ANNEXURE - III

DEPARTMENT OF INFORMATION TECHNOLOGY

Generalized Minors in Information Technology

SNo.	Course Name	L-T-P	CR	Prerequisites
1	Linux fundamentals	3-1-0	4	Programming
2	Internet Technology & Web Design	3-1-0	4	Basics of Web
3	GitHub Essentials	3-1-0	4	Programming
4	Relational Database Implementation	3-1-0	4	Databases
5	Mobile Technology	3-1-0	4	Programming
6	Insight to Cloud Computing	3-1-0	4	Databases

Specialized Minor Tracks in Information Technology

SNo.	Course Name	L-T-P	CR	Prerequisites
Track-1 Web Semantics				
1	HTML 5 & CSS	3-1-0	4	Programming
2	XML&PHP	3-1-0	4	HTML Basics
3	JavaScript	3-1-0	4	Programming
4	UI & UX Design fundamentals	3-1-0	4	Design Principles
Track-2 Networking &Security				
1	Cryptography	3-1-0	4	Mathematics
2	Network Security	3-1-0	4	Cryptography
3	Computer Forensics	3-1-0	4	Security
4	Blockchain Fundamentals	3-1-0		Security
Track-3 Cloud Computing				
1	Fundamentals of Cloud Computing	3-1-0	4	Fundamentals of Programming
2	Cloud Networking	3-1-0	4	Cloud Computing
3	High Performance Computing	3-1-0	4	C Language
4	Data Virtualization	3-1-0	4	Cloud Computing

Generalized Minors in Information Technology

LINUX FUNDAMENTALS

Course Code – Category: **CREDITS 4**
L T P E O Sessional Marks: 40
3 1 0 0 0 End Exam Marks: 60
End Exam: 3 Hours

Prerequisites : Familiarity with computers.

Course Objectives :

1. To teach principles of operating system including File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking Commands, Basic Linux commands, Scripts and filters.
2. To familiarize fundamentals of the Bourne again shell (bash), shell programming, pipes, input and output redirection Control structures, arithmetic in shell interrupt processing, functions, debugging shell scripts.
3. To impart fundamentals of file concepts kernel support for file, File structure related system calls (file API's)
4. Demonstrate the role and responsibilities of a Linux system administrator.
5. Discuss shell programming in Linux operating system
6. Distinguish various filter and server commands

Course Outcomes:
At the end of this course, the students would be able to :
CO-1: Understand Linux Architecture and Effectively use Linux Environment using shell, filters and program development tools.
CO-2: Perform file I/O management through commands and perform package management, storage management and failure recovery.
CO-3: Automate tasks and write simple programs using scripts.
CO-4: Configure important services like FTP, DNS,Squid and WEB

Mapping of Course Outcomes with POs and PSOs

COs/POs -PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P010	PO11	PO12	PSO1	PSO2
CO1	3	2	3	1								2	3	2
CO2	3	2	2	1								2	3	2
CO3	3	2	3	1								2	3	2
CO4	3	3	2	2								2	2	2

UNIT-1 **8 Periods**

Overview of Linux: What is Linux,s root in Unix,Common Linux Features,advantage of Linux,Overview of Unix and Linux architectures,Linux files system,hardware requirements for Linux,Linux standard directories,Commands for files and directories cd, ls, cp, rm, mkdir,rmdir, pwd, file, more, less.

Learning outcomes: At the end of this unit, the students will be able to

- Explain the history and origins of the Linux operating system.
- Understanding the basic set of commands and utilities in Linux/UNIX systems.
- Explain the structure of the Linux operating system.
- Use Linux commands to manage files and file systems

UNIT-2 **12 Periods**

Essential Linux commands: Processes in Linux, Process fundamentals, Connecting,processes with pipes, Redirecting input, Redirecting output, Background processing, Managing multiple processes, Process scheduling – (at,batch), nohupcommand,kill, ps, who,find, sort, touch, file,file processing commands – wc, cut, paste etc.

Learning outcomes: At the end of this unit, the students will be able to

- Use Linux commands to manage files and file systems.
- Ability to be productive in a Linux environment.

UNIT-3 **12 Periods**

Shell programming :Basics of shell programming,various types of shell available in Linux,Comparisons between various shells,Shell programming in bash,Conditionalstatements,Loopingstatements.Casestatement,Parameter passing.

Learning outcomes: At the end of this unit, the students will be able to

- Create and execute BASH scripts
- Automate simple tasks in Linux.

UNIT-4 **12 Periods**

System administration : Common administrative tasks,identifying administrative files,Configuration and log files,Role of system administrator,Managing user accounts -adding users,Managing user accounts -deleting users,Changing permissions and ownerships,Creating and managing groups.

Learning outcomes: At the end of this unit, the students will be able to

- Demonstrate the role and responsibilities of a Linux system administrator.
- Establish user accounts and permissions.

UNIT-5 **8 Hours**

Simple filter commands & Configure various Servers: Filter Commands-pr, head, tail, Filter Commands -cut, sort .Filter Commands- uniq, etc..

Learning outcomes: At the end of this unit, the students will be able to

- Distinguish various filter and server commands.
- Configure basic Linux network services.

Textbooks for Reference

1. Cristopher Negus – Red Hat Linux Bible, Wiley Dreamtech India 2005 edition.
2. Yeswant Kanethkar – UNIX Shell Programming, First edition, BPB.

References :

1. Official Red Hat Linux Users guide by Redhat, Wiley Dreamtech India
2. Graham Glass & King Ables – UNIX for programmers and users, Third Edition, Pearson Education.
3. Neil Mathew & Richard Stones – Beginning Linux Programming, Fourth edition, Wiley Dreamtech India.

INTERNET TECHNOLOGY AND WEB DESIGN

CREDITS 4

Instruction: 3 Periods & 1 Tut/week **Sessional Marks**: 40
End Exam: 3Hours **End Exam Marks:** 60

Pre-requisite(s): Basics of Web

Course Objectives:

The main objective of the course is

1. Present the basic web technology concepts that are required for developing the web applications.
2. The key technology components are descriptive languages, server-side program program elements and client-side program elements.

Course Outcomes:

After completion of the course, the student will be able to:
CO-1: Analyse the basic Internetworking concepts and its applications
CO-2: Describe the issues related to ethics and privacy related to Internet
CO-3: Designing Webpages using HTML and designing of Cascading Style Sheets (CSS)
CO-4: Constructing and publishing websites using Dynamic webpages

Mapping of Course Outcomes with POs and PSOs

COs/POs-PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P010	PO11	PO12	PSO1	PSO2
CO1	2	1	2	1	2			1	1	1		2	2	2
CO2	2	1	2	1	3			1	1	1		2	2	2
CO3	2	1	2	1	3			1	1	1		2	2	2
CO4	2	1	2	1	3			1	1	1		2	2	2

UNIT-I: **10 Hours**

Introduction, Network Hardware, LAN, WAN, MAN, Wireless Networks, Internetworks, Network Software, Protocol Hierarchies, Design Issues for Layers, Interfaces and Services, Relationships of Services to Protocols, OSI Reference Model.

Learning Outcomes: At the end of this unit student will be able to learn

Different types of networks, Design issues, usage of wireless networks and the reference models.

UNIT-II: **7 Hours**

Evolution and growth of the Internet, working of the Internet, Getting Online, Email and WWW.

Learning Outcomes: At the end of this unit student will be able to learn

Importance of the Internet and its wide usage in the present scenario.

UNIT-III: **8 Hours**

Building Websites and making Dynamic webpages, Hosting and Promoting Websites.

Learning Outcomes: At the end of this unit student will be able to learn

Basic Design of webpages and how to promote the websites.

UNIT-IV: **10 Hours**

Hypertext Markup Language (HTML), Designing webpages using webpages, Physical styles of text, Logical styles of text, creation of List.

Tables in HTML: Creation of tables, Including images in webpages: Image Tag, Image mapping.

Learning Outcomes: At the end of this unit student will be able to learn

How to create webpages by using different styles, tables, list and Images.

UNIT-V: **8 Hours**

Frames in HTML, Creation of Forms, Introduction to Cascading Style sheets (CSS).

Learning Outcomes: At the end of this unit student will be able to learn

How to create forms and frames in HTML

Textbooks:

1. Computer Networks and Internet: Douglas Comer, 5th Edition, PHI
2. Internet: A User's Guide: K.L. James, 2nd Edition, PHI Learning
3. HTML, XML, CSS AND XHTML: TeodomGugoin, 1st Edition, Firewall Media

Reference Books:

1. Web Design: A Beginners Guide: Wendy Willard, 2nd Edition, MGH.

GITHUB ESSENTIALS

CREDITS 3

Instruction: 4 Periods (3Lec & 1 Tut) /Week
End Exam: 3 Hours

Sessional Marks : 40
End Exam Marks: 60

Prerequisite(s): Basic knowledge of programming and Linux is assumed for the course

Course Objectives

1. Understand why version control is a fundamental tool for coding and collaboration
2. Install and run Git on your local machine
3. Use and interact with GitHub
4. Collaborate with others through remote repositories

Course Outcomes

After completion of this course, a student will be able to:

CO1. Understanding version control tools and leverage to create and clone code.
CO2. Apply branch protections to get out of sticky situations by reverting past commits.
CO3. Creating new repository by the usage of commands and also explore the remote branches , rebasing the changes
CO4. Overview of squash changes in the code and focus on managing projects

Mapping of Course Outcomes with POs and PSOs

COs/POs-PSOs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	P010	PO11	PO12	PSO 1	PSO 2
CO1	3	2	3	3	1	1	1				2	2	3	3
CO2	2	2	2	2	1					2	2	2	3	3
CO3	2	2	3	3	3						1	1	2	3
CO4	2	2	3	3	3						1	1	2	3

UNIT-I Introduction to Version Control: (8 hours)

Keeping historical copies,Diffing Files, Applying Changes, Practical Appilication of diff and patch, Version control: version control and Automation

Learning outcomes: At the end of this unit, the students will be able to

1. tracks changes made to computer files and saves the file
2. Understand why version control is a fundamental tool for coding and collaboration

UNIT-II Introduction to Git (10 hours)

Git: installation , intilaizing,adding,committing and Working with the staging environment, Deleting files , Managing your log, Rollbacks, identifying commits, Branch: creating new branch, merging, merge conflicts

Learning outcomes: At the end of this unit, the students will be able to

1. Install git on Windows, Mac and Linux
2. add files to your own GitHub repository

UNIT-III Customizing Git **(8 hours)**

Tricks for Customization, Remote branch Housekeeping, Creating a Global Git ignore file Working around Long Git commands

Learning outcomes: At the end of this unit, the students will be able to

1. Staging, committing and pushing files to GitHub
2. Git on the command line

UNIT-IV Working with Remote **(10 hours)**

Intreaction with GitHub, Remote/,fetching new changes, Updating the local Repository, the pull-merges-push workflow, Pushing Remote Branches, Rebasing your changes,

Learning outcomes: At the end of this unit, the students will be able to

1. Create and use a remote repository on GitHub
2. Learn the entire daily workflow that most developers use

UNIT-V Collabration **(10 hours)**

A simple Pull Request on GitHub, The Typical Pull Requesr Workflow on GitHub, Updating an existing Pull Request, Squashing Changes, Code Reviews: code review workflows, use code reviews in GitHub, Managing Collabration, Tracking isuues, Continuous integration.

Learning outcomes: At the end of this unit, the students will be able to

1. GitHub pull requests
2. Manage GitHub issues

Text Books

1. Begning Git and GitHub: A comprehensive Guide to Version Control, Project Management and Team Work for New Developer by Mariot Tsitoara
2. GitHub Essentials: Unleash the Power of Collabrative Development Workflow using Github, 2nd Edition by Achilleas Pipinellis

References

1. A Practical Guide to Git and GitHub for Windows uUsers: From Beginner to Expert in Easy Step by Step Exrcises by Roberto Vormittag
2. GitHub for Dummies by Phil Haack Sarha Guthals

Relational Database Implementation

CREDITS 4

L T P E O
3 1 0 0 0

Sessional Marks: 40
End Exam Marks: 60
End Exam: 3 Hours

Prerequisite(s): A good background in **DBMS** fundamentals is required

COURSEOBJECTIVES:-

1. Master the basics of SQL and construct queries using SQL
2. Understand the **relational database** design principles.
3. Familiar with database storage structures and access techniques

COURSE OUTCOMES

On completingthiscoursestudentwill beableto

CO1: Using the basic concepts of database design, data modelling and normalization.
CO2: Convert ER Model to Relational Model and write queries using SQL.
CO3: Understand PL/SQL, data types, operators and control statements
CO4: Apply and relate the concepts of transaction, concurrency control and recovery in database.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	3			1	1					1	2	2
CO2	1	2	3										2	2
CO3	3	2	2		2								3	2
CO4	3	3	1				2					1	3	2

UNIT-I: **11 periods**

Database Concepts: A Relational approach: Database – Relationships – DBMS – Relational Data Model – Integrity Rules – Theoretical Relational Languages. Database Design: Data Modeling and Normalization: Data Modeling – Dependency – Database Design – Normal forms – Dependency Diagrams – De -normalization – Another Example of Normalization.

Learning outcomes: At the end of this unit, the students will be able to

- Design relationships
- Apply Normalization
- Draw Dependency diagrams

UNIT-II: **13 periods**

Oracle9i: Overview: Personal Databases – Client/Server Databases – Oracle9i an introduction – SQL *Plus Environment – SQL – Logging into SQL *Plus - SQL *Plus Commands – Errors & Help – Alternate Text Editors - SQL *Plus Worksheet - iSQL *Plus. Oracle Tables: DDL: Naming Rules and conventions – Data Types – Constraints – Creating Oracle Table – Displaying Table Information – Altering an Existing Table – Dropping, Renaming, Truncating Table – Table Types – Spooling – Error codes.

Learning outcomes: At the end of this unit, the students will be able to

- Gain the knowledge on oracle 9i & SQL

- Create the Oracle Table and perform operations on tables.

UNIT-III: **13 periods**

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

Learning outcomes: At the end of this unit, the students will be able to

- Work with tables
- Perform Arithmetic operations
- Apply sorting and grouping techniques on tables

UNIT-IV: **13 periods**

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

Learning outcomes: At the end of this unit, the students will be able to

- Identify the data types
- Work with PL/SQL and cursors
- Perform DML opeartions

UNIT-V: **10 periods**

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

Learning outcomes: At the end of this unit, the students will be able to

- Identify Named blocks
- Analyze data dictionary views
- Work with Functions, packages and Triggers

Case Study 1

Hospital Management System

Aim: XYZ hospital is a multi specialty hospital that includes a number of departments, rooms, doctors, nurses, compounders, and other staff working in the hospital. Patients having different kinds of ailments come to the hospital and get check up done from the concerned doctors. If required they are admitted in the hospital and discharged after treatment.

The aim of this case study is to design and develop a database for the hospital to maintain the records of various departments, rooms, and doctors in the hospital. It also maintains records of the regular patients, patients admitted in the hospital, the check up of patients done by the doctors, the patients that have been operated, and patients discharged from the hospital.

Case Study 2

Painting Hire Business System Description:

A local businesswoman has decided to start her own Internet business, called Masterpieces Ltd, hiring paintings to private individuals and commercial companies.

Because of your reputation as a database designer she has called upon your services to design and implement a database to support her new business. At the initial planning meeting, to discuss the design, the following user requirements were requested.

The system must be able to manage the details of customers, paintings and those paintings currently on hire to customers. Customers are categorized as B (bronze), S (silver), G (gold) or P (platinum). These categories entitle a customer to a discount of 0%, 5%, 10% or 15% respectively.

Customers often request paintings by a particular artist or theme (eg animal, landscape, seascape, naval, still-life, etc). Over time a customer may hire the same painting more than once.

Each painting is allocated a customer monthly rental price defined by the owner. The owner of the painting is then paid 10% of that customer rental price. Any paintings that are not hired within six months are returned to the owner. However, after three months, an owner may resubmit a returned painting.

Each painting can only have one artist associated with it.

Several reports are required from the system. Three main ones are:

1. For each customer, a report showing an overview of all the paintings they have hired or are currently hiring.
2. For each artist, a report of all paintings submitted for hire.
3. For each artist, a returns report for those paintings not hired over the past six months Remember to identify key attributes and any foreign key attributes.

Text Books:

DATABASE SYSTEMS USING ORCLE – Nilesh Shah, 2nd edition, PHI.
UNIT-I: Chapters 1 & 2
UNIT-II: Chapters 3 & 4
UNIT III: Chapters 5 & 6
UNIT-IV: Chapters 10 & 11
UNIT-V: Chapters 12,13 & 14

Reference Books:

1. DATABASE MANAGEMNET SYSTEMS – Arun Majumdar &Pritimoy Bhattacharya, 2007, TMH.
2. DATABASE MANAGEMETN SYSTEMS – Gerald V. Post, 3rd edition, TMH.

MOBILE APPLICATION DEVELOPMENT

CREDITS 4

L T P E O
3 1 0 0 0

Sessional Marks: 40
End Exam Marks: 60
End Exam: 3 Hours

Prerequisite(s): Object oriented concepts, C++ programming

Course Outcomes

After completion of this course, the students will be able to:

CO1: Understand and apply OOP and Java programming in problem solving.
CO2: Understand the fundamentals of Android system
CO3: Learn and Use Mobile User Interfaces
CO4: Develop the Android App using Android Studio.

Mapping of Course Outcomes with POs and PSOs

COs/POs -PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	P010	PO11	PO12	PSO1	PSO2
CO1	2	2	1		2	1			2			2	2	2
CO2	2	2	2		2	1			2			2	2	2
CO3	2	2	2	2	2	1			2			2	2	2
CO4	2	2	2	1	2	1			3			2	2	2

UNIT-I: 10Periods

Introduction: Introduction to Java, JVM, java garbage collector, Command line arguments, classes and objects.

Inheritance: Inheritance hierarchies, super and sub classes, Member access rules, super keyword, preventing inheritance: final classes and methods, the Object class and its methods.

Polymorphism: dynamic binding, method overriding, abstract classes and methods.

Interfaces: Interfaces vs. Abstract classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interfaces.

Learning outcomes :

- After completion of this unit Student will understand the basic concepts of Object oriented concepts
- To learn why Java is useful for the design of desktop and web applications.
- To learn how to implement object-oriented designs with Java.
- To identify Java language components and how they work together in applications.

UNIT-II 10 Periods

Packages: Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

Exception handling: Dealing with errors, benefits of execution handling, the classification of exceptions- exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, re throwing exceptions, exception specification, built in exceptions, creating own exception sub classes.

Learning outcomes :

- To understand how to use Java APIs for program development.
- To learn how to extend Java classes with inheritance and dynamic binding.
- To learn how to use exception handling in Java applications.

UNITIII: 8 Periods

Introduction To Mobile Apps and Android: Need of Mobile Apps, Different Kinds of Mobile Apps, Android History.

Android Architecture: Overview of Android Stack, Android Features, Introduction to OS layers

Deep Overview in Android Stack: Linux Kernel, Libraries, Android Runtime, Application Framework, Dalvik VM

Learning outcomes :

- To understand the differences between JVM and Android Stack and Different layers in Android
- Recognizes mobile computing platforms and mobile computing
- Recognizes smart devices ,Recognizes mobile development environments.
- Explains the basic concepts of Android phone features and capabilities.

UNITIV: 10 Periods

Installing Android Machine: Configuring Android Stack, Setting up Android Studio, Working with Android Studio, Using Older Android Tools

Creating First Android Application: Creating Android Project, Debugging Application setting up environment, AVD Creation, Executing Project on AndroidScreen

Android Components: Activities, Services, Broadcast Receivers, Content Providers

Hello World App: Creating your first project, The manifest file, Layout resource, Running your app on Emulator

Learning outcomes:

- Understands the basic technologies used by the Android platform. Recognizes the structure of an Android application project. Uses the tools necessary for Android application project.
- Explains the relationship between XML and Java for the Android platform.

UNITV: 10 Periods

Building UI with Activities: Activities, Views, layouts and Common UI components, Creating UI through code and XML, Activity lifecycle, Intents, Communicating data among Activities **Advanced UI:** Selection components (GridView, ListView, Spinner), Adapters, Custom Adapters, Complex UI components, Building UI for performance, Menus, Creating custom and compound Views, Toast, Custom Toast, Dialogs, Status bar Notifications

Learning Outcomes:

- Recognizes and uses Android Environment Emulator and Application life cycle.
- Creates and configures simulation environments using the AVD Manager.
- Recognizes Activity stack.
- Recognizes Android application's life cycle states and uses life cycle methods.
- Defines user interfaces using XML layouts.
- Uses AndroidManifest.xml, main.xml, strings.xml, and the drawable folder.

Text Books:

1. Herbet Schidt and Dale Srien, Java Fundamentals - A comprehensive Introduction, TMH.
2. Pradeep kothari,Android Application Development (With Kitkat Support), Black Book, Dreamtech publications

Reference Books:

1. P.J. Deitel and H.M. Deitel, Java for Programmers, Pearsoneducation
2. Prasant-Pattnaik, Fundamentals of Mobile Computing

INSIGHT TO CLOUD COMPUTING

Course Code – Category:
L T P E O
3 1 0 0 0

CREDITS 4
Sessional Marks: 40
End Exam Marks: 60
End Exam: 3 Hours

Prerequisite(s):

1. Should have basic knowledge on Operating system and technologies.
2. Should have fundamental knowledge in programming and concept of resource management.

Course Objectives

1. Cloud Computing gives the student to gain the skill and knowledge how to enable insights.
2. Understand the cloud service(IaaS, SaaS, PaaS) & deployment models(Public, Private, Hybrid)
3. Understanding cloud Transformations, Development and ability to work with data centre services.

Course Outcomes

After completion of this course, the students will be able to:
CO-1: Analyze the components of cloud computing showing how business ability in an organization can be created.
CO-2: Evaluate the deployment of web services from cloud Architecture to analyze case studies to derive and develop the cloud based applications.
CO-3: Compare and contrast the economic benefits delivered by various cloud models based on applications requirements, economic constraints and business requirements.
CO-4: Critique the consistency of Service deployed from a cloud.

Mapping of Course Outcomes with POs and PSOs

COs/POs-PSOs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	P0 10	PO 11	PO 12	PS O1	PS O2
CO1	1		2										1	1
CO2	1	2	3	2									2	3
CO3		2	2										2	2
CO4	1	2	3	2									1	3

UNIT-I Cloud Computing Fundamentals **10 Periods**

Understanding Cloud Fundamentals: Cloud Computing definition, private, public and hybrid cloud.

Exploring Cloud Delivery Services: IaaS, PaaS, SaaS. Benefits and challenges of cloud computing, public vs private clouds.

Learning outcomes: At the end of this unit, the students will be able to

- Analyze the components of cloud computing and Cloud Services exploration.

UNIT-II Management of Cloud Services **12 Periods**

Cloud Services: Reliability, Availability and Security of services deployed from the cloud.

Cloud Computing Infrastructures: Cloud Computing infrastructures available for implementing cloud based services. Private IaaS, usage of IaaS, Exploring PaaS, benefits of PaaS, Having correct Requirements for TaaS, PaaS.

Learning outcomes: At the end of this unit, the students will be able to

- Analyze The Components Of Cloud Computing And Cloud Services Exploration.

UNIT-III Cloud Economics & Applications **10 Periods**

Economic Strategy: Developing an Economic Strategy, Comparing traditional models with the cloud

Cloud Applications: Technologies and the processes next generation cloud Applications and the process required when develop applications

Learning outcomes: At the end of this unit, the students will be able to

- Compare and contrast the Economic Benefits delivered by various Cloud Models based on Application Requirements

UNIT-IV Application Development **10 Periods**

Creation of Environments: Service creation environments to develop cloud based applications. Environment for service development, Amazon, Azure, Google App.

Learning outcomes: At the end of this unit, the students will be able to

- Develop and deploy the cloud Applications.

UNIT-V Cloud IT Model **10 Periods**

Case Studies: Analysis of Case Studies when deciding to adopt Cloud computing architecture, cloud based service, applications and development platform deployment so as to improve the total cost of ownership (TCO)

Learning outcomes: At the end of this unit, the students will be able to

- Analyze case studies to derive the best practice model to apply when Developing and Deploying Applications.

Text Books

1. Gautam Shroff, –Enterprise Cloud Computing Technology Architecture Applications, Cambridge University Press; 1 edition, [ISBN: 978-0521137355], 2010.
2. Toby Velte, Anthony Velte, Robert Elsenpeter, –Cloud Computing, A Practical Approach‖ McGraw-Hill Osborne Media; 1 edition [ISBN: 0071626948], 2009.

References

1. Hurwitz, Judith S., et al. Cloud Computing For Dummies. Germany, Wiley, 2009.
2. Dimitris N. Chorafas, –Cloud Computing Strategies CRC Press; 1 edition [ISBN:1439834539], 2010.

SPECIALIZED MINORS

HTML 5 & CSS

CREDITS 4

L	T	P	E	O
3	1	0	0	0

Sessional Marks: 40
End Exam Marks: 60
End Exam: 3 Hours

Pre-requisite: No Pre Requisite.

Course Objectives:

- Understand the principles of creating an effective web page using HTML.
- Develop skills in analyzing the usability of a web site.
- Lay out HTML elements using CSS Style, color, background, margin and padding.

Course Outcomes: After completion of this course student will be able to:

CO-1: Develop web pages using HTML Tags and Attributes like-heading levels, links, ordered and unordered lists within a web page.
CO-2: Develop web pages using HTML Frames, Forms, Tables.
CO-3: Develop web pages using cascading style sheets tostyleandlayoutwebpages.
CO-4: Differentiate inline, internal and external Style sheets.

Mapping of course outcomes with program outcomes:

COs/POs-PSOs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO12	PSO1	PSO2
CO1	3	2	2		3				2	1	2	2	3	2
CO2	**3**	**2**	**2**		**3**				**2**	**1**	**2**	**2**	**3**	**2**
CO3	**3**	**1**	**2**		**3**				**2**	**1**	**2**	**2**	**3**	**2**
CO4	**2**	**2**	**2**		**3**							**2**	**3**	**2**

SYLLABUS

Unit-1: **8 Periods**

WebDevelopmentIntroduction, HTML-Introduction, HTMLTagsandAttributes, HTMLTag vs.Element, HTML Attributes, Howtodifferentiate HTMLDocumentVersions.

HTML-Basic FormattingTags: HTMLBasicTags, HTMLFormattingTags, HTML Color Coding. HTML-Grouping: DivandSpanTags, HTML-Lists: UnorderedLists, OrderedLists, Definitionlist.

Learning Outcomes: At the end ofthis unit theStudents will be able to

- Demonstrate Thefundamentaltechnologyusedto definethe structureofa webpage.
- ApplyHTMLto text,HTMLtostructurea webpage, createhyperlinks using HTML.
- ApplyHTML to create paragraph,list and heading.
- ApplyHTMLto groupelementsusingtheclassoridattributes,andinlinelevelandblocklevel separation.
- ApplyHTMLto list items using orderedlist(<ol>),anunorderedlist(<ul>),ora menu(<menu>).

Unit-2: **8 Periods**

HTML-Images: ImageandImageMapping, HTML-Hyperlink: URL-Uniform Resource Locator, URLEncoding, HTML-Table:<table>, <th>, <tr>, <td>, <caption>,<thead>, <tbody>, <tfoot>, <colgroup>, <col>.

Learning Outcomes: At the end ofthis unit theStudents will be able to

- ApplyHTMLto embedimagesinsidewebpages using <img>element.
- ApplyHTMLtocreate HyperlinkswhichmakestheWeba web.
- ApplyHTMLtorepresenttabulardataona webpage.

Unit-3: **8 Periods**

HTML Frame: Using Attributes, Iframe as the Target. HTML Form: <form>, <input>, <textarea>, <button>, <select>, <label>.<option>,<legend>, <fieldset>.

HTML-Headers: Title, Base, Link, Style, Script.

Learning Outcomes: At the end ofthis unit theStudents will be able to

- ApplyHTML toCreate Frames for nestedbrowsingcontext-embedding anotherHTMLpageintothecurrentpage using iframe tag.
- ApplyHTML toCreate forms for interactingwithweb sites (registeringandloggingin,sendingfeedback,buyingproducts,and more).
- ApplyHTML to create web pages using <head>elementwhich providesgeneralinformation (metadata)aboutthedocument, includingitstitleandlinkstoits scriptsandstylesheets.

Unit-4: **10 Periods**

CSS Introduction:CSSSyntax,CSS- External, Internal, Inline, singleStyleSheets, MultipleStyleSheets, Value, LengthsandPercentages, CSS-Selectors: IDSelectors, ClassSelectors, GroupingSelectors, UniversalSelector, AttributeSelectors, CSS-PseudoClasses. CSS-Color:Backgroundcolor, background-image,

Learning Outcomes: At the end ofthis unit theStudents will be able to

- Create web pages using CSStostyleandlayoutwebpages.
- Create web pages using CSS to applycolors,positioning,ordecorations.

Unit-5: **10 Periods**

CSS-Text:color, background-color, text-decoration, text-align, vertical-align, text-transform, white-space, letter-spacing, word-spacing, line-height, font-family, font-size, font-style.
CSS-Lists & Tables: list-style-type, list-style-position, list-style-image, list-style, CSSTables-border, Size, Alignment, Style, CSS BOX: Borders & Outline, Margin & Padding, Height and width.

Learning Outcomes: At the end ofthis unit theStudents will be able to

- Create web pages using CSS to apply style ofa font,such asitsfamily,size andweight,line height.
- Create web pages using CSS to lists tablethat defines how tolay outtable data.
- Create web pages using CSS to definetherectangular boxes—including their padding andmargin.

Textbooks:

1. Beginning Web Programming With HTML XHTML and CSS, Jon Duckett, 2nd Edition, Wiley Publishing

Reference Books:s

1. HTML & CSS Design And Build Websites, Jon Duckett, Wiley Publishing
2. HTML 5 Black Book (Covers CSS3, JavaScript, XML, XHTML, AJAX, PHP, jQuery), DT Editorial Services, 2nd Edition, DreamTech Press.

CRYPTOGRAPHY

CREDITS 4

L	T	P	E	O
3	1	0	0	0

Sessional Marks: 40
End Exam Marks: 60
End Exam: 3 Hours

Course Objectives:

1. To learn the fundamental concepts of cryptography
2. To defend the security attacks on information systems with secure algorithms

Course Outcome:

1. Learn to analyse the security of the in-built cryptosystems
2. Develop cryptographic algorithms for information security
3. Develop authentication schemes for identity and membership authorization
4. Implement Hashing and Digital Signature techniques

Correlation of COs with Program Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	3	3				3					1	
CO2	1	1	1	2	2			3		3		3	1	3
CO3	1	1	1	1		3		3		3		3	2	2
CO4	1	1	1	1	2	3		3		3		3	2	2

SYLLABUS

UNIT-1: INTRODUCTION TO SECURITY **10 periods**

Information Security - Confidentiality, Integrity & Availability – Authentication, Authorization & Non-Repudiation – Introduction to Plain Text, Cipher Text, Encryption and Decryption Techniques, Secure Key, Hashing, Digital signature.

Learning Outcomes: At the end of this Unit the student will be able

- To gain knowledge on security principles
- To understand the elements of cryptographic operations
- To understand the hashing and digital signature

UNIT-2: SYMMETRIC ENCRYPTION **10 periods**

Block cipher, Stream cipher - Data Encryption Standard (DES) - Cipher Block Chaining (CBC) –Multiple Encryption DES - International Data Encryption Algorithm (IDEA) - Advanced Encryption Standard (AES).

Learning Outcomes: At the end of this Unit the student will be able

- **To** understand different algorithm types
- To gain knowledge on cryptographic algorithm modes
- To gain knowledge on different secret key/ private key cryptographic techniques

UNIT-3: ASYMMETRIC ENCRYPTION 8 Periods

Asymmetric key generation techniques – Applications of asymmetric encryption methods – RSA, Elliptic Curve Cryptography – Homomorphic encryption.

Learning Outcomes: At the end of this Unit the student will be able

- To understand different public key cryptographic techniques
- To gain knowledge on applications of public key cryptography

UNIT-4: DIGITAL SIGNATURES AND MESSAGE DIGESTS 10 periods

Digital signature standards - Secure One-time Signatures - Application of Digital Signatures – Diffie Hellman Key Exchange - Elliptic Curve Digital Signature algorithm, Cryptographic Hash Functions- Applications- Simple hash functions and features for ensuring security – Hash functions based on Cipher Block Chaining, Message Digest - MD5.

Learning Outcomes: At the end of this Unit the student will be able

- To understand the concept of digital signature and its applications
- To understand the different digital signature algorithms.

UNIT-5: HASHING AND MESSAGE AUTHENTICATION 10 periods

Secure Hash Algorithm (SHA), Authentication Systems – Password and Address – Security Handshake Drawbacks -Authentication Standards – Kerberos- PKI Trust Models -Message Authentication Codes (MAC)– Security features- MAC based on Hash Functions - MAC based on Block Ciphers.

Learning Outcomes: At the end of this Unit the student will be able

- To know the versions of SHA
- To understand the security handshake pitfalls.
- To understand different authentication protocols.

Text Books

1. D. R. Stinson, Cryptography: Theory and Practice, 3rd Ed. Boca Raton, FL: Chapman & Hall/CRC, 2005. (ISBN No.: 978-1-58-488508-5).
2. W. Stallings, Cryptography and Network Security: Principles and Practice, 7th Ed. Pearson Publishers, 2017. (ISBN No.: 978-0-13-44446-11).

Reference Books

1. J. H. Silverman, A Friendly Introduction to Number Theory, 4th Ed. Boston: Pearson, 2012. (ISBN No.: 978-0-321-81619-1).
2. C. Kaufman, R. Perlman, and M. Speciner, Network Security: Private Communication in a Public World, 2nd Ed. United States: Prentice Hall PTR, 2002. (ISBN No.: 978-0-13-046019-6)

FUNDAMENTALS OF CLOUD COMPUTING

CREDITS 4

L	T	P	E	O
3	1	0	0	0

Sessional Marks: 40
End Exam Marks: 60
End Exam: 3 Hours

Prerequisite(s):

1. Should have basic knowledge on Operating system and technologies.
2. Should have fundamental knowledge in programming and concept of resource management.

Course Objectives

1. To introduce the basic concepts of Cloud Computing, essential characteristics, history.
2. Describe the cloud service(IaaS, SaaS, PaaS) & deployment models(Public, Private, Hybrid)
3. Understanding cloud infrastructure, VM's, Networking, Storage, Cloud related trends.

Course Outcomes

After completion of this course, the students will be able to:

CO-1: Define and analyze the services and models of Cloud Computing
CO-2: Articulate the business case and accessibility in different cloud ecosystem
CO-3: Interpret local cloud and virtualization techniques based on application requirement
CO-4: Identify real time cloud applications in different scenarios appropriate to society

Mapping of Course Outcomes with POs and PSOs

COs/POs-PSOs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	P01 0	PO1 1	PO1 2	PSO 1	PSO 2
CO1	1	1							3				1	1
CO2		2	3		1								2	3
CO3				3				1					2	2
CO4			1			3							1	3

UNIT-I Overview of Cloud Computing **10 Periods**

Cloud Computing:Introduction to cloud computing, Definition and essential characteristics of Cloud Computing, History and evolution of Cloud Computing, Key cloud service providers and their services, Cloud Adoption.

Learning outcomes: At the end of this unit, the students will be able to

- Learn the evolution & definition of Cloud Computing.
- Characteristics of Cloud Computing.

UNIT-II Cloud Computing Models and Services **10 Periods**

Cloud Service Models: IaaS, PaaS, SaaS. *Development Models*: Public, Private, Hybrid to solve real world challenges

Learning outcomes: At the end of this unit, the students will be able to

- Learn about the different types of service and development models of Cloud Computing

UNIT-III Cloud infrastructure and Storage **10 Periods**

Cloud Infrastructure:Overview of cloud Infrastructure, Containers, File Storage, Block Storage, Object Storage, and Content Delivery Networks (CDN).

Learning outcomes: At the end of this unit, the students will be able to

- Learn about various cloud architectures and the benefits of Content Delivery Networks

UNIT-IV Components of Cloud Computing **10 Periods**

Cloud VM's: Virtualization and Virtual Machines, Types of Virtual Machines, Secure networking in Cloud

Learning outcomes: At the end of this unit, the students will be able to

- Learn about various components such as virtualization, Virtual Machines and also secure networking

UNIT-V Cloud Adoption, Emerging Technologies and Trends **10 Periods**

Micro Services: Cloud Native, Hybrid Multi-cloud, cloud Native Applications. *Application Modernization:* Business case for cloud computing, *Emerging technologies and Trends*: cloud AI, IoT, Block chain and Analytics

Learning outcomes: At the end of this unit, the students will be able to

- Learn about the emergent trends in Cloud Computing and how native cloud work.

Text Books

1. Buyya R., Broberg J., Goscinski A., Cloud Computing: Principles and Paradigm, First Edition, John Wiley and Sons, 2011.
2. Rittinghouse, John W., and James F. Ransome, Cloud Computing: Implementation, Management, And Security, CRC Press, 2017.

References

1. Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, Mastering Cloud Computing, Tata Mcgraw Hill, 2013.
2. Toby Velte, Anthony Velte, Robert Elsenpeter, ‑Cloud Computing – A Practical Approach, Tata Mcgraw Hill, 2009.