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/Web Services/Software Project Management/ Artificial Intelligence	CECA61	4
III	Project	Major Project –(group)	CMCA6P	7

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 **I 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 point (GP)	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)**

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

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

- **Classification**
  a) First Class with Distinction : CGPA $\geq$ 7.5*****
  b) First Class : CGPA $\geq$ 6.0
  c) Second Class : CGPA $\geq$ 5.0 and $<$ 6.0
  d) 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 - Behuouz 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 OBJECTIVIES:

- 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‘sLineDrawingAlgorithm-Bresenham‘sCircleDrawing 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 SURFACEALGORITHMS

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.

ARTIFICAL 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.