KURUKSHETRA UNIVERSITY, KURUKSHETRA

NAME OF THE PROGRAMME : BACHELOR OF COMPUTER APPLICATIONS - CLOUD TECHNOLOGY AND INFORMATION SECURITY (BCA- CTIS)

(TO BE IMPLEMENTED W.E.F. 2023-24)

DURATION : THREE YEARS

Semester	Course	Paper Code	Nomenclature of Paper	Work load/ hour/ week	Exam Time (Hrs)	Internal Marks		External Marks		Total Marks
						Max	Pass	Max	Pass	
5	DSE- 1	BCA-CTIS-501	ELECTIVE – III	3	3	15	6	60	24	75
		BCA-CTIS-502	ELECTIVE – IV	3	3	15	6	60	24	75
		BCA-CTIS-503	S/W LAB – I BASED ON BCA-502	4	3	10	4	40	16	50
	DSE- 2	BCA-CTIS-504	ELECTIVE – V	3	3	15	6	60	24	75
		BCA-CTIS-505	ELECTIVE – VI	3	3	15	6	60	24	75
		BCA-CTIS-506	S/W LAB – II BASED ON BCA-505	4	3	10	4	40	16	50
	DSE- 3	BCA-CTIS-507	ELECTIVE –VII	3	3	15	6	60	24	75
		BCA-CTIS-508	ELECTIVE –VIII	3	3	15	6	60	24	75
		BCA-CTIS-509	S/W LAB – III BASED ON BCA-508	4	3	10	4	40	16	50
	SEC-CTIS- 3	SEC-CTIS-510	ELECTIVE – IX	2	3	10	4	40	16	50
		TOTAL		**32**	**30**	**130**	**52**	**520**	**208**	**650**
	ELECTIVE-III									
	BCA-CTIS-501(I)		Cloud Web Services	3	3	15	6	60	24	75
	BCA-CTIS-501(II)		Infrastructure Solutions on Cloud	3	3	15	6	60	24	75
	ELECTIVE-IV									
	BCA-CTIS-502(I)		Network Administration	3	3	15	6	60	24	75
	BCA-CTIS-502(II)		Linux Administration	3	3	15	6	60	24	75
	ELECTIVE-V									

	BCA-CTIS-504(I)		Cloud Security	3	3	15	6	60	24	75
	BCA-CTIS-504(II)		Cyber Security Incident Response Management	3	3	15	6	60	24	75
	ELECTIVE-VI									
	BCA-CTIS-505(I)		Mobile Application Development	3	3	15	6	60	24	75
	BCA-CTIS-505(II)		Programming with Python	3	3	15	6	60	24	75
	ELECTIVE-VII									
	BCA-CTIS-507(I)		Data Warehousing & Mining	3	3	15	6	60	24	75
	BCA-CTIS-507(II)		E-Commerce	3	3	15	6	60	24	75
	ELECTIVE-VIII									
	BCA-CTIS-508(I)		Artificial Intelligence	3	3	15	6	60	24	75
	BCA-CTIS-508(II)		Data Base Security	3	3	15	6	60	24	75
	ELECTIVE-IX									
	SEC -510(II)		Entrepreneurship	2	3	10	4	40	16	50
	BCA-510(II)		MOOCs *	2	3	15	6	60	24	75
6	CC-BCA-CTIS-6	BCA-CTIS-601	Major Project/Internship	28	24	100	40	400	160	500
		BCA-CTIS-602	MOOCs*	2	3	15	6	60	24	75
		BCA-CTIS-603	Seminar	2	3	15	6	60	24	75
		TOTAL		**32**	**30**	**130**	**52**	**520**	**208**	**650**
	GRAND TOTAL			**192**	**180**	**780**	**312**	**3120**	**1248**	**3900**

BCA-CTIS-501(I) Cloud Web Services	
Type: Core Course (CC) Contact Hours: 03 hours/week. Examination Duration: 3 Hours Mode: Lecture External Maximum Marks: 60 External Pass Marks: 24 (i.e. 40%) Internal Maximum Marks: 15 Total Max. Marks: 75 Total Pass Marks: 30 (i.e. 40%)	**Instructions To Paper Setter For End Semester Exam:** Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: loud services facilitate access to server infrastructure managed by the provider, including data storage and access, security and scalability, and updates. Cloud Providers are organizations that offer these services to clients and it is the most preferred method for medium and small organizations to opt for these services in order to avoid the cost overhead and operational costs. This course aims to provide the students an insight into cloud operations and introduce them to Amazon Web Services (AWS) cloud services.

Course Outcomes: At the end of this course, the student will be able to:
BCA-CTIS -501 (I).1. Understand Cloud delivery and deployment models.
BCA-CTIS -501 (I).2. Understand AWS cloud services and pricing policies.
BCA-CTIS -501 (I).3. Get the students familiar with AWS console and security services.
BCA-CTIS -501 (I).4. Understand AWS storage and networking.
BCA-CTIS-501 (I).5. Understand various services presented in the AWS environment.

UNIT: I
Introduction to AWS: Definition of Cloud Computing, IAAS PAAS, SAAS, Private; Public Cloud, AWS Business hierarchy, The AWS Infrastructure, AWS Strategy, AWS Ecosystem, AWS Benefits, AWS Competitors.
AWS and Applications on Cloud AWS Costs: Salient Features of AWS, Cloud Application Designing Principles, AWS Costing, Advantages of Cost Utilization Tracking, Working Principles, Managing AWS Costs, Case Studies.

UNIT: II
AWS Management Console and Security: AWS Management Console: Setting up AWS Account, Accessing AWS Services, S3 Bucket, Case Studies. Boundaries of Cloud, Security, AWS Security Groups, Security groups for Application Partitioning – Concept, Amazon Virtual Private Cloud.

UNIT: III
AWS Storage, Elasticity and AWS Networking: Amazon Storage, S3 Storage Basics, Managing Voluminous Information with EBS, Glacier Storage Service, AWS Networking: Networking Basics, VLAN Basics, Basics of AWS VLANs, AWS Network IP Addressing
and Mapping. Case Studies.

UNIT: IV
AWS Services: CloudFront, Relational Database Service, AWS Service Integration, AWS Platform Services: Cloud Search, Simple Queue Service, Simple Notification Service, Simple Email Services, Simple Workflow Service, AWS Management Services: Managing AWS Applications, Monitoring with Cloud watch, Auto-Scaling in AWS, AWS Cloud Formation, Case Studies

TEXTBOOKS:

- Cloud Computing: Principles and Paradigms, Rajkumar Buyya, James Broberg, Andrzej M. Goscinski,, John Wiley and Sons Publications, 2011
- Amazon Web Services for Dummies, Bernald Golden, John Wiley & Sons, 2013

Reference Book

- Brief Guide to Cloud Computing, Christopher Barnett, Constable & Robinson Limited,2010

BCA-CTIS-501(II): Infrastructure Solutions on Cloud

Type: Core Course (CC) Contact Hours: 03 hours/week. Examination Duration: 3 Hours Mode: Lecture External Maximum Marks: 60 External Pass Marks: 24 (i.e. 40%) Internal Maximum Marks: 15 Total Max. Marks: 75 Total Pass Marks: 30 (i.e. 40%)	**Instructions To Paper Setter for End Semester Exam:** Examiner will be required to set NINE questions. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner must set EIGHT more questions selecting TWO from each UNIT. Students will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory questions, students will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: This course aims to provide an understanding of the cloud computing platform and infrastructure of Windows Azure Building, deploying, and managing applications and services through a global network of Microsoft-managed data centres. The Services mainly into computing storage & web application

Course Outcomes: At the end of this course, the student will be able to:
BCA-CTIS -501(II).1. Learn the basics of cloud technology in Windows Azure services like computer service.
BCA-CTIS -501(II).2. Apply and design suitable Virtualization concept, Cloud Resource Management and design scheduling algorithms.
BCA-CTIS -501(II).3. Assess cloud Storage systems and Cloud security, the risks involved, their impact and develop cloud applications.
BCA-CTIS -501(II).4 Understand network, data, and app services.

UNIT-I

Introduction: Introduction to MS. Azure, Virtual Machines: Creating Virtual Machines, Difference Between Basic and Standard VMs, Logging in to a VM and Working, Attaching an empty Hard Disk to VM, Hosting a Website in VM , Configuring Endpoints, Scaling up and Down, Creating a custom Image from VM, Creating a VM from a custom Image, Shut down VM without Getting Billed, VM Pricing

UNIT-II

Managing Infrastructure in Azure: Azure Virtual Networks, Highly Available Azure Virtual Machines, Virtual Machine Configuration Management, Customizing Azure Virtual Machine Networking
Load Balancing: Creating Cloud Services, Adding Virtual Machines to a Cluster, Configuring Load Balancer

UNIT-III

Azure Active Directory: Introduction to Active Directory (AD), Identity and Authentication in Public Cloud – Introduction to Azure AD – Extending Active Directory into Azure – Azure AD and applications – Reporting and Monitoring Azure AD.
Windows Azure Storage: What is a Storage Account, Advantages, Tables, blobs, queues and drives, Azure Appfabric: Connectivity and Access control Automation: Introduction Windows PowerShell, Creation of Runbooks, uploading a Shell Script, Authoring a Shell Script

UNIT-IV

SQL Azure: Creating a SQL Server, creating a SQL DB, Creating Tables, Adding Data to the Tables, View Connection Strings, Security Configurations, Migrating on premise DB to SQL Azure.
Websites: Creating a Website, Setting deployment credentials, Choosing a platform, Setting up Default page for the website, Scaling, Auto Scaling by Time, Auto Scaling by Metric, Difference between Free, Shared, Basic and Standard websites, Creating a website using Visual studio.

Text Books:

1. Cloud Computing Bible, Barrie Sosinsky, Wiley-India, 2010
2. Cloud Computing: Principles and Paradigms, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wiley, 2011
3. Windows Azure Step By step by Roberto Brunetti.

Reference Books:

1. Michael W, “Implementing Microsoft Azure Infrastructure Solutions”, Phi Learning Pvt Ltd, 2009

BCA-CTIS-502(I): NETWORK ADMINISTRATION

Type: Core Course (CC) Contact Hours: 03 hours/week. Examination Duration: 3 Hours Mode: Lecture External Maximum Marks: 60 External Pass Marks: 24 (i.e. 40%) Internal Maximum Marks: 15 Total Max. Marks: 75 Total Pass Marks: 30 (i.e. 40%)	**Instructions To Paper Setter for End Semester Exam:** Examiner will be required toset NINE questions. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner must set EIGHT more questions selecting TWO from each UNIT. Students willbe required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory questions, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: This course aims to introduce the basic terminology on the design, installation, configuration, and operation of local area networks. This course provides students with the knowledge and skills necessary to install and configure a stand-alone and client computer that are part of a workgroup or domain.

Course Outcomes: At the end of this course, the student will be able to:
BCA-CTIS -502.1. To expose students to introductory networking concepts in the information technology industry.
BCA-CTIS -502.2. To expose students to the impact of network user and Groups.
BCA-CTIS -502.3. To give students hands-on experience installing, configuring, and managing File System.
BCA-CTIS -502.4. Learn All types of Device Networking and basics of Network Plan in Business.

UNIT-I

Overview of Computer Network: Basics of Computer Networking, Types of Networks, Installing or Upgrading a Network Operating System, Preparing for installation. Installing from different installation mediums, Upgrade process, identifying setup errors, Managing Hardware Devices, understanding device drivers, Adding new devices. Networking and its use in IT Industry.

UNIT-II

Creating and Managing Accounts on Network: User Account, User authentication, User profiles, Creating, managing, and troubleshooting user accounts.
Implementing Group and Computer Accounts: Creating group objects, Group types and scopes, Build-in groups, Creating and managing computer accounts.

UNIT-III

Managing File Access: Introduction to file systems, Creating and managing shared folders, Managing shared folder permissions and NTFS permissions
Managing Disks and Storage Devices: Disk management concepts, Managing partitions and volumes, Fault tolerant disk strategies, Monitoring disk health, Disk utilities.
Advanced File System Management: File and folder attributes, Advanced attributes, Disk quotas, The distributed file system

UNIT-IV

Implementing and Managing Printers: Installing and sharing printers, Configuring, and managing printer resources
Using Group Policy: Creating and editing group policy objects, Group policy inheritance.
Server Administration: Procedures and standards, Terminal services and remote administration, Delegating administrative authority, Software update services.

Text Books:

1. The Complete Guide to enter a Career in Tech: Advice on How to break into Network Administration: Basic Technique of the IT world by Kennisth Odoms.
2. Computer Networking With Internet Protocols and Technology By W. Stalling

Reference Books:

1. The Practice of system & Network Administration 2nd edition by Thomas Limoncelli
2. Computer Network Administration A Clear and Concise Reference, Gerardus Blokdyk.

BCA-CTIS-502(II) LINUX ADMINISTRATION

Type: Core Course (CC) Contact Hours: 03 hours/week. Examination Duration: 3 Hours Mode: Lecture External Maximum Marks: 60 External Pass Marks: 24 (i.e. 40%) Internal Maximum Marks: 15 Total Max. Marks: 75 Total Pass Marks: 30 (i.e. 40%)	**Instructions To Paper Setter For End Semester Exam:** Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: This course aims to introduce the duties of system administrator, system configuration files, tcp/ip networking, network file system, basics of samba server, internet services used in Linux

Course Outcomes: At the end of this course, the student will be able to:
BCA-CTIS -502 (II).1. Understand the basic duties of system administrator, booting and shutting down process, and file system in Linux.
BCA-CTIS -502 (II).2. Develop basic system administration scripts to automate system tasks and understand basics of TCP/IP Networking
BCA-CTIS -502 (III).3. Understand the installation of Samba server and its connectivity with Windows PC
BCA-CTIS -502 (II).4. Understand Internet Services provided by Linux and configuration files for Domain Name System.

UNIT: I
Introduction: Introduction to UNIX, Linux, GNU and Linux distributions
Duties of the System Administrator: The Linux System Administrator, Installing and Configuring Servers, Installing and Configuring Application Software, Creating and Maintaining User Accounts, Backing Up and Restoring Files, Monitoring and Tuning Performance, configuring a Secure System, Using Tools to Monitor Security
Booting and shutting down: Boot loaders-GRUB, LILO, Bootstrapping, Init process, rc scripts, Enabling and disabling services. **The File System:** Understanding the File System Structure, Working with Linux-Supported File Systems, Memory and Virtual File Systems, Linux Disk Management

UNIT: II
System Configuration Files: System wide Shell Configuration Scripts, System Environmental Settings, Network Configuration Files, Managing the init Scripts, Configuration Tool, and Editing Your Network Configuration
TCP/IP Networking: Understanding Network Classes, Setting Up a Network Interface Card (NIC), Understanding Subnetting, Working with Gateways and Routers, Configuring Dynamic Host Configuration Protocol, Configuring the Network Using the Network

UNIT: III
The Network File System: NFS Overview, planning an NFS Installation, configuring an NFS Server, configuring an NFS Client, Using Automount Services, Examining NFS Security
Connecting to Microsoft Networks: Installing Samba, Configuring the Samba Server, Creating Samba Users 3, Starting the Samba Server, Connecting to a Samba Client, Connecting from a Windows PC to the Samba Server

UNIT: IV
Additional Network Services: Configuring a Time Server, providing a Caching Proxy Server, Optimizing Network Services. **Internet Services:** Secure Services, SSH, scp, sftp Less Secure Services (Telnet, FTP, sync, rsh, rlogin, finger, talk and talk), Linux Machine as a Server, Configuring the xinetd Server, comparing xinetd and Standalone, Configuring Linux Firewall Packages
Domain Name System: Understanding DNS, Understanding Types of Domains Servers, Examining Server Configuration Files, configuring a Caching DNS Server, configuring a Secondary Master DNS Server, configuring a Primary Master Server, Checking Configuration.

TEXTBOOKS:
- Beginning Linux by Neil Mathew 4th Edition
- Red hat Linux Networking and System Administration by Terry Collings

REFERENCES:

- UNIX: Concepts and techniques, S. Das, Tata McGraw-Hill,
- Linux Administration: A Beginner's Guide, Fifth Edition, Wale Soyinka, Tata McGraw-Hill
- Linux: Complete Reference, 6th Edition, Richard Petersen, Tata McGraw-Hill

BCA-CTIS-504(I) CLOUD SECURITY

Type: Core Course (CC) Contact Hours: 03 hours/week. Examination Duration: 3 Hours Mode: Lecture External Maximum Marks: 60 External Pass Marks: 24 (i.e. 40%) Internal Maximum Marks: 15 Total Max. Marks: 75 Total Pass Marks: 30 (i.e. 40%)	**Instructions To Paper Setter For End Semester Exam:** Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: This course aims to provide fundamental knowledge of the cloud landscape, architectural principles, methods, and design patterns, and understanding of the critical security and privacy issues in cloud computing and their challenges, as well as how to create safe cloud-based services.

Course Outcomes: At the end of this course, the student will be able to:
BCA-CTIS -504 (I).1. Learn about Cloud principles.
BCA-CTIS -504 (I).2. Learn about Challenges in Cloud Computing.
BCA-CTIS -504 (I).3. Understand the risk assessment and management.
BCA-CTIS -504(I).4. Learn about various security mechanisms to create a secure cloud environment.

UNIT: I
Cloud Computing: Definition, Evolution, Characteristics, Various Cloud Deployment Models, Cloud Service Models, Advantages, Cloud Architecture, Virtualization in Cloud, SLA, Cloud Applications.

UNIT: II
Cloud Security issues, Security Objectives, Secure Cloud Software Requirements, Security Services, Infrastructure Security, Data Security and Storage, Data Privacy and Integrity in Cloud. Cloud Service Providers.

UNIT: III
Security Threats and Vulnerabilities to Infrastructure, Data, and Access Control; Risk Assessment and Management, Cloud Service Provider Risks, Virtualization Security Management in the Cloud, Trusted Cloud Computing.

UNIT: IV
Cloud Computing: Planning/Disaster Recovery, Standards for Security: OpenID, SSL/TLS, Encrypting, Decrypting Data and Key Management, Creating a Cloud Security Strategy, The
Future of Security in Cloud Computing.

TEXTBOOKS:

- Ronald L. Krutz, Russell Dean Vines, Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Wiley Publishing, 2010.
- Tim Mather, Subra Kumaraswamy, and Shahed Latif, ”Cloud Security and Privacy”, Published by O’Reilly Media, Inc., 2009.

BCA-CTIS-504(II) Cyber Security Incident Response Management

Type: Core Course (CC) Contact Hours: 03 hours/week. Examination Duration: 3 Hours Mode: Lecture External Maximum Marks: 60 External Pass Marks: 24 (i.e. 40%) Internal Maximum Marks: 15 Total Max. Marks: 75 Total Pass Marks: 30 (i.e. 40%)	**Instructions To Paper Setter For End Semester Exam:** Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: The course has been designed to give students an extensive overview of cyber security Incident response management issues, tools and techniques critical in solving cyber security domains.

Course Outcomes: At the end of this course, the student will be able to:
BCA-CTIS -504 (II).1. Able to understand the cyber security concept and its associated challenges.
BCA-CTIS -504 (II).2. Able to understand the cybercrimes, their nature, legal remedies and as to how report the crimes through available platforms and procedures.
BCA-CTIS -504 (II).3. Able to understand the Management and Incidents of Cyber Security, risk analysis and security planning.
BCA-CTIS -504(II).4. Able to understand the legal issues and ethics related to cyber security

UNIT: I
Introduction to Cyber Security: Overview of Cyber Security, Cyber Threats, Cyber Warfare, Cyber Crime, Cyber terrorism, Cyber Espionage, Need for a Comprehensive Cyber Security Policy, Regulation of cyberspace, Architecture of cyberspace, Concept of cyber security, Issues and challenges of cyber security.

UNIT: II
Cybercrime and Cyber law; Classification of cybercrimes, Common cybercrimes- cybercrime targeting computers and mobiles, cybercrime against women and children, financial frauds, social engineering attacks, malware and ransomware attacks, zero day and zero click attacks, Reporting of cybercrimes, Legal perspective of cybercrime, IT Act 2000 and its amendments, Cybercrime and offences, Organisations dealing with Cybercrime and Cyber security in India.

UNIT: III
Management and Incidents: Security Planning, Organizations and security plan, Contents, Security Planning Team Members, Commitment to Security Plan, Business continuity Planning; Assess Business Impact, develop strategy and develop the plan, Handling Incident, Risk Analysis, Dealing with disaster; Natural Disasters, Power loss, Human Vandals, Interception of sensitive Information, Contingency planning, Physical Security Recap.

UNIT: IV
Legal Issues and Ethics: Protecting Programs and Data, Copyrights, Patents, Trade Secrets, Special Cases. Information and the Law: Information as an object, Legal issues, The Legal Systems. Rights of Employees and Employers. Redress of Software Failures, Computer Crime, Ethical Issues in Computer Security, Incident Analysis with Ethics

TEXTBOOKS:
1. Marjie T. Britz, Computer Forensics and Cyber Crime: An Introduction, Pearson Education
2. Nina Godbole, Sunit Belapure, Cyber Security (Understanding Cyber Crimes, Computer Forensics and Legal Perspectives), Wiley
3. Bill Nelson, Amelia Phillips, Christopher Steuart, Guide to Computer Forensics and Investigations, Cengage Learning
4. Charles P. Pfleeger, Shari Lawrence, Jonathan Maargulie, Security in Computing

BCA-CTIS-505(I) MOBILE APPLICATION DEVELOPMENT	
Type: Core Course (CC) Contact Hours: 03 hours/week. Examination Duration: 3 Hours Mode: Lecture External Maximum Marks: 60 External Pass Marks: 24 (i.e. 40%) Internal Maximum Marks: 15 Total Max. Marks: 75 Total Pass Marks: 30 (i.e. 40%)	**Instructions To Paper Setter For End Semester Exam:** Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: This course aims to provide in-depth coverage of various concepts of mobile application development, especially Android-based applications. This course will help students develop and publish their mobile applications.

Course Outcomes: At the end of this course, the student will be able to:
BCA-CTIS -505 (I).1. Understand the Android Platform, its architecture and features.
BCA-CTIS -505 (I).2. Design and implement user interface, database application and content providers.
BCA-CTIS -505 (I).3. Understand and apply hardware components and security issues in Android.
BCA-CTIS -505(I).4. Evaluate multimedia, camera and location-based services in Android application.
BCA-CTIS-505(I).5. Create and implement test cases to analyse performance of Android application.

UNIT: I
Introduction: Mobile Applications, Characteristics and Benefits, Application Model, Infrastructure and Managing Resources, Mobile Software Engineering, Frameworks and Tools, Mobile devices Profiles. Application Design: Memory Management, Design patterns for limited memory, Work flow for Application Development, Techniques for composing Applications, Dynamic Linking, Plug-ins and rules of thumb for using DLLs, Concurrency and Resource Management.

UNIT: II
Development: Intents and Services, Storing and Retrieving data, Communication via the Web, Notification and Alarms, Graphics and Multimedia, Telephony, Location based services, Packaging and Deployment, Security and Hacking.
Google Android: Introduction, JDK & ADK, Android Application Architecture, Traditional Programming Model and Android, Activities, Intents, Tasks, Services; Runtime Environment for Applications, Callbacks and Override in application, Concurrency, Serialization, Application Signing, Publishing your application, API keys for Google Maps.

UNIT: III
Android Framework: GUI and MVC Architecture, Fragments and Multi-platform development, Creating Widgets: Layouts, Canvas Drawing, Shadows, Gradients; Applications with multiple screens; Handling database in Android: Android Database class, Using the Database API.

UNIT: IV
Android Applications: Working with Eclipse and Android, Various life cycles for applications, building a User Interface: Blank UI, Folding and Unfolding a scalable UI, Making Activity, Fragment, Multiple
layouts; Content Provider, Location and Mapping: location based services, Mapping, Google Maps
activity, working with MapView and MapActivity; Playing and Recording of Audio and Video in
application; Sensors and Near Field Communication; Native libraries and headers, Building client server applications.

TEXTBOOKS:
1. Zigurd Mednieks, Laird Dornin, G,Blake Meike and Masumi Nakamura "Programming Android", O'Reilly Publications.
2. Wei-Meng Lee, "Beginning iPhone SDK Progrmming with Objective-C", Wiley India Ltd.
3. James C.S. "Android Application development", CENGAGE Learning.
4. Gargenta M., Nakamura M., "Learning Android", O'Reilly Publications.V S Janakiraman, "Foundation of Artificial Intelligence and Expert Systems"

BCA-CTIS-505(II): PROGRAMMING WITH PYTHON

Type: Core Course (CC) Contact Hours: 03 hours/week. Examination Duration: 3 Hours Mode: Lecture External Maximum Marks: 60 External Pass Marks: 24 (i.e. 40%) Internal Maximum Marks: 15 Total Max. Marks: 75 Total Pass Marks: 30 (i.e. 40%)	**Instructions To Paper Setter For End Semester Exam:** Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: The course is designed to provide Basic knowledge of Python. Python programming is intended for software engineers, system analysts, program managers and user support personnel. After completing this course, student will be able to gain Problem solving skills and programming capability.

Course Outcomes: At the end of this course, the student will be able to:
BCA-CTIS-505(II).1. Understand the basics of Python programming
BCA-CTIS-505(II).2. Use various sequences and mapping in Python
BCA-CTIS-505(II).3. Import Modules and Create user defined functions in python
BCA-CTIS-505(II).4. Understand different types of files and File Handling in python

UNIT-I

Introduction to Python, features, Character set, tokens (keyword, identifier, literal, operator, punctuator), variables, use of comments, **Data types**: number (integer, floating point, complex), boolean, sequence (string, list, tuple), None, mapping (dictionary), mutable and immutable data types.
Operators: arithmetic operators, relational operators, logical operators, assignment operator, augmented assignment operators, identity operators (is, is not), membership operators (in, not in), precedence of operators, **Expressions**, evaluation of expression, type conversion (explicit & implicit conversion).

UNIT-II

Lists: introduction, indexing, list operations, traversing a list using loops, built-in functions. **Tuples**: introduction, indexing, tuple operations, built-in functions. **Dictionary**: introduction, accessing items in a dictionary using keys, mutability of dictionary, traversing a dictionary, built-in functions. **Strings**: introduction, indexing, string operations, traversing a string using loops, built-in functions. **Conditional statements**: if, if-else, if-elif-else. **Iterative statements**: for loop, range function, while loop, break and continue statements, nested loops.

Unit – III

Introduction to Python modules: Importing module using 'import <module>' and using from statement, importing math module, random module. **Functions**: types of function (built-in functions, functions defined in module, user defined functions), creating user-defined function, arguments and parameters, default parameters, positional parameters, function returning value(s),scope of a variable (global scope, local scope)

Unit – IV

Introduction to files, types of files (Text file, Binary file, CSV file), relative and absolute paths, file modes, **Text file**: open, close, reading, writing/appending data to a text file, seek and tell methods. **Binary file**: open, close, read, write/create, search, append and update operations in a binary file, **CSV file**: open / close read and write into a csv file

Text Books:

1. Python: The Complete Reference - Mc Graw Hill Edition - by Martin C Brown
2. Introduction to programming using python - Pearson - by Y. Daniel Liang

BCA-CTIS-507(I) Data Warehousing & Mining	
Type: Core Course (CC) Contact Hours: 03 hours/week. Examination Duration: 3 Hours Mode: Lecture External Maximum Marks: 60 External Pass Marks: 24 (i.e. 40%) Internal Maximum Marks: 15 Total Max. Marks: 75 Total Pass Marks: 30 (i.e. 40%)	**Instructions To Paper Setter For End Semester Exam:** Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: To familiarize the students with the basics of DWDM

Course Outcomes: At the end of this course, the student will be able to:

BCA-CTIS -507 (I).1. To understand the basic principles, concepts, and applications of data warehousing and to differentiate between OLTP and OLAP

BCA-CTIS -507 (I).2. To understand the task of data mining as an important phase of the knowledge discovery process.

BCA-CTIS -507 (I).3. To analyse various tools of Data Mining and their techniques to solve the real time problems.

BCA-CTIS -507(I).4. To develop further interest in research and design by understanding classification techniques.

UNIT: I

Data Warehouse: Basic concepts, The Data Warehouse - A Brief History, Characteristics, Difference between Operational Database Systems and Data Warehouse, Architecture for a Data Warehouse, Fact and Dimension Tables, Data Warehouse Schemas, Data Cube: A Multidimensional Data Model, Data Cube Computation Methods, Typical OLAP Operations, Data Warehouse Design and Usage.

UNIT: II

Data Mining: Introduction: Motivation, Importance, Knowledge Discovery Process, Data Mining Functionalities, Interesting Patterns, Classification of Data Mining Systems, Major issues, Data Objects and Attribute Types. Data Preprocessing: Overview, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization. Data Visualization,

UNIT: III

Association Rule Mining- Market Basket Analysis, Frequent Itemset Mining using Apriori Algorithm, Improving the Efficiency of Apriori, Neural Network- Bayesian Belief Networks, Classification by Backpropagation. Data Mining Applications, Data Mining Trends and Tools.

UNIT: IV

Clustering- Requirement for Cluster Analysis, Clustering Methods- Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Evaluation of Clustering. Outliers, Types of Outliers and Challenges of Outlier Detection. Nearest Neighbour Classification: Performance of Nearest Neighbour Classifiers.

TEXTBOOKS:

1 J Hanes, M. Kamber, Data Mining Concepts and Techniques, Elsevier India.
2. Ronald K. Pearson, Exploratory Data Analysis Using R, CRC Press.

Reference Books:

1.G.S. Linoff, M.J.A. Berry, Data Mining Techniques, Wiley India Pvt. Ltd.
2. Berson, S.J. Smith, Data Warehousing, Data Mining & OLAP, Tata McGraw-Hill.
3. Jared P. Lander, R For Everyone, Perason India Education Services Pvt. Ltd.

BCA-CTIS-507(II) E-Commerce	
Type: Core Course (CC) Contact Hours: 03 hours/week. Examination Duration: 3 Hours Mode: Lecture External Maximum Marks: 60 External Pass Marks: 24 (i.e. 40%) Internal Maximum Marks: 15 Total Max. Marks: 75 Total Pass Marks: 30 (i.e. 40%)	**Instructions To Paper Setter For End Semester Exam:** Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: Analysis and evaluate thee commerce model along with the concepts e Governance and Emerging Technologies in E Commerce

Course Outcomes: At the end of this course, the student will be able to:
BCA-CTIS -507 (II).1. Understand and deploy the importance of the Internet, web apps, features, and elements in E-Commerce to boost up the traditional venture across the globe.
BCA-CTIS -507 (II).2. Understand various types of E-commerce in the market i.e., B2B, B2C, C2C, C2B.
BCA-CTIS -507 (II).3. Analyze the difference between Governance and E-governance.
BCA-CTIS -507(II).4. Understand the way to explore various sectors i.e. Tourism, Share market, E-Banking, and etc.
BCA-CTIS-507(II).5. Understand the emerging E- Commerce scenario i-n India

UNIT: I

Introduction to E-Commerce: -Business operations; E-commerce practices vs. traditional business practices; concepts of B2B, B2C, C2C, B2G, G2H, G2C; Features of E-Commerce, Types of Ecommerce Systems, Elements of E-Commerce, principles of E-Commerce, Benefits and Limitations of E-Commerce.
Management Issues relating to e-commerce. Operations of E-commerce: Credit card transaction; Secure Hypertext Transfer Protocol (SHTP); Electronic payment systems; Secure electronic transaction (SET); SET`s encryption; Process; Cybercash; Smart cards; Indian payment models.

UNIT: II

Applications in governance: EDI in governance; E-government; E-Governance applications of Internet; concept of government –to- business, business-to-government and citizen-to-government; E-governance models; Private sector interface in E- governance. Applications in B2C: Consumers shopping procedure on the Internet; Impact on disinter mediation and re-intermediation; Global market; Strategy of traditional department stores.

UNIT: III

Products in b2c model; success factors of e-brokers; Broker-based services on-line; On- line travel tourism services; Benefits and impact of e-commerce on travel industry; Deal estate market; online stock trading and its benefits; Online banking and its benefits; On- line financial services and their future; E-auctions – benefits, implementation and impact

UNIT: IV

Applications in B2B: Key technologies for b2b; architectural models of b2b, characteristics of the supplier –oriented marketplace, buyer-oriented marketplace and intermediary-oriented marketplace; Just In Time delivery in b2b; Internet-based EDI from traditional EDI; Marketing Issues in b2b.
Emerging Business models: Retail model; Media model; advisory model, made-to-order manufacturing model; Do-it- yourself model; Information service model; Emerging hybrid
models; Emerging models in India, Internet & E-Commerce scenario in India; Internet security Issues; Legal aspects of E-commerce

TEXTBOOKS:

1. Turban E,. Lee J., King D. and Chung H.M: "Electronic commerce-a ManagerialPerspective", Prentice-Hall International, Inc.
2. Bhatia V.," E-Commerce", Khanna Book Pub. Co.(P) Ltd., Delhi.

BCA-CTIS-508(I): ARTIFICIAL INTELLIGENCE

Type: Core Course (CC) Contact Hours: 03 hours/week. Examination Duration: 3 Hours Mode: Lecture External Maximum Marks: 60 External Pass Marks: 24 (i.e. 40%) Internal Maximum Marks: 15 Total Max. Marks: 75 Total Pass Marks: 30 (i.e. 40%)	**Instructions To Paper Setter For End Semester Exam:** Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: This course aims to introduce the duties of system administrator, system configuration files, tcp/ip networking, network file system, basics of samba server, internet services used in Linux

Course Outcomes: At the end of this course, the student will be able to:
BCA-CTIS -508 (I).1. Understand the fundamentals of Artificial intelligence and problem-solving using resolution.
BCA-CTIS -508 (I).2. Understand architecture, components and knowledge representation strategies in Expert system.
BCA-CTIS -508 (I).3. Understand and analyze different search strategies and their properties
BCA-CTIS -508 (I).4. Understand the purpose and applicability of NLP and Robotics.

UNIT – I

Artificial Intelligence: Intelligence, AI Concepts, Various definitions of AI, Knowledge, Knowledge Pyramid, People and Computers: What computers can do better that people, what people can do better than computers; Characteristics of AI Problems, Problem Representation in AI, Components of AI, AI Evolution, Application Areas of AI, History of AI, The Turing Test, The Revised Turing Test.
The predicate calculus: Syntax and semantic for propositional logic and FOPL, Clausal form, inference rules, resolution and unification.

UNIT – II

Expert System: Components of Expert System: Knowledge Base, Inference Engine, User Interface, Features of Expert System, Expert System Life Cycle, Categories of Expert System, Rule Based vs. Model Based Expert Systems, Advantages/Limitations of Expert System, Developing an Expert System: Identification, Conceptualization, Formalization,
Implementation, Testing, Using an Expert System, Application Areas of Expert System

UNIT-III

Search strategies: Strategies for state space search-data driven and goal driven search; Search algorithms- uninformed search (depth first, breadth first, depth first with iterative deepening) and informed search (Hill climbing, best first, A* algorithm, mini-max etc.), computational complexity, Properties of search algorithms - Admissibility, Monotonicity, Optimality, Dominance.

UNIT – IV

Natural Language Processing: Introduction, Need, Goal, Fundamental Problems in Natural Language Understanding, How People overcome Natural Language Problems, Speech Recognition: Introduction, Advantages and Approaches, Introduction to Robotics: Parts of a Robot, Controlling a Robot, Intelligent Robots, Mobile Robots

TEXTBOOKS:

- Henry C. Mishkoff, “Understanding Artificial Intelligence”
- V S Janakiraman, “Foundation of Artificial Intelligence and Expert Systems”

REFERENCES:

- Dan W. Patterson, “Introduction to Artificial Intelligence and Expert Systems”

BCA-CTIS-508(II): DATABASE SECURITY	
Type: Core Course (CC) Contact Hours: 03 hours/week. Examination Duration: 3 Hours Mode: Lecture External Maximum Marks: 60 External Pass Marks: 24 (i.e. 40%) Internal Maximum Marks: 15 Total Max. Marks: 75 Total Pass Marks: 30 (i.e. 40%)	**Instructions To Paper Setter For End Semester Exam:** Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: This course aims to understand the various database security models and their advantages and disadvantages.

Course Outcomes: At the end of this course, the student will be able to:
BCA-CTIS -508 (II).1. Understand basic concepts of database security.
BCA-CTIS -508 (II).2. Understand Access Control and SQL injection methods.
BCA-CTIS -508 (II).3. Understand Database Security Models.
BCA-CTIS -508 (II).4. Understand Security Mechanism and Security Software Design.

UNIT – I

Database Security: - Introduction to Database Security issues and DBA, Access Control, User Accounts and Database Audits, Relationship between Information Security and Information Privacy, Objectives, Need of Database Security, Types of Database Security, Threats to the Database, Types of Threats, Principles of Database Security, Authentication and Authorisation

UNIT-II

Access Control Methods: - Discretionary Access Control, Mandatory Access Control, Role-Based Access Control.
SQL Injection Methods, Risks associated with SQL Injection Methods, Projection Techniques, Flow Control, Encryption, Digital Signature, Digital Certificates

UNIT-III

Challenges in maintaining Database Security
Security Models:- Access Matrix Model Take-Grant Model, Acten Model, PN Model, Hartson and Hsiao's Model, Fernandez's Model, Bussolati and Martella's Model for Distributed Databases, Bell and LaPadula's Model , Biba's Model, Dion's Model, Sea View Model, Jajodia and Sandhu's Model, The Lattice Model for the Flow Control

UNIT – IV

Security Mechanism: - Introduction, User Identification/Authentication, Memory protection, Resource Protection, Control Flow Mechanisms
Security Software Design Introduction: A methodological approach to Security Software Design, Secure Operating System Design, Secure DBMS Design, Security Packages, Database Security Design, Statistical Database Protection & Intrusion Detection Systems, Introduction Statistical Concepts and Definitions, Types of Attacks, Inference Controls, Evaluation criteria for Control comparison, Introduction to IDES System, RETISS System, ASES System Discovery

TEXTBOOKS:

- Fundamentals of Database Systems Ramez Elmasri, Shamkant B. Navathe
- Handbook on Database Security Applications and Trends Michael Gertz, Sushil JajodiaV S Janakiraman, "Foundation of Artificial Intelligence and Expert Systems"

REFERENCES:

- Fundamentals of Database Systems Ramez Elmasri, Shamkant B. Navathe
- Implementing Database Security and Auditing Ron Ben Natan
- Database Security by Silvana Castano, Maria Grazia Fugini, Giancarlo Martella

BCA–CTIS-510(II) : Entrepreneurship	
Type: Core Course (CC) Contact Hours: 02 hours/week. Examination Duration: 3 Hours Mode: Lecture External Maximum Marks: 40 External Pass Marks: 16 (i.e. 40%) Internal Maximum Marks: 10 Total Max. Marks: 50 Total Pass Marks: 20 (i.e. 40%)	**Instructions To Paper Setter For End Semester Exam:** Examiner will be required to set NINE questions in all. Question No.1 will consist of objective type / short-answer type questions covering the entire syllabus. In addition to Question no. 1, the examiner is required to set EIGHT more questions selecting TWO from each UNIT. Student will be required to attempt FIVE questions in all. Question No.1 will be compulsory. In addition to compulsory question, student will have to attempt FOUR more questions selecting ONE question from each UNIT. All questions will carry equal marks.

Course Objectives: The purpose of this course is to introduce students the basics of Entrepreneurship.

Course Outcomes: At the end of this course, the student will be able to:

BCA–CTIS-510(II).1. To be able understand who the entrepreneurs are and what competences needed to become an entrepreneur.

BCA–CTIS-510(II).2 To be able understand insights into the management, opportunity search, identification of a Product; market feasibility studies; project finalization etc. required for small business enterprises.

BCA–CTIS-510(II).3 To be able to write a report and do oral presentation on the topics such as product identification, business idea, export marketing etc.

BCA–CTIS-510(II).4. To be able to know the different financial and other assistance available for the establishing small industrial units

UNIT-I

Entrepreneurship: Concept and Definitions; Entrepreneurship and Economic Development; Classification and Types of Entrepreneurs; Entrepreneurial Competencies; Factor Affecting Entrepreneurial Growth – Economic, Non-Economic Factors; EDP Programmes; Entrepreneurial Training; Traits/Qualities of an Entrepreneurs; Entrepreneur; Manager Vs. Entrepreneur. types of entrepreneurships, Entrepreneurial myths.

UNIT-II

Opportunity / Identification and Product Selection: Entrepreneurial Opportunity Search and Identification; Criteria to Select a Product; Conducting Feasibility Studies; Sources of business ideas, launching a new product; export marketing, project finalization, Project Report Preparation; Project Planning and Scheduling. Sources of finance for entrepreneurs.

UNIT-III

Small Enterprises and Enterprise Launching Formalities : Definition of Small Scale; Rationale; Objective; Scope; SSI; Registration; NOC from Pollution Board; Machinery and Equipment Selection , Role of SSI in Economic Development of India; major problem faced by SSI,MSMEs – Definition and Significance in Indian Economy; MSME Schemes, Challenges and Difficulties in availing MSME Schemes.

UNIT-IV

Role of Support Institutions and Management of Small Business: Director of Industries; DIC; SIDO; SIDBI; Small Industries Development Corporation (SIDC); SISI; NSIC; NISBUD; State Financial Corporation SIC; Marketing Management; Production Management; Finance Management; Human Resource Management; Export Marketing, Venture Capital: Concept, venture capital financing schemes offered by various financial institutions in India requirements for formation of a Private/Public Limited Company. Case Studies-At least one in whole course.

Text Books:

1. "Entrepreneurship development small business enterprises", Pearson, Poornima M Charantimath,2013.
2. Roy Rajiv, "Entrepreneurship", Oxford University Press, 2011.
3. "Innovation and Entrepreneurship", Harper business- Drucker F, Peter, 2006.

4. “Entrepreneurship”, Tata Mc-graw Hill Publishing Co. ltd new Delhi- Robert D. Hisrich, Mathew J. Manimala, Michael P Peters and Dean A. Shepherd, 8th Edition, 2012
5. Entrepreneurship Development- S.Chand & Co.,Delhi- S.S.Khanka 1999
6. Small-Scale Industries and Entrepreneurship. Himalaya Publishing House, Delhi -Desai, Vasant, 2003.
7. Entrepreneurship Management -Cynthia, Kaulgud, Aruna, Vikas Publishing House, Delhi, 2003.

Reference Books:

1. Badhai, B ‘Entrepreneurship for Engineers’, Dhanpat Rai & co. (p) Ltd.
2. Desai, Vasant, ‘Project Management and Entrepreneurship’, Himalayan Publishing House, Mumbai, 2002.
3. Gupta and Srinivasan, ‘Entrepreneurial Development’, S Chand & Sons, New Delhi