**

Telecommunication systems – GSM-Mobile services-System architecture-Radio interface-Protocols-Localization and calling-Handover-Security-new data services-DECT-System architecture-Protocol architecture. Satellite systems – Applications-Basics-GEO-LEO-MEO-Routing-Localization-Handover.

**UNIT III (10 Hrs)**

Broadcast systems – Overview-Cyclical repetition of data-Digital audio broadcasting-Digital video broadcasting-Convergence of broadcasting and mobile communications. Wireless LAN- Introduction – Infrastructure and ad-hoc networks – IEEE 802.11- System architecture – Protocol architecture – Physical layer-Medium access control layer (Basic DFWMAC-DCF using CSMA/CA, MAC frames) –Bluetooth- User scenarios – Architecture.

**UNIT IV (9 Hrs)**

Mobile Network Layer - Mobile IP-Goals, assumptions and requirements-entities and terminology-IP Packet delivery-Agent Discovery-Registration-Tunneling and encapsulation-Optimizations-Reverse tunneling-IPV6-IP micro-Mobility support.

**UNIT V (11 Hrs)**

Mobile Transport Layer – Traditional TCP – Congestion control-Slow start-Fast retransmit-Implications of mobility-Classical TCP improvements-Indirect TCP-Snooping TCP-Mobile TCP-Fast retransmit/fast recovery-Transmission/time-out freezing-Selective retransmission-Transaction oriented TCP. Wireless application protocol (Architecture, Wireless datagram protocol, Wireless application environment, Wireless markup language) - imode technology.

**TEXT BOOK**

1. Mobile Communications, J. Schiller, Addison Wesley, Second Edition, 2011.

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BCA**

**Effective from the academic year: 2019-2020  
SIXTH SEMESTER**

**ELECTIVE II- NETWORK SECURITY**

**Objective of the subject:** This course content covers various risks involved with network computers. Topics like cryptographic algorithms, keys, architectures for implementing network security tools and techniques for protecting the network data are discussed.

**UNIT I** (10 Hrs)  
Computer Security Concepts- Security Attacks- Security Services- Security Mechanisms- A Model for Networking Security- Symmetric Encryption Principles- Cryptography- Cryptanalysis- Feistel Cipher Structure.

**UNIT II** (10 Hrs)  
Public-Key Cryptography- Approaches to Message Authentication- Secure Hash Functions- Message Authentication Codes- Public-Key Cryptography Principles- Digital Signatures.

**UNIT III** (10 Hrs)  
Network Security Applications- Key Distribution and User Authentication- Symmetric Key Distribution Using Symmetric Encryption- Key Distribution Using Asymmetric Encryption- Public-Key Infrastructure- Federated Identity Management.

**UNIT IV** (10 Hrs)  
Wireless Network Security- IEEE 802.11 Wireless LAN Overview- IEEE 802.11i Wireless LAN Security- IEEE 802.11i Services- IEEE 802.11i Phases of Operations. IP Security- IP Security Overview- IP Security Policy.

**UNIT V** (10 Hrs)  
System Security- Intruders- Intrusion Techniques- Intrusion Detection- Firewalls- Need for Firewalls- Firewall Characteristics- Types of Firewalls- Firewall Location and Configurations.

**TEXT BOOK**

1. Network Security Essentials (Application & Standard), William Stallings, Pearson Education, Fourth Edition, 2013.

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BCA**

**Effective from the academic year: 2019-2020  
SIXTH SEMESTER**

**ELECTIVE II – INTRODUCTION TO INTERNET OF THINGS**

**Objective of the subject:** This subject highlights on physical design, logic design, enabling technologies of IoT, IoT system management and design methodology, IoT physical devices and cloud offerings.

**UNIT I: (10 Hrs)**

Introduction to Internet of things: Introduction- Definition and Characteristics - Physical design of IOT-Logical design of IOT

**UNIT II: (10 Hrs)**

IOT Enabling Technologies-IOT Levels and Deployment templates – Domain Specific IOTs – Home Automation – Smart Cities – Agriculture.

**UNIT III: (10 Hrs)**

IOT Platforms Design Methodology – Purpose and Requirements Specification – Process Specification – Domain Model Specification – Information Model Specification – Service Specification – IoT Level Specification- Case Study on IoT System for Weather Monitoring.

**UNIT IV: (10 Hrs)**

IOT physical devices and Endpoints – IoT Device –Exemplary Device: Raspberry Pi – About the Board- Linux on Raspberry Pi - Raspberry Pi Interfaces – Serial – SPI – I2C.

**UNIT V: (10 Hrs)**

Case Studies illustrating IoT Design: Home Automation: Smart lighting- Cities : Smart Parking-Environment: Air pollution monitoring-Productivity application: IoT Printer.

**TEXT BOOK:**

1. Arshdeep Bahga ,Vijay Madiseti, Internet Of Things-A hands on approach, - 2014.

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BCA**

**Effective from the academic year: 2019-2020  
FIFTH SEMESTER**

**ELECTIVE II: ENTERPRISE RESOURCE PLANNING**

**Objective of the subject:** This paper concentrates on basic concepts of ERP, ERP and related technologies, implementing ERP, ERP in action, business modules and the ERP marketplace.

**UNIT I**

**(10 Hrs)**

Introduction : Enterprise –An Overview – Introduction to ERP – Basic ERP concepts - Justifying ERP investments – Risks of ERP - Benefits of ERP – Examples for Open, proprietary and In-house ERPs.

**UNIT II**

**(10 Hrs)**

ERP and Technology: ERP and related technologies – Business process reengineering – Data warehousing – Data mining – On-line analytical processing – Product life cycle management – customer relationship management – Selection of ERP for an organization.

**UNIT III**

**(10 Hrs)**

ERP Implementation : To be or not to be – Implementation challenges – Implementation life cycle – Implementation methodologies – ERP project teams – Vendors and Consultants – Contracts with Vendors , Consultants and Employees – Training and education – Key success factors of ERP.

**UNIT IV**

**(10 Hrs)**

The Business Modules : Business Modules of an ERP Package – Finance – Manufacturing – Human Resources – Plant Maintenance – Materials Management – Quality Management – Marketing – Sales, Distribution and service.

**UNIT V**

**(10 Hrs)**

The ERP Market: ERP market place and marketplace dynamics - SAP AG – Oracle Corporation – PeopleSoft - JD Edwards – QAD Inc – SSA Global – Open ERP.

**TEXT BOOK**

1. ERP Demystified, Alexis Leon, Tata McGraw - Hill Publishing Company, Second Edition, Eighth Reprint, 2010.

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BCA**

**Effective from the academic year: 2019-2020  
SIXTH SEMESTER**

**ELECTIVE II: AIR AND SEA NAVIGATION**

**Objective of the Subject:** This course is designed to introduce the computing technologies used for Air and Sea Navigation. The fundamentals, key terms and equipments used for the navigations purposes are discussed.

**UNIT I:**

**(10 Hrs)**

Air Navigation: Navigation Aids – Distance Measuring Equipments (DME) – LORAN - Doppler RADAR – GPS. Aeronautical lighting and other Airport Visual Aids: Approach Light Systems – Runway Edge Light Systems – Control of Lighting Systems - Air Space: General Dimensions of Airspace Segments – Transient Speed Control-Descent gradient - Wind Direction. Air Traffic Control: Air Route Traffic Control Centers – Control Towers.

**UNIT II:**

**(10 Hrs)**

Emergency Procedures: Pilot Responsibility and Authority -Emergency Conditions –Distress Signals – Safety of the Flight: Weather Observing Program – Medical Facts for Pilots: Fitness for flight – Vision in flight –Dynamics of the Helicopter - Helicopter Operations: Helicopter Flight control systems.

**UNIT III:**

**(10 Hrs)**

Fundamentals: Introduction to Marine Navigation – Nautical Charts: Chart fundamentals – Piloting: Definition and Purpose - Preparation – Transition to Piloting - Short Range aids to Navigation: Fixed Lights – Light Characteristics – Buoyage Systems – Compasses – Magnetics Compasses - Tides and Tidal Currents: Origins of Tides – Features of Tides

**UNIT IV:**

**(10 Hrs)**

Emergency Navigations: Basic Techniques -Navigation Regulations: Ship Routing –Avoiding rock collisions - Maritime Safety Systems - Global Maritime Distress and Safety System - Distress Signals. Hydrography: Basics of Hydrographic Surveying. Weather Elements: General Description of the Atmosphere.

**UNIT V:**

**(10 Hrs)**

Satellite Navigation: The Global Position System – LORAN Navigation: Introduction to LORAN – LORAN Description – RADAR Navigation: Principles of RADAR operations. Navigational Astronomy: The Universe – AZIMUTHS and AMPLITUDES

**TEXT BOOKS**

1. Nathaniel Bowditch, LL.D, “The American Practical Navigator : The Epitome of Navigation”, The National Imagery and Mapping Agency, 2002.
2. Jim Doherty, “Maritime Navigation”, Trieste, Italy, 2010(Online Tutorial)
3. Professor Dr. Paul Stephen Dempsey, Director, Institute of Air & Space. “Air Navigation”, McGill University, [www.iasl.mcgill.ca](http://www.iasl.mcgill.ca) (online Tutorial)
4. Aeronautical Information Manual, Official Guide to Basic Flight Information and ATC Procedures, US Department of Transportation, Federal Aviation Administration, 2017.

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**BCA**  
**Effective from the academic year: 2019-2020**  
**SIXTH SEMESTER**

**Skill Based Subject: SOFT SKILLS**

**Objective of the subject:** This course content guides and helps students to concentrate on career planning, group discussion, art of listening skill, art of speaking skill, body language, team building and team work, etiquette, manners, CV writing, interview skills, and dress code.

**UNIT I**

**(6 Hrs)**

Soft skills: Introduction – Importance of Soft Skills – Attributes Regarded as Soft Skills – Practicing Soft Skills – Know Thyself / Self Discovery: Importance of Knowing Yourself – Process of Knowing Yourself – Developing Positive Attitude .

**UNIT II**

**(6 Hrs)**

Forming Values: Meaning – What is a value? - Values Relating to Education – Values Relating to Self and Others- Important of Values – Types of Values: Terminal and Instrumental values, Power of Values – Examples for Values. Career Planning: Guidelines for Choosing a Career – Myths about Choosing a Career – Tips for Successful Career Planning.

**UNIT III**

**(6 Hrs)**

Art of Listening: What is listening? – Benefits of Active Listening – Kinds of Listening – Art of Reading: Benefits of Reading – Different Types of Reading – The SQ3R Technique – Art of Speaking: Defining Communication – Special Features of Communication – Importance of Communication – Tips for Effective Communication.

**UNIT IV**

**(6 Hrs)**

Body Language: Forms of Body Language – Parts of Body Language – Types of Body Language - Team Building and Teamwork: Aspects of Team Building – Skills Needed for Teamwork – A Model of Team Building - Team Vs Group - Characteristics of Effective Team – Role of a Team Leader – Role of Team Members - Group Discussion(GD): Meaning of GD – Skills Required in a GD – Essential Elements of GD.

**UNIT V**

**(6 Hrs)**

Etiquette and Manners: Introduction – Classification of Etiquette – Manners: Introduction – Why Should You Practice Good Manners? - Preparing CV/Resume: Meaning – Types of Resumes – CV Writing Tips – Interview Skills: Types of Interview – Types of Questions Asked – Dress Code at Interview.

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**TEXT BOOK**

1. Dr. K. Alex, "Soft Skills Know yourself & Know the world", S.Chand & Company Ltd, 2009.

**RERENCE BOOK**

- Gopalswamy Ramesh, Mahadevan Ramesh, The ACE of Soft Skills: Attitude, Communication, and Etiquette for Success, 1st Edition, Kindle Edition, *Pearson Education*, 2010.

