



MANONMANIAM SUNDARANAR UNIVERISTY,  
TIRUNELVELI-12

## SYLLABUS

### UG - COURSES – AFFILIATED COLLEGES

Course Structure for BCA (Choice Based Credit System)

(with effect from the academic year 2021-2022 onwards )



| Semester-VI |                    |  |              |        |
|-------------|--------------------|--|--------------|--------|
| Part        | Subject Status     | Subject Title  | Subject Code | Credit |
| III         | CORE               | CLOUD COMPUTING  | CMCA61       | 4      |
| III         | CORE               | DATA COMMUNICATIONS AND NETWORKING   | CMCA62       | 4      |
| III         | CORE               | VB.NET   | CMCA63       | 4      |
| III         | Major Practical VI | VB.NET LAB   | CMCAP6       | 2      |
| III         | Major Elective II  | COMPUTER GRAPHICS/<br>WEB SERVICES/<br>SOFTWARE PROJECT MANAGEMENT/<br>ARTIFICIAL INTELLIGENCE | CECA61       | 4      |
| III         | Project            | MAJOR PROJECT –(GROUP)   | CMCA6P       | 7      |
|             | Nan Muthalvan      | PBL ANDROID APP DEVELOPMENT  |              |        |



**Total Marks: 100 Internal Exam: 25 marks + External Exam: 75 marks**

**A. Scheme for internal Assessment:**

Maximum marks for written test: **20 marks**

**3 internal tests**, each of **1 hour** duration shall be conducted every semester.

To the average of the **best two** written examinations must be added the marks scored in. The **assignment** for 5 marks.

The break up for internal assessment shall be:

Written test- 20 marks; Assignment -5 marks Total - 25 marks

**B. Scheme of External Examination**

**3 hrs.** examination at the end of the semester

A – Part : 1 mark question two - from each unit

B – Part : 5 marks question one - from each unit

C – Part : 8 marks question one - from each unit

➤ **Conversion of Marks into Grade Points and Letter Grades**

| S.No | Marks  | Letter Grade | Grade (GP) | point | Performance   |
|------|--------|--------------|------------|-------|---------------|
| 1    | 90-100 | O            | 10         |       | Outstanding   |
| 2    | 80-89  | A+           | 9          |       | Excellent     |
| 3    | 70-79  | A            | 8          |       | Very Good     |
| 4    | 60-69  | B+           | 7          |       | Good          |
| 5    | 50-59  | B            | 6          |       | Above Average |
| 6    | 40-49  | C            | 5          |       | Pass          |
| 7    | 0-39   | RA           | -          |       | Reappear      |
| 8    | 0      | AA           | -          |       | Absent        |

➤ **Cumulative Grade Point Average (CGPA)**

$$CGPA = \frac{\Sigma (GP \times C)}{\Sigma C}$$

- **GP** = Grade point, **C** = Credit
- CGPA is calculated only for Part-III courses
- CGPA for a semester is awarded on cumulative basis

➤ **Classification**

- First Class with Distinction : CGPA  $\geq$  7.5\*
- First Class : CGPA  $\geq$  6.0
- Second Class : CGPA  $\geq$  5.0 and  $<$  6.0
- Third Class : CGPA  $<$  5.0



# Cloud Computing

## Course Objectives:

- To study the basics of cloud computing and different Cloud Computing services
- To understand the key concepts of virtualization, Cloud Implementation, Programming and Mobile cloud computing

## Course Prerequisites:

- Basic knowledge of programming, operating systems, databases and networking is recommended

## Course Outcomes (COs):

Upon completion of the course, the students should be able to:

- CO1: Understand the basics of Cloud Computing
- CO2: Comprehend the concepts of Virtualization and the design of Cloud Services
- CO3: Classify appropriate techniques and tools to develop Cloud applications
- CO4: Apply the knowledge of Python for Cloud Services
- CO5: Develop the security architecture for a Cloud environment

## UNIT I: CLOUD COMPUTING FOUNDATION

Introduction to Cloud Computing - Cloud Computing Basics - History of Cloud Computing - Importance of Cloud Computing - Characteristics - Move to Cloud Computing: Pros and Cons of Cloud Computing - Nature of the Cloud - Technologies in Cloud Computing - Migrating into the Cloud - Seven-step Model. Types of Cloud - Cloud Infrastructure - Cloud Application Architecture. Working of Cloud Computing: Trends in Computing - Cloud Service Models - Cloud Deployment Models

## Unit II: CLOUD COMPUTING ARCHITECTURE

Cloud Computing Technology: Cloud Lifecycle Model - Role of Cloud Modeling and Architecture - Reference Model for Cloud Computing-Cloud Industry Standard. Cloud Architecture: Developing Holistic Cloud Computing Reference Model - Cloud System Architecture. Cloud Modelling and Design: Basic Principles - Model for Federated Cloud Computing- Cloud Eco System - Cloud Governance.

## Unit III: VIRTUALIZATION

Definition of Virtualization - Adopting Virtualization -Types of Virtualization - Virtualization Architecture and Software - Virtual Clustering - Introduction to Cluster - Virtualization Application - Pitfalls of Virtualization. Grid, Cloud and Virtualization: Virtualization in Grid - Virtualization in Cloud. Virtualization and Cloud Computing :



Anatomy of Cloud Infrastructure - Anatomy of Cloud Computing - Virtual Infrastructures - CPU Virtualization - Network and Storage Virtualization

#### **Unit IV: DATA STORAGE AND SECURITY**

Data Storage: Introduction to Enterprise Data Storage - Data Storage Management - File Systems - Cloud Data Stores - Using Grids for Data Storage. Cloud Storage: Overview of Cloud Storage - Data Management for Cloud Storage - Provisioning Cloud Storage - Data-intensive Technologies for Cloud Computing. Risks in Cloud Computing: Introduction - Risk Management - Cloud Impact - Enterprise Wide Risk Management - Types of Risks in Cloud Computing . Data Security in Cloud: Introduction - Current State - Homo Sapiens and Digital Information - Cloud, Digital Persona and Data Security - Content Level Security (CLS).

#### **Unit V: CLOUD COMPUTING SERVICES**

Cloud Services: Cloud Types and Services - Software as a Service (SaaS) - Platform as a Service (PaaS)- Infrastructure as a Service (IaaS) - Other Clouds Services . Cloud Computing at Work: Cloud Service Development Tool - Management/Administrative Services. Tools and Technologies for Cloud - Parallel Computing -Cloud Computing Application Platform - Cloud Computing Platform - Tools for Building Cloud - Programming in Cloud. Cloud Tools: VMWare – Eucalyptus – CloudSim – OpenNebula – Nimbus - Microsoft Cloud Service: Windows Azure Platform - Google Cloud Applications - Amazon Cloud Services

#### **Reference Books:**

1. Srinivasan.A, J.Suresh , —Cloud Computing: A Practical Approach For Learning And Implementation, Pearson Education India, 2014.
2. Barrie Sosinsky, —Cloud Computing Bible, New Delhi: Wiley India Pvt. Ltd, 2012.
3. Buyya, Vecciola and Selvi, —Mastering Cloud Computing: Foundations and Applications Programming, Tata McGraw Hill, 2013.

## **Data Communications and Networking**

#### **Course Objectives:**

- To understand the concept of Computer network.
- To impart knowledge about networking and internetworking devices.
- To be familiar with the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks.

#### **Course Prerequisites:**

- basic knowledge on computer connectivity and connectivity peripherals



**Course Outcomes (COs):**

Upon completion of the course, the students should be able to:

- CO1:Remember the organization of computer networks, factors influencing computer network development and the reasons for having variety of different types of networks.
- CO2:Understand Internet structure and can see how standard problems are solved
- CO3:Apply knowledge of different techniques of error detection and correction
- CO4:Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies
- CO5:Knowledge about different computer networks, reference models and the functions of each layer in the models

**UNIT – 1**

**Introduction:** Data Communications, Networks, Protocols and Standards. Basic Concepts: Line Configuration, Topology, Transmission mode, Categories of Networks.OSI Model: Layered architecture, Functions of the layers, TCP/IP Protocol suite

**UNIT – 2**

**Signals:** Analog and digital, periodic and aperiodic signals, analog signals, Digital signals. Transmission media: Guided media, unguided media. Multiplexing: FDM, WDM, TDM, Multiplexing Application-The Telephone system.LAN: Project, Ethernet, Other Ethernet networks, Token bus, Token Ring, FDDI, Comparison

**UNIT – 3**

**Switching:** Circuit Switching, Packet Switching, Message Switching. ISDN: Services, ISDN Layers, Broadband ISDN. Frame Relay: Introduction, operation, Congestion control. ATM: ATM Layers applications. SONET: physical configuration, SONET layers, Applications

**UNIT - 4**

**Networking and internetworking devices:** Repeaters, Bridges, Routers, Gateways, other devices, Routing algorithms, Distance vector routing, link state routing. Transport layer: Duties, Connection TCP/IP Protocol suite: Overview of TCP/IP: Internet protocol, Addressing, Subnetting.

**UNIT – 5**

**Other protocols in the network layer:** ARP, RARP, ICMP, IGMP Transport layer:



TCP UDP TCP/IP Protocol suite: Application layer: Client server model, BOOTP, DHCP DNS, FTP, SMTP, WWW and HTTP.

**Reference Books:**

1. Data Communication & Networking - Behouuz A. Forouzan, 2nd Edition Tata McGraw-Hill Edition
2. Computer Networks A.S Tanenbaum, Pearson Education
3. Data and Computer communications Seventh edition William Stallings PHI

## **VB.Net**

**Course Objectives:**

- To understand the concept of Dot net programming.
- To impart knowledge about given problem and design solutions using VB.NET.
- Illustrate various Data base concepts using ADO dot Net.

**Course Prerequisites:**

- Basic knowledge of web application and any existing object-oriented programming languages like C++ or C# is recommended

**Course Outcomes (COs):**

Upon completion of the course, the students should be able to:

- CO1:Understanding the basic concepts of visual programming
- CO2:Able to Design simple applications using VB.Net
- CO3:Apply knowledge and Work with GUI applications
- CO4:Understand database applications
- CO5:Develop creative windows applications

### **UNIT I**

VB.NET 2005 Training: The .NET Framework Architecture Part 2-Introducing Windows Forms- Implementing Class Library Object in VB.NET 2005 -Introduction and Implementing Inheritance in VB.NET 2005- Visual Studio.NET Namespaces.

### **UNIT II**

Windows Designing a Form using Forms Designer Window-Exploring the Forms Designer generated code-Using Application Class and Message Class-Setting and Adding Properties to a Windows Form - Event Handling In Visual Basic .NET 2005.



**UNIT III**

Building graphical interface elements-Adding Controls -Common Controls and Handling Control Events-Dialog Boxes in Visual Basic .NET 2005 -Common Windows Forms Controls Section-DomainUpDown and NumericUpDown -Creating Menu and Menu Items-Creating Multiple-Document Interface (MDI) Applications Validation-Exceptions.

**UNIT IV**

Creating and Managing Components Section-Creating and Managing .NET Assemblies-Simple Data Binding-Complex Data Binding-Using the Data Form Wizard-Access and Manipulate Data - The ADO .NET Object Model-Access and Manipulate Data - Using DataSets-Using XML Data.

**UNIT V**

Finding and Sorting Data in DataSets-Editing Data With ADO .NET-Web Services - SOAP, WSDL, Disco and UDDI-Instantiating - Invoking Web Services, Creating Proxy Classes with WSDL-Creating Web Service Project.

**Reference Books:**

1. Programming Visual Basic .NET, Dave Grundgeiger, 2008.
2. Beginning VB.Net, Richard Blaire, Jonathan Crossland, Mathew Renolds, 2nd Edition, 2008.
3. Programming VB.Net, Garry Cornell, Jonathan Morrison, APress Publications, 2007.

**VB.Net LAB****Course Outline**

1. Write a program to count number of times the click event occurs
2. Write a program using image lists
3. Write a program using rich textbox control
4. Write a program using Menus and Built-In Dialogs
5. Write a program using Exception Handling
6. Write a program using function
7. Write a program deploying Polymorphism using VB.NET
8. Write a program developing Inheritance using VB.NET
9. Create a Simple web application
10. Create a web application using Validation Controls
11. Write a program using Page Redirection Concept
12. Create Student Information System
13. Create a program using Data Grid control



# COMPUTER GRAPHICS

## COURSE OBJECTIVES:

- To study various graphical Input and Output devices.
- To study how to manipulate graphics object by applying different transformations.
- To study different algorithms for drawing lines, ellipse, circle parabola etc.

## COURSE OUTCOMES:

- Understand the structure of modern computer graphics systems.
- Understand the basic principles of implementing computer graphics primitives.
- Develop design and problem-solving skills with application to compute graphics.

## UNIT – 1 INPUT AND OUTPUT DEVICES

Introduction: Application and Operations of Computer Graphics - Graphics Packages – Requirements of a Graphical System – GUI. Common Input Devices – Graphical output Devices Raster Scan Video Principle - Raster Scan CRT Monitors – Color Raster Scan System – Plasma Display – LCD – Hard copy Raster Devices - Raster Scan System – Memory Tube Displays – Plotters – Graphics Accelerators – Coprocessors.

## UNIT – 2 ALGORITHMS

Scan Conversion – Methods – Polynomial Method – DDA algorithms for line drawing Algorithm, Circle, Ellipse, Parabola – Bresenham's Line Drawing Algorithm – Bresenham's Circle Drawing Algorithm – Problem of Scan Conversion – Solid Areas – Odd Even Methods – Winding Number Method - Solid Area Filling – Algorithms – Boundary, Flood Fill Algorithm.

## UNIT – 3 TRANSFORMATION

Two Dimension Transformations – Translation – Scaling – Rotation – Transformations of Points and Objects – Homogenous Coordinate System and Transformations – Reflection – Shearing – Three Dimension Transformations - Translation – Scaling – Rotation – Reflection – Shearing.

## UNIT - 4 CLIPPING ALGORITHMS

2D Viewing and Clipping – Windows and View Ports – Viewing Transformations – Clipping of lines in 2D – Cohen Sutherland Clipping Algorithms – Visibility – Midpoint subdivision method – parametric Clipping – Polygon Clipping – Sutherland Hodgeman Algorithm – Clipping against Concave windows.

## UNIT V HIDDEN SURFACE ALGORITHMS

Hidden Surface Elimination – Black Face Removable Algorithm Z buffer Algorithm.

## TEXT BOOK:

1. Computer Graphics Multimedia and Animation – Malay K. Pakira – PHI Learning 2008.

## REFERENCE BOOK:

1. Computer Graphics – Apurva Desai – PHI – 2008.





2. PrabhatAndleigh, KiranThakrar – Multimedia system and Design – Prentice Hall2000.

## **WEB SERVICES**

### **COURSE OBJECTIVES**

- To study XML Technologies & XML Applications.
- To study service-Oriented Architecture (SOA) and Application Integration.
- To study services such as. XML,SOAP

### **COURSE OUTCOMES:**

- To create secured Web services.
- Develop Web services using a variety of advanced computer languages and applications.
- Create, develop, and test Web services including a mobile application.

### **UNIT– 1 INTRODUCTION TO WEB SERVICES**

Industry standards, Technologies and Concepts underlying Web Services – their support to Web Services – Applications that consume Web Services.

### **UNIT – 2 XML**

XML – its choice for Web Services – Network protocols to backend databases – Technologies – SOAP, WSDL – exchange of information between applications in distributed environment – Locating remote Web Services – its access and usage, UDI specification –and Introduction.

### **UNIT – 3 WEB SERVICES**

A brief outline of web services – conversation – static and interactive aspects of system interface and its implementation, work flow – Orchestration and refinement, Transactions , Security issues – the common attacks – security attacks facilitated within web services quality of services – Architecting of systems to meet users requirement with respect to latency, performance, reliability, QOS metrics, Mobile and wireless services – energy consumption, network band width utilization, portals and services management.

### **UNIT – 4 WEB APPLICATIONS**

Building real world enterprise application using web services – sample source codes to develop web services – steps necessary to build and deploy web services and client applications to meet customer’s requirement – Easier development, customization, maintenance, transactional requirements, seamless porting to multiple devices and platforms.



## UNIT - 5 WEB DEVELOPMENT

Development of Web Services and applications onto tomcat application server and Axis SOAP server (both are free wares) - Web Services Platform as a set of enabling technologies for XML based distributed computing.

### REFERENCE BOOKS:

1. Developing Enterprise Web Services: An Architects Guide – Sandeep Chatterjee, James Webber, Prentice Hall,2003.
2. NET web services, Architecture and Implementation with .Net - Keith Ballinger, Pearson Education, First Edition 2003.
3. Developing Java Web Services: Architecting and developing secure web services using Java - Ramesh Nagappan, John Wiley and Sons, first edition, 2003.
4. Executive Guide to Web Services - Eric A marks and Mark J Werrell, John Wiley and sons, 2003.
5. Web Services: A managers Guide - Anne Thomas Manes, Addison Wesley, 2003
6. Web Services – An Introduction – B.V.Kumar, S.V.Subrahmanya, Tata McGraw-Hill Publishing Company Limited, 2004.

## SOFTWARE PROJECT MANAGEMENT

### Course Objectives:

- To outline the need for Software Project Management.
- To highlight different technique for software cost estimation and activity planning.
- To know about what is Software Project Management.

### Course Outcomes:

- Employ Analytical and Modern project development methodology for the process of project management in delivering successful Real time IT projects.
- Evaluate a project to develop the scope of work, provide accurate cost estimates, software development size, effort, and schedule and network diagram for new program proposals or enhancements to existing Software.
- Understanding and using the risk management analysis techniques that identify the factors that put a project at risk and to quantify the likely



effect of risk on project timescales.

- Identifying the resources required for a project and to produce a work plan and resource Schedule.

### **UNIT - 1 CONVENTIONAL SOFTWARE MANAGEMENT**

Waterfall Model - Conventional Software Management Performance – Evolution of Software economics - Software economics – Pragmatic software cost estimation – Improving software economics – Reducing software product size – Improving software process – Team effectiveness – Automation through software environments.

### **UNIT - 2 VARIOUS STAGES**

Lift cycle phases – Engineering and Production stages – Inception, Elaboration, Construction and Transition Phases – Artifacts of the process – The artifact sets – Management, Engineering and Pragmatic artifacts – Model based software architectures.

### **UNIT – 3 WORKFLOWS OF THE PROCESS**

Workflows of the process – Software process Workflows – Iteration Workflows – Iterative process planning – work breakdown structures – Planning guidelines – cost & schedule estimation process – iteration planning process – pragmatic planning – Project Organizations & responsibilities.

### **UNIT – 4 VARIOUS PROCESSES**

Process automation – Tools – The project environment – Project control and Process Instrumentation – The seven-core metrics – Management indicators – Quality indicators – Life cycle expectations – Pragmatic software metrics – Metrics automation – Tailoring the Process – Process discriminates.

### **UNIT - 5 MODERN PROJECT PROFILE**

Continuous Integration – Early risk resolution – Evolutionary requirements – software management Principles Next generation software economics – Modern Process transitions.

### **TEXT BOOKS:**

1. Software Project Management - Walker Royce, Pearson Education,2012.
2. Software Project Management - Bob Hughes and Mike Cotterell, Tata McGrawHill,2011.
3. Software Project Management in practice –Pankaj Jalote, Pearson Education,2012.



# ARTIFICIAL INTELLIGENCE

## Course Objectives:

- To introduce the basic principles, techniques, and applications of Artificial Intelligence.
- Emphasis will be placed on the teaching of these fundamentals, not on providing a mastery of specific software tools or programming environments.
- Assigned projects promote a ‘hands-on’ approach for understanding, as well as a challenging avenue for exploration and creativity.

## Course Outcomes:

- Knowledge of what constitutes "Artificial" Intelligence and how to identify systems with Artificial Intelligence.
- Explain how Artificial Intelligence enables capabilities that are beyond conventional technology, for example, chess-playing computers, self-driving cars, robotic vacuum cleaners.
- Ability to apply Artificial Intelligence techniques for problem solving.

## UNIT – 1 PROBLEM, PROBLEM SPACES AND SEARCH

What is AI? – AI Problems – What is an AI technique – Defining the problem as a state space search – Production system - Production system – Characteristics – Problem Characteristics.

## UNIT – 2 HEURISTIC SEARCH TECHNIQUES

Generate and test – Hill Climbing – Best First Search – Problem Reduction – Constraints satisfaction – Means end analysis.

## UNIT – 3 KNOWLEDGE REPRESENTATION

Representations and Mappings – Approaches to Knowledge Representation. Using predicate Logic: Representing simple facts in logic – Computable functions and prediction – Resolution – The basic of resolution – Resolution in Propositional Logic – The Unification algorithm – Resolution in Predicate Logic.

## UNIT – 4 REPRESENTING KNOWLEDGE USING RULES

Procedural versus – Declarative Knowledge – logic Programming – Forward versus Backward Reasoning–Matching.

## UNIT – 5 GAME PLAYING

The Minimax search procedure – Adding Alpha Beta cut offs – Addition Refinements – Waiting for Quiescence – Secondary Searches – Using Book moves.

### TEXT BOOKS:

1. Artificial Intelligence – Elaine Rich, Kevin Knight & Shiv shankar, Tata McGraw Hill, 2008.
2. Artificial Intelligence and Intelligent Systems –N.P.Padhy, 2005.

### REFERENCE BOOKS:

1. Artificial Intelligence: A modern approach - Stuart Jonathan, Russell, Pearson, 2019
2. Introduction to Artificial Intelligence - Rajendra, Akerkar, PHI, 2014.

