MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act,1956

B.Tech. with Minor Degree Program in Cloud Computing

Course Structure (2024-25)

(Applicable for 2024-2025 Batch-R24 Syllabus)

S. No.	Sem	Course Code	Course Title	Course Area	Hours Per Week			Credits	Scheme of Examination Maximum Marks		
					L	T	P		Internal (CIE)	External (SEE)	Total
1	V	245MDCSE501	Computer Networks	PC	3	0	0	3	40	60	100
2	V	245MDCSE502	Cloud Computing	PC	3	0	0	3	40	60	100
3	V	245MDCSE530	Cloud Computing Lab	PC	0		2	1	40	60	100
4	VI	245MDCSE503	AWS for Cloud Computing	PC	3	0	0	3	40	60	100
5	VI	245MDCSE531	AWS for Cloud Computing Lab	PC	0		2	1	40	60	100
6	VI	255MDCSE504	Data Mining and Data warehousing	PC	3	0	0	3	40	60	100
7	VI	255MDCSE532	Data Mining and Data warehousing Lab	PC	0	0	2	1	40	60	100
8	VI		Project	PS	3			3	40	60	100
		Total Credits			**18**	**0**	**0**	**18**	**320**	**480**	**800**

Department of Computer Science Engineering
B.Tech Cloud Computing (Minor)

COMPUTERNETWORKS

III Year-I Semester

L	T	P	C
3	0	0	3

Prerequisites:

1. Basic knowledge of computer organization and operating systems.
2. Understanding of fundamental data structures and programming concepts.

Objectives:

1. To introduce the basic components and models of computer networks.
2. To understand data communication principles and transmission media.
3. To study LAN, MAN, and WAN technologies with protocols.
4. To familiarize with network devices, addressing, and layered architecture.
5. To provide knowledge of TCP/IP protocols and applications of computer networks.

Outcomes:

1. Identify the different components in a Communication System and their respective roles.
2. Describe the fundamental concepts on data communication and the design of computer networks.
3. To get familiarized with the basic protocols of computer networks.
4. Describe the technical issues related to the local Area Networks
5. Identify the common technologies available in establishing LAN infrastructure.

UNIT I

Introduction to Network:- Definition, Applications, line configuration, Network topologies, Transmission mode, Types of Networks (LAN, WAN, MAN), Protocols, Network models: The OSI model, TCP/IP Protocol Suite.

Physical Layer: Signals –Analog signals, Digital signals, Transmission media - Guided & Un-Guided.

UNIT-II

Network LAN Technologies: Ethernet, Fast Ethernet, Gigabit Ethernet, and Wireless LAN's.

Data Link Layer: Error Detection and correction - Types of Errors, Error Detection, Error correction. Data link Protocols – Stop-and-wait ARQ, Go-back-n ARQ, Automatic Repeat Request (ARQ).

UNIT-III

Network Devices: Modem, Hub, Switch, Router, Repeaters, bridges, Gateway.

Network Layer: Internetwork Protocol (IP), Addressing (Classes, Dotted-decimal notation, Sample Internet), Subnet mask, Network layer Protocols – ARP, IPv4, and IPv6.

UNIT-IV

Transport Layer: TCP protocol, UDP protocol, Process-to-Process delivery, Congestion: Congestion control, congestion avoidance, congestion discarding, Quality of Service (QOS).

UNIT-V

Application Layer: Domain Name System (DNS) - domain name space, distribution of name space, DNS in the Internet, SMTP, SNMP, FTP, POP3, HTTP, WWW.

Text Books:

1. Data Communication and Computer Networks by Behrouz A. Forozoun, Published by Thomas MC GRAW HILL 2nd edition.
2. Andrew S. Tanenbaum, "Computer Networks", Fourth Edition, 2003
3. An introduction to computer network by PETERLDORODAL.

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Department of Computer Science Engineering
B.Tech Cloud Computing (Minor)

CLOUD COMPUTING

III Year-I Semester **L T P C**

3 0 0 3

Prerequisites:

1. Basics of computer networks and internet technologies.
2. Familiarity with operating systems and virtualization concepts.

Objectives:

1. To introduce cloud computing fundamentals, history, and evolution.
2. To study cloud models (IaaS, PaaS, SaaS) and deployment types.
3. To understand cloud service providers and their offerings.
4. To analyze cloud data storage, security, and virtualization concepts.
5. To provide awareness of issues like scalability, privacy, and interoperability in the cloud.

Outcomes

1. Compare the strengths and limitations of cloud computing
2. Identify the architecture, infrastructure and delivery models of cloud computing
3. Apply suitable virtualization concept.
4. Choose the appropriate cloud player, Programming Models and approach.
5. Address the core issues of cloud computing such as security, privacy and interoperability

UNIT I

Introduction to Cloud Computing: Evolution and History of Cloud Computing, Introduction to Cloud Computing, Why Cloud Computing is Becoming Highly Important, Features of Cloud Computing, Cloud Computing for various users, Advantages of Cloud Computing, Limitations of Cloud Computing.

UNIT-II

Cloud Models and Types: The NIST Model, Cloud Cube Model, Deployment Models, Service Models. Layers and Types of Cloud, Components of Cloud Computing, Cloud Computing Service Providers

Software as a Service (SaaS): Software as a Service, Evolution of SaaS, Brief Introductory part of Software as a Service, SaaS Unification Technologies, SaaS Integration Products and Technologies, SaaS Product Selection Criteria, SaaS Integration Services, Advantages of SaaS

UNIT-III

Platform as a Service (PaaS): Introduction to PaaS, Evolution of PaaS, PaaS Service Providers- Acquia Cloud, Amazon AWS, Amazon Elastic Beanstalk, Google App Engine, Force.com, PaaS Application Framework, PaaS Operator Verbs, PaaS Developer Verbs, Advantages and Challenges of PaaS

UNIT-IV

Infrastructure as a Service (IaaS): Evolution, IaaS Architecture- Advantages and Disadvantages of Infrastructure as a Service, SAN model, IaaS Providers, IaaS Architecture, Advantages and Disadvantages of Infrastructure as a Service

Data in Cloud : Evolution of Network Storage in Cloud, Data as a Service, Database as a Service, Cloud Based Data Storage, Advantages and Limitations of Cloud Based Storage Solution, Cloud Based Data Storage Service Providers

UNIT-V

Virtualization: Introduction to Virtualization and its Technical Evolution, History of Virtualization, Types of Virtual Machines, Advantages of Virtualization, Components of Virtualization, Types of Virtualization

Text Books:

1. Hand book of Cloud Computing By Dr. Anand Nayyar(Editor),First Edition2019, BPB Publication, India
2. Cloud computing a practical approach-Anthony T. Velte, Toby J.Velte Robert Elsenpeter TATA McGraw- Hill , New Delhi – 2010
3. Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online - Michael Miller - Que 2008
4. Cloud Computing, Theory and Practice, Dan C Marinescu, MKEl sevier.
5. Cloud Computing, A Hands on approach, Arshadeep Bahga, Vijay Madisetti, University Press
6. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christenvecctiola, S Tammaraiselvi, TMH

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Department of Computer Science Engineering
B.Tech Cloud Computing (Minor)

CLOUD COMPUTING LAB

III Year-I Semester

L	T	P	C
0	0	2	1

Prerequisites:

1. Knowledge of basic operating systems and networking.
2. Familiarity with programming and web technologies.

Objectives:

1. To gain hands-on experience with cloud-based document and application management.
2. To install and configure cloud platforms like OpenStack.
3. To implement security and identity management features in cloud environments.
4. To design and deploy private cloud services.
5. To perform case studies on public cloud platforms like AWS and Azure.

Outcomes:

1. Installing and using identity management feature of Open Stack.
2. Installing and using security feature of own Cloud.
3. Installing and using Administrative features of own Cloud.
4. Design Cloud Services and Set a private cloud
5. Installing and using JOSSO.

Practical Syllabus:

1. Create a word document of your class time table and store locally and on cloud with doc and pdf format.
2. Prepare a Power Point on cloud on topic of your choice.
3. Create your resume in an eat format using Google and Zoho cloud
4. Install Open Stack and use it as Infrastructure as a Service and use technology own Cloud.
5. Installing and using identity management feature of Open Stack.
6. Write a program for web feed using PHP, HTML.
7. Installing and using JOSSO.
8. Installing and using security feature of own Cloud.
9. Installing and using Administrative features of own Cloud.
10. Case study on Amazon EC2.
11. Case study on Microsoft azure.

References:

1. Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online - Michael Miller - Que 2008
2. Cloud Computing, Theory and Practice, Dan C Marinescu, MKE l sevier.
3. Cloud Computing, A Hands on approach, Arshadeep Bahga, Vijay Madisetti,

University Press
4. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christen vecctiola, S Tammaraiselvi, TMH

Co-Curricular Activities:

a) <u>Suggested Co-Curricular Activities:</u>

(Co-curricular activities shall not promote copying from text book or from others work and shall encourage self/independent and group learning)

A. Measurable

1. Assignments (in writing and doing forms on the aspects of syllabus content and outside the syllabus content. Shall be individual and challenging)
2. Studentseminars(ontopicsofthesyllabusandrelatedaspects(individualactivity))
3. Quiz (on topics where the content can be compiled by smaller aspects and data (Individuals or groups as teams))
4. Study projects (by very small groups of students on selected local real-time problems pertaining to syllabus or related areas. The individual participation and contribution of students shall be ensured (team activity))

B. General

1. Group Discussion
2. Others

RECOMMENDED CONTINUOUS ASSESSMENT METHODS: Some of the following Suggested assessment methodologies could be adopted:

1. Theoral and written examinations (Scheduled and surprise tests),
2. Closed-book and open-book tests,
3. Programming exercises,
4. Practical assignments and laboratory reports,
5. Observation of practical skills,
6. Individual and group project reports.
7. Efficient delivery using seminar presentations,
8. Vivavoce interviews.
9. Computerized adaptive testing, literature surveys and evaluations,
10. Peers and self-assessment, outputs form individual and collaborative work

Department of Computer Science Engineering
B.Tech Cloud Computing (Minor)

AWS FOR CLOUD COMPUTING

III Year-I Semester

L	T	P	C
3	0	0	3

Prerequisites:

1. Knowledge of cloud computing basics and virtualization.
2. Familiarity with computer networks and distributed systems.

Objectives:

1. To understand cloud enabling technologies and virtualization tools.
2. To learn AWS infrastructure, networking, and VPC configuration.
3. To analyze cloud storage services such as Amazon S3.
4. To explore AWS compute services (EC2) and pricing models.
5. To study cloud security models at network, host, and application levels.

Outcomes

1. Configure various virtualization too ls such as Virtual Box, VM ware work station. Design and deploy a web application in a PaaS environment.
2. Learn how to simulate a cloud environment to implement new schedulers.
3. Install and use a generic cloud environment that can be used as a private cloud.
4. Manipulate large data sets in a parallel environment.

UNIT-I

Introduction: Definition of Cloud – Evolution of Cloud Computing – Benefits of Cloud Computing - Underlying Principles of Parallel and Distributed Computing – Cloud Characteristics – Elasticity in Cloud – On-demand Provisioning.

UNIT-II

Cloud Enabling Technologies: Service Oriented Architecture – REST and Systems of Systems – Web Services – Publish Subscribe Model – Basics of Virtualization – Types of Virtualization – Implementation Levels of Virtualization – Virtualization Structures-Tools and mechanisms.

UNIT-II

Virtualization of CPU – Memory – I/O Devices –Virtualization Support and Disaster Recovery. Cloud Architecture & Services: Layered Cloud Architecture Design – Public, Private and Hybrid Clouds -Cloud computing models: laaS – PaaS – SaaS,

cloud delivery models, cloud deployment models.

UNIT-III

AWS & Networking: Introduction to AWS, AWS Global infrastructure, Google cloud platform, network switches & virtual private cloud (VPC), VP Cand Subnets, IP addressing in AWS, AWS security groups, EC2 instance types. EC2 pricing models

UNIT-IV

Cloud storage: Cloud Storage –Advantages of Cloud Storage – Cloud Storage Providers – S3 (Simple Storage Service) - S3 Features.

Security in cloud: Software-as-a-Service Security–Security Governance–Virtual Machine Security-Security types: network level, host level, application level.

Text Books:

1. KaiHwang, Geoffrey C. Fox, Jack G. Dongarra, "Distributed and Cloud Computing, From Parallel Processing to the Internet of Things", Morgan Kaufmann Publishers, 2012.
2. Overview of AWS: AWS whitepaper, copyright@aws,inc, and /or its affiliates. BYLAWS.
3. Rittinghouse, JohnW., and James F. Ransome, Cloud Computing: Implementation, Management and Security‖, CRC Press, 2017.
4. Rajkumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, Mastering Cloud Computing‖, Tata Mc graw Hill, 2013.
5. Toby Velte, Anthony Velte, Robert Elsenpeter, "Cloud Computing -A Practical Approach‖, Tata Mc graw Hill, 2009.
6. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud: Transactional Systems for EC2 and Beyond (Theory in Practice) ‖, O'Reilly, 2009.

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AWS FOR CLOUD COMPUTING LAB

III Year-I Semester

L	T	P	C
0	0	2	1

Prerequisites:

1. Familiarity with Linux/Windows OS and basic programming.
2. Understanding of virtualization tools like VirtualBox/VMware.

Objectives:

1. To configure and manage virtualization tools for cloud environment simulation.
2. To deploy applications on Google App Engine and AWS platforms.
3. To simulate scheduling algorithms using CloudSim.
4. To practice VM creation, file transfer, and inter-VM communication.
5. To implement Hadoop-based applications on cloud clusters.

Outcomes

1. Configure various virtualization tools such as Virtual Box, VMware work station. Design and deploy a web application in a PaaS environment.
2. Able to Install Virtual box/ VMware Work station with different flavours of linux or windows OS on top of windows7 or Windows 8.
3. Able to Install a Compiler in the virtual machine create using virtual box and execute Simple Programs
4. Able to Install Google App Engine. Create hello world append other simple web applications using python/java.
5. Able to Simulate a cloud scenario using Cloud Sim and run a scheduling algorithm that is not present in Cloud Sim

Practical Syllabus:

1. Install Virtual box/VMware Work station with different flavours of linux or windows OS on top of windows7 or Windows 8.
2. Install a Compiler in the virtual machine created using virtual box and execute Simple Programs
3. InstallGoogleAppEngine.Createhelloworldappandothersimplewebapplicationsusing python/java.
4. Use GAE launcher to launch the web applications.
5. Simulate a cloud scenario using Cloud Sim and run a scheduling algorithm that is not present in Cloud Sim.
6. Find a procedure to transfer the files from one virtual machine to another virtual machine.

7. Find a procedure to launch virtual machine using try stack (Online Open stack Demo Version)
8. Install Hadoopsing lenode cluster and run simple applications like word count

References:

1. Raj kumar Buyya, Christian Vecchiola, S. ThamaraiSelvi, Mastering Cloud Computing, Tata Mcgraw Hill, 2013.
2. Toby Velte, Anthony Velte, Robert Elsenpeter,"Cloud Computing-A Practical Approachǁ, Tata Mcgraw Hill, 2009.
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DATA MINING AND DATA WARE HOUSING

III Year-I Semester

L	T	P	C
3	0	0	3

Prerequisites:

1. Basic knowledge of databases and SQL.
2. Understanding of probability, statistics, and algorithms.

Objectives:

1. To introduce concepts of data warehousing and OLAP operations.
2. To understand preprocessing techniques for real-world datasets.
3. To learn data mining algorithms for association, classification, and clustering.
4. To analyze advanced methods such as neural networks and genetic algorithms.
5. To apply data mining for web, text, and unstructured data.

Outcomes

1. To understand data mining concepts.
2. To learn Data mining techniques and algorithms.
3. Comprehend the data mining environments
4. Characterize the various kinds of patterns that can be discovered by association rule mining.
5. Evaluate mathematical methods underlying the effective application of datamining.

UNIT-I

Data Warehousing: Introduction, What is Data Warehouse? Definition, Multidimensional Data Model, **OLAP** Operations, Warehouse Schema, Data Warehouse Architecture, Warehouse Server, Metadata, OLAP Engine, Data Warehouse Backend Process, Other Features

Data Preprocessing, Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation

UNIT-II

Data Mining: What is Data Mining? Data Mining: Definitions, KDD vs Data Mining, DBMS vs DM, Other Related Areas, DM Techniques, Other Mining Techniques, Issues and Challenges in DM, DM Applications- Case Studies

Association Rules: What is an Association Rule?, Methods to Discover Association Rules, A

Priori Algorithm, Partition Algorithm, Pincer-Search Algorithm, Dynamic Itemset Counting Algorithms, FP-Tree Growth Algorithm, Discussion on Different Algorithms, Incremental Algorithms, Border Algorithms, Generalized Association Rule, Association Rules with Item Constraints

UNIT-III

Clustering Techniques: Clustering Paradigms, Partitioning Algorithms, k-Medoid Algorithms, CLARA, CLARANS, Hierarchical Clustering, DBSCAN, BIRCH, CURE, Categorical Clustering Algorithms, STIRR, ROCK, CACTUS,

UNIT-IV

Decision Trees: What is a Decision Tree?, Tree Construction Principle, Best Split, Splitting Indices, Splitting Criteria, Decision Tree Construction Algorithms, CART, ID3, C4.5, Decision Tree Construction with Presorting, Rain Forest, Approximate Methods, CLOUDS, BOAT, Pruning Techniques, Integration of Pruning and Construction, Ideal Algorithm

UNIT-V

Other Techniques: What is a Neural Network?, Learning in NN, Unsupervised Learning, Data Mining Using NN: A Case Study, Genetic Algorithms, Rough Sets, Support Vector Machines

Web Mining: Web Mining, Web Content Mining, Web Structure Mining, Web Usage Mining, Text Mining, Unstructured Text, Episode Rule Discovery for Texts, Hierarchy of Categories, Text Clustering

Text Books:

1. Data Mining Techniques, Arun K Pujari, University Press
2. Data Mining: Concepts and Techniques, 3rdEdition, Jiawei Han, Micheline Kamber, Jian Pei

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DATA MINING AND DATA WARE HOUSING LAB

III Year-I Semester

L	T	P	C
0	0	2	1

Prerequisites:

1. Basic Python programming skills.
2. Knowledge of database systems and SQL queries.

Objectives:

1. To apply preprocessing and cleaning techniques on datasets.
2. To implement similarity measures using Python libraries.
3. To perform classification using Decision Trees and Naïve Bayes.
4. To implement clustering methods like K-Means, DBSCAN, and Hierarchical clustering.
5. To generate association rules using Apriori algorithm for market basket data.

Outcomes

1. Apply preprocessing techniques on real world datasets
2. Apply a priority algorithm to generate frequent item sets.
3. Apply Classification and clustering algorithms on different datasets.

PracticalSyllabus:

1. Demonstrate the following data preprocessing tasks using python libraries.
    a) Loading the dataset
    b) Identifying the dependent and independent variables
    c) Dealing with missing data
2. Demonstrate the following data preprocessing tasks using python libraries.
    a) Dealingwith categorical data
    b) Scaling the features
    c) Splitting dataset into Training and Testing Sets
3. Demonstrate the following Similarity and Dissimilarity Measures using python
    a) Pearson's Correlation
    b) Cosine Similarity
    c) Jaccard Similarity
    d) Euclidean Distance
    e) Manhattan Distance
4. Build a model using linear regression algorithm on any dataset.

5. Build a classification model using Decision Tree algorithm on iris dataset
6. Apply Naïve Bayes Classification algorithm on any dataset
7. Generate frequent item sets using Apriority Algorithm in python and also generate association rules for any market basket data.
8. Apply K-Means clustering algorithm on any dataset.
9. Apply Hierarchical Clustering algorithm on any dataset.
10. Apply DBSCAN clustering algorithm on any dataset.

References:

a. Introduction to Privacy-Preserving Data Publishing: Concepts and Techniques, Benjamin C.M. Fung, Ke Wang, Ada Wai-Chee Fu, Philip S. Yu

b. Data Mining: Concepts, Modes and Techniques, Florin Gorunescu(auth.)

Co-Curricular Activities:

Suggested Co-Curricular Activities:

1. Training of students by related industrial experts.
2. Assignments
3. Seminars, Group-discussions, Quiz, Debates etc. (on related topics).
4. Preparation of videos on tools and techniques.
5. Visits to technology facilities, firms, research organizations etc.
6. Invited lectures and presentations on related topics by field/industrial experts.