

**Course: Elective  
Cloud Computing**

<b>Semester: I</b>	<b>Credits: 4</b>	<b>Subject Code: SMAJCCC223556</b>	<b>Lectures: 60</b>
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**Course Outcomes:**

- CO1: Articulate the main concepts, key technologies, strengths, limitations of cloud computing and the possible applications for state-of-the-art cloud computing.
- CO2: Identify the architecture and infrastructure of cloud computing, including cloud delivery and deployment models.
- CO3: Compare the advantages and disadvantages of various cloud computing platforms.
- CO4: Identify security and privacy issues in cloud computing.
- CO5: Demonstrate the use of commercial cloud computing platforms such as Web Services, Windows Azure, and Google App Engine.
- CO6: Implement cloud computing concepts on commercial cloud computing platforms.

<b>Unit 1: Fundamentals and Architecture, Services and Applications of cloud</b>	<b>15</b>
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- Fundamentals of Cloud Computing-Overview, Roots of Cloud Computing, Layers and Types of Cloud, Desired Features of a Cloud, Benefits and Disadvantages of Cloud Computing, Cloud Infrastructure Management, Infrastructure as a Service Provider, Platform as a Service Provider, Challenges and Risks.
- Cloud-Enabling Technology- Broadband Networks and Internet Architecture, Data Center Technology, Virtualization Technology, Web Technology, Multitenant Technology, Service Technology.
- Architecture, Services and Applications of cloud -Exploring the Cloud Computing Stack, Infrastructure as a Service, Platform as a Service, SaaS Vs. PaaS, Identity as a Service, Using PaaS Application Frameworks, Software as a Service Cloud Deployment Models, Public vs Private Cloud, Cloud Solutions, Cloud ecosystem, Service management, Compliance as a Service.

<b>Unit 2: Abstraction and Virtualization</b>	<b>15</b>
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- Abstraction and Virtualization-Introduction to Virtualization Technologies, Load Balancing and Virtualization, Understanding Hypervisors, Understanding Machine Imaging, Porting Applications, Virtual Machines Provisioning and Manageability, Virtual Machine Migration Services, Virtual Machine Provisioning, Provisioning in the Cloud Context Virtualization of CPU, Memory, I/O Devices, Virtual Clusters and Resource management, Virtualization for Data Center Automation.




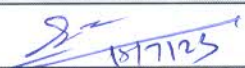
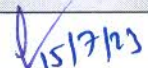
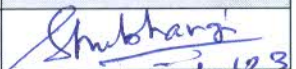
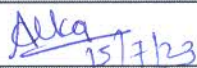

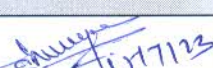
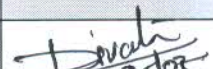
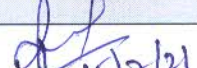
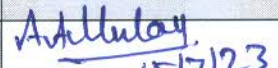
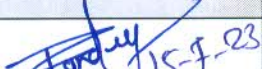
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<b>Unit 3: Security in Cloud</b>	<b>15</b>
<ul style="list-style-type: none"> <li>• Security Overview- Cloud Security Challenges and Risks, Software-as-a-Service Security, Security Governance – Risk Management – Security Monitoring, Security Architecture Design, DataSecurity.</li> <li>• Application Security – Virtual Machine Security, Identity Management and Access Control, Autonomic Security, Autonomic Security Storage Area Networks.</li> <li>• Disaster Recovery in Clouds.</li> </ul>	

<b>Unit 4: Cloud platforms and Applications</b>	<b>15</b>
<ul style="list-style-type: none"> <li>• Cloud platforms and applications -Programming Support of Google App Engine, Programming on Amazon AWS and Microsoft Azure, Emerging Cloud Software Environments, Understanding Core OpenStack Ecosystem.</li> <li>• Applications: Moving application to cloud, Microsoft Cloud Services</li> <li>• Google Cloud Applications, Amazon Cloud Services, Cloud Applications (Social Networking, E-mail, Office Services, Google Apps, Customer Relationship Management).</li> <li>• Practical demonstration and Assignments</li> </ul>	

**References Books:**

- Brian J.S. Chee and Curtis Franklin, *Cloud Computing: Technologies and Strategies of the Ubiquitous Data Center*, CRC Press ISBN 9788131222560.
- Christian Vecchiola, S. Thamarai Selvi Rajkumar Buyya, *Mastering Cloud Computing: Foundations and Applications Programming*, McGraw Hill, ISBN: 9781259029950, 1259029956
- Kai Hwang, Geoffrey C Fox, Jack G Dongarra *Distributed and Cloud Computing, From Parallel Processing to the Internet of Things*, Morgan Kaufmann Publishers, edition 2012.

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