Maharashtra Institute of Technology

Chhatrapati Sambhajinagar

An Autonomous Institute Affiliated to
Dr. Babasaheb Ambedkar Marathwada University,
Chhatrapati Sambhajinagar, Maharashtra (India)

Honors Degree in "Computer Science and Engineering"
(Specialization-Cloud Computing)

(Revised NEP 2020 Based Curriculum)
WEF AY 2024-25

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(An Autonomous Institute)

(4 Year Honours Degree Program in B. Tech (Computer Science and Engineering) Syllabus Structure

Specialization: Cloud Computing

WEF 2024-25 (NEP 2020 Based Curriculum)

Semester	Course Category	Course Code	Course Title	L	T	P	Contact Hrs./Wk	Credits	ISE-I	ISE-II	CIE	TA	ESE	Total
III	Honour	CSE801	Cloud Computing Foundation	3	-	-	3	3	15	15	10	10	50	100
IV	Honour	CSE802	Database Storage in Cloud Computing	3	-	-	3	3	15	15	10	10	50	100
V	Honour	CSE803	Online Course specific to Program of Study =	$	-	-	1	3	15	15	10	10	50	100*
VI	Honour	CSE804	Online Course specific to Program of Study =	$	-	-	1	3	15	15	10	10	50	100*
VII	Honour	CSE805	Online Course specific to Program of Study #	$	-	-	1	3	15	15	10	10	50	100*
VIII	Honour	CSE806	Online Course specific to Program of Study #	$	-	-	1	3	15	15	10	10	50	100*
					-	-	10	18	90	90	60	60	300	600

Abbreviations: L: Lecture, T: Tutorial, P: Practical, ISE: In-Semester Examination, CIE: Continuous Internal Evaluation, TA: Teacher's Assessment, ESE: End-Semester Examination

$ - Lecture hours are not mentioned as the course offered is either in the online or self-paced study mode. The Contact hours per week is mentioned for actual contact with the Mentor.

Online Course specific to Honours Degree Program of Study:

Course Code	Guidelines/Instructions:
CSE803	= It could be of following two online mode courses: **Online Mode A-** MOOC courses will be as per the approved basket of Courses from Board of Studies (Program offering) and subsequently approved by the Academic Council. These courses can be opted through platforms like SWAYAM, NPTEL, etc The course selected must be of minimum 3 Credits nature and mentioned for credit transfer by the MOOC platform. * In this case Continuous Assessment and proctored exam will be conducted by the MOOC Portal. As per the guidelines mentioned on the SWAYAM, NPTEL platform, Institute level examination may be conducted in accordance with the prescribed rules and regulations for credit transfer and eligibility. **Online Mode B:** Department may offer courses to be completed in Online mode (self-paced study mode). The course e-content either prepared by the department or available on University/National body recognized portal. The course selected must be of minimum 3 Credits nature. * In this Online Mode B offered courses, department will conduct the Internal Assessment (ISE, TA, CIE). End Semester Examination will be conducted as per Institute norms (**only Regular Examination**).
CSE804	
CSE805	
CSE806	

General Note:

1. **Department offering the Program, will communicate the approved course basket to the students, well in advance, to ease the student enrollment, mentor allotment, and communication to examination cell.**
2. **If the courses in ONLINE mode A & B is not available at the time of study, Department may design the curriculum for physical mode conduction.**
3. **Students and Faculty must refer the guidelines for enrollment, eligibility and examination rules given in this document.**

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Chhatrapati Sambhajinagar,M.S.-431010

Chairperson
Academic Council
Maharashtra Institute of Technology,
Chhatrapati Sambhajinagar (M.S.)

Faculty of Science & Technology
Syllabus of Honours Degree in "Computer Science and Engineering"
(Specialization - Cloud Computing) (Semester III)

Course Category: Honour Course Code: **CSE801** Course: Cloud Computing Foundation Teaching Scheme: Theory- 3 Hrs./week	**Credits: 3-0-0** In Semester Examination-I: 15 Marks In Semester Examination-II: 15Marks Teacher Assessment: 10 Marks Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks End Semester Examination (Duration): 2 Hrs.

Prerequisite	Cloud Computing Basics
Objectives	• To review and strengthen important concepts of Cloud Computing • Introduce the concept cloud computing
Unit-I	**Fundamentals of cloud computing:** Introduction to the cloud computing, Advantages of cloud computing, Cloud Adoption Framework, Cloud Computing models, Cloud service categories. IAAS, PAAS, SAAS. Pricing Models, Billing and Cost concepts, Pricing Calculator. **(06 Hrs)**
Unit-II	**Overview of Cloud Infrastructure & Management:** Introduction to the Cloud Infrastructure, On premises Infrastructure, Global Connectivity of cloud computing, Cloud Dashboard Management, Cloud Region, Cloud Availability Zone, Edge Location, Data Centers, Cloud Server. **(07Hrs)**
Unit-III	**Introduction to Amazon EC2 and Compute Services:** Introduction EC2, Define EC2, Compute service overview, EC2 Cost Optimization, Container, Lambda service and its category, difference between managed service and unmanaged service in EC2, Elastic Benstalk service and its application. **(07 Hrs)**
Unit-IV	**Cloud Security and Identity Management**: Introduction to the Cloud Security, Concept of Identity Access Management Service, Shared Responsibility Model, Customers responsibility and Cloud Service Provide Responsibility, Cloud Account Security, Cloud Root Security, Cloud Customer Security. Ensure Security Compliance through Dashboard. **(07 Hrs)**
Unit-V	**Cloud Network & Virtualization Fundamentals:** Cloud Network, Introduction to virtualization, Concept of Virtual Machines, Define Instances in cloud, Cloud Network basics, Cloud Network services, Virtual Private Cloud, Virtual Private Network. Cloud front service, Cloud Watch service. **(06 Hrs)**
Unit-VI	**Advanced Cloud Services and Network Security:** Cloud Content Delivery methods, VPC security, Route 53 service of cloud computing, Lab Diagram (10 systems), VPC and VPN configuration. Cloud Identity Access group, VPN and VPC cloud compliances. **(06 Hrs)**

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	Sr. No.	Title	Author	Publication	Edition
References	1.	Mastering Cloud Computing	Rajkumar Buyya	Mcgraw Hill	2nd
	2.	Cloud Computing Implementation Management and security	John W Ritting House	CRC Press	1st
	3.	Cloud Computing A Practical approach	Anthony T Velte	Mcgraw Hill	1st
	4.	Cloud Computing Web based application that change the way you work and collaborate online	Nichael Miller	Pearson	1st

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Faculty of Science & Technology
Syllabus of Honours Degree in "Computer Science and Engineering"
(Specialization - Cloud Computing) (Semester IV)

Course Category: Honour Course Code: **CSE802** Course: **Database Storage in Cloud Computing** Teaching Scheme: Theory: 03 Hrs./week	**Credits: 3-0-0** In Semester Examination-I: 15 Marks In Semester Examination-II: 15Marks Teacher Assessment: 10 Marks Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks End Semester Examination (Duration): 02 Hrs.

Prerequisite	Cloud Computing Basics and storage
Objectives	• To review and strengthen important concepts of Cloud Computing • Introduce the concept cloud computing and Storage services of Cloud
Unit-I	**Foundations of Cloud Storage and Billing** Introduction to cloud Storage, Storage billing and Dashboard, Block Storage, Object Storage, individual storage volume, boot volume for EC-2 instances, Data storage, file system, database host, enterprise application for storage of cloud services. **(06 Hrs)**
Unit-II	**Amazon Web Services (AWS) Storage Solutions** Elastic Block storage volume types, EBS features, Simple storage service (S-3), S-3 Bucket, S-3 Storage Classes, Amazon S3 Intelligent Tiering, Amazon S3 Standard, Infrequent Access (Amazon S3 Standard, Amazon S3 One Zone, Infrequent Access (Amazon S3 One Zone, Amazon S3 Glacier. **(07 Hrs)**
Unit-III	**Amazon Web Services (AWS) File and Archive Storage Solutions** Introduction to Elastic File System, EFS features, EFS Architecture, EFS implementation, EFS resources, Glacier Storage service and its working principle, Glacier service use cases, life cycle policies, cloud storage services, S3 and S3 Glacier services. **(07 Hrs)**
Unit-IV	**Fundamentals of Cloud Storage and Security** Introduction to storage server, server encryption, client decryption, KMS (Key Management Service), CMKS (Customer Master Keys), Storage control access service, Data archive with cloud services, 119s durability of storage. **(06 Hrs)**
Unit-V	**Comparative Analysis of Cloud Storage Services** Comparison of difference types of storage in cloud computing, EBS, EFS, S-3, Glacier, Functions of EFS, Durability of EBS, Consistency of S-3, Customer and service provider service of cloud storage. **(07 Hrs)**
Unit-VI	**Fundamentals of Cloud Storage Services** Introduction to storage snapshot service, storage elasticity, difference between SSD and HHD, Storage volume and its type, mounting, Temporary storage, Pricing model for storage, Storage consol. **(06 Hrs)**

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	Sr. No.	Title	Author	Publication	Edition
References	1.	Cloud Computing Bible	Barrie Sosinsky	Wiley	4th
	2.	Enterprise Cloud Computing Technology Architecture	Gautam Shroff	Cambridge University	4th
	3.	Web Technologies TCP /IP Web Java Programming & Cloud Computing	Achut Godbole	Mcgraw Hill	2nd
	4.	Cloud computing with the Window Azure Platform	Roger Jennings	Wiley	5th

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Faculty of Science & Technology Syllabus for Honors in Cloud Computing Offered by Computer Science and Engineering department (Semester V)	
Course Category: **Honor** Course Code: CSE803 **Course: Cloud Infrastructure and services** Teaching Scheme: Theory: 03 Hrs./week	Credits: 3-0-0 In Semester Examination-I: 15 Marks In Semester Examination-II: 15Marks Teacher Assessment: 10 Marks Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks End Semester Examination (Duration): 02 Hrs.

Prerequisite	Basic understanding of computer networks, virtualization concepts, and operating system fundamentals.
Objectives	• Understand the core concepts, architectures, and service models of cloud computing, including SaaS, PaaS, IaaS, and SECaaS. • Analyze cloud application design, deployment models, security standards, and performance optimization techniques. • Evaluate cloud computing risks, cost models, and data/application security measures for effective cloud adoption.
Unit-I	**Introduction to Cloud Computing** basic concepts of Cloud Computing, characteristics, layered architecture, and evolution of cloud computing. comparisons with traditional computing models and an overview of risks and challenges. **(06Hrs)**
Unit-II	**Cloud Types and Deployment Models** Different cloud types like public, private, and hybrid, and their implementation. deployment models and the transition from traditional to cloud-based architectures. **(07Hrs)**
Unit-III	**Cloud Service Models** Core service models such as IaaS, PaaS, SaaS, DBaaS, and SOA-based application,MaaS and CaaS, case studies. **(07Hrs)**
Unit-IV	**Cloud Security and Risk Management** Introduction of Security as a Service (SECaaS), cloud security standards, risk analysis, and identity services. recovery, storage, and monitoring services with risk mitigation. **(07Hrs)**
Unit-V	**Cloud Applications and Performance Optimization** Cloud application requirements, architecture, client-server mechanisms, and performance tuning. Networking issues, automation, self-service, and parallelization. **(06Hr)**
Unit-VI	**Cloud Costing and Data Management** Cloud database performance, service brokerage, and billing models. Cost calculation through TCO, Data management, data Security. **(06Hrs)**

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	Sr.No.	Title	Author	Publication	Edition
Textbooks /Reference Books	1.	Cloud Computing: Concepts, Technology & Architecture	Thomas Erl, Zaigham Mahmood	Prentice Hall (Pearson)	1st
	2.	Mastering Cloud Computing: Foundations and Applications Programming	Rajkumar Buyya, Christian Vecchiola	McGraw Hill Education	2nd
	3.	Cloud Computing Bible	Barrie Sosinsky	Wiley India Pvt. Ltd.	1st
	4.	Distributed and Cloud Computing: From Parallel Processing to the Internet of Things	Kai Hwang, Jack Dongarra,	Morgan Kaufmann	2nd

Reference link
https://onlinecourses.swayam2.ac.in/nou25_cs33/preview

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Faculty of Science & Technology
Syllabus for Honors in Cloud Computing
Offered by Computer Science and Engineering department (Semester V)

Course Category: **Honor** Course Code: CSE803 **Course: Cloud Infrastructure and services** Teaching Scheme: Theory- 3 Hrs./week	Credits: 3-0-0 In Semester Examination-I: 15 Marks In Semester Examination-II: 15Marks Teacher Assessment: 10 Marks Continuous Internal Evaluation: 10 Marks End Semester Examination: 50 Marks End Semester Examination (Duration): 2 Hrs.

Course Outcomes	**CO1:** Understand the fundamental concepts, architecture, and service models of cloud computing. **CO2:** Compare cloud computing with traditional architectures and analyze deployment models like public, private, and hybrid. **CO3:** Apply various cloud services such as SaaS, PaaS, IaaS, and SECaaS to real-world applications. **CO4:** Evaluate cloud security, performance, cost models, and application architectures for efficient decision-making.

CO PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	2	2	2	1	1	1	1	2	1
CO2	3	3	2	2	2	1	2	1	1	2	2
CO3	2	3	3	3	3	1	2	1	1	2	2
CO4	2	2	3	3	2	1	2	2	2	2	3
Average	2.5	2.5	2.5	2.5	2.25	1	1.75	1.25	1.25	2	2
Mapping Strength	**3**	**3**	**3**	**3**	**2**	**1**	**2**	**1**	**1**	**2**	**2**

CO PSO Mapping

COs	PSO I	PSO II	PSO III
CO1	2	2	1
CO2	3	3	2
CO3	2	2	3
CO4	3	2	2
Avg	2.5	2.25	2

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