



Government Holkar (Model, Autonomous) Science  
College, Indore (M.P.)

Computer Science Department

Part A - Introduction			
Programme – B.C.A. (Computer Applications - Major)		Class – B.C.A. VI Semester	Year- 2025 Session- 2024-25
Course Type (Computer Applications) – Major			
1	Course Code	S6-BCA1T	
2	Course Title	Cloud Computing	
3	Pre – requisite (if any)		
4	Course Learning Outcomes (CLO)	<p>On successful completion of this course, the students will be able to:</p> <ol style="list-style-type: none"><li>1. Recall and state the definition of Cloud Computing, as well as distinguish between private, public, and hybrid clouds.</li><li>2. Understand the benefits of using cloud computing, such as cost-efficiency, scalability, and accessibility, and explain how it compares to traditional IT infrastructure.</li><li>3. Apply your knowledge to create and manage virtual machines (VMs) within a cloud environment, using platforms like Amazon EC2 or Microsoft Azure.</li><li>4. Analyze and evaluate the security features and practices of different cloud service providers, considering factors like data encryption, access controls, and compliance standards.</li><li>5. Create a comprehensive cloud architecture for a scalable web application, incorporating components like load balancers, databases, and auto-scaling mechanisms.</li><li>6. Evaluate and critique the impact of cloud computing on traditional IT infrastructure, considering aspects such as workforce skills, cost implications, and security concerns.</li></ol>	
5	Credit Value	4 Credits	
6	Total Marks	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks Total 40+60= 100 Marks	Minimum Pass Marks – 35

Dr. Pradeep Sharma

B.C.A. VI Semester Department of Computer Science, GHS Indore

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Part A - Introduction			
Programme – B.C.A. (Computer Applications - Major)	Class – B.C.A. VI Semester	Year- 2025	Session- 2024-25
Course Type (Computer Applications) – Major			
Course Code	S6-BCAIT		
Course Title	Cloud Computing		

Part – B Content of the Course		
Total no. of lectures – As per UGC rules (1 Credit = 15 Lectures)		
S. No.	Topics	No. of Lectures
I	Cloud Computing Fundamental: Cloud Computing definition, private, public and hybrid cloud. Cloud types; IaaS, PaaS, SaaS. Benefits and challenges of cloud computing, public vs private clouds. <b>Cloud computing platforms</b> – IaaS: Amazon EC2, S3 Bucket, PaaS: Google App Engine, Microsoft Azure, SaaS: AWS IAM (Identity and Access Management).	8
II	Basics Of Service Management in Cloud Computing, Data Management in Cloud Computing. Cloud Computing Architecture: Cloud Reference Model, Layer and Types of Clouds, Architectural design of Compute and Storage Clouds.	12
III	Overview of cloud management & Virtualization: Fundamental concepts of compute storage, networking, desktop and application virtualization, role of virtualization in enabling the cloud Virtualization benefits, server virtualization, Block and file level storage virtualization. Virtualization management, Virtualization technologies and architectures, virtual machine, Measurement and profiling of virtualized applications. <b>Hypervisors:</b> KVM, Xen, VMware hypervisors and their features. Introduction to Containerization Technology, Virtualization vs Containerization. <b>Container Engine Tools:</b> Docker/Podman.	14
IV	Cloud Security: Cloud Information security 18 fundamentals, Cloud security services, Design principles, Secure Cloud Software Requirements, Policy Implementation, Cloud Computing Security Challenges, Virtualization security Management, Cloud Computing Security Architecture.	14

**Dr. Pradeep Sharma**  
HEAD

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Programme – B.C.A. (Computer Applications - Major)	Class – B.C.A. VI Semester	Year- 2025	Session- 2024-25
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Course Code	S6-BCAIT		
Course Title	Cloud Computing		

V	Market Based Management of Clouds, Federated Clouds/Inter Cloud: Characterization & Definition, Cloud Federation Stack, Third Party Cloud Services Case study: Google App Engine, Microsoft Azure, Hadoop, Amazon, Aneka.	12
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**Dr. Pradeep Sharma**  
 HEAD  
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Part A - Introduction			
Programme – B.C.A. (Computer Applications - Major)	Class – B.C.A. VI Semester	Year- 2025	Session- 2024-25
Course Type (Computer Applications) – Major			
Course Code	S6-BCA1T		
Course Title	Cloud Computing		

Part C- Learning Resources
Textbooks, References Books, Other resources
<p><b>Suggested Readings:</b></p> <p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. A. Srinivasan, J.Suresh, Cloud Computing A Practical approach for learning and implementation, Pearson India, [ISBN-978131776513]</li> <li>2. Gautam Shroff, Enterprise Cloud Computing Technology Architecture Applications [ISBN:978-0521137355]</li> <li>3. Kumar Saurabh "Cloud Computing insights in to New-Era Infrastructure", Wiley India, 2011</li> <li>4. मध्य प्रदेश हिंदी ग्रंथ अकादमी की पुस्तकें</li> </ol> <p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Dimitris N. Chorafas, Cloud Computing Strategies [ISBN: 1439834539]</li> <li>2. Buyya, Selvi, Mastering Cloud Computing, TMH Pub</li> <li>3. Krutz, Vnes, Cloud Security, Wiley Pub</li> <li>4. Antohy T Velte, "Cloud Computing: A Practical Approach", McGraw Hill</li> <li>5. Michael Miller, "Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online".</li> <li>6. James E Smith, Ravi Nair, "Virtual Machines", Morgan Kaufmann Publishers.</li> </ol> <p><b>Suggested Digital Platforms Web Links:</b></p> <ol style="list-style-type: none"> <li>1. <a href="https://onlinecourses.nptel.ac.in/noc22cs20/preview">https://onlinecourses.nptel.ac.in/noc22cs20/preview</a></li> <li>2. <a href="https://nptel.ac.in/courses/106105223">https://nptel.ac.in/courses/106105223</a></li> <li>3. <a href="https://nptel.ac.in/courses/106104182">https://nptel.ac.in/courses/106104182</a></li> <li>4. <a href="https://www.tutorialspoint.com/cloud_computing/index.htm">https://www.tutorialspoint.com/cloud_computing/index.htm</a></li> <li>5. <a href="https://www.classcentral.com/course/swayam-cloud-computing-10027">https://www.classcentral.com/course/swayam-cloud-computing-10027</a></li> </ol> <p><b>Suggested Equivalent Online Courses:</b></p> <ol style="list-style-type: none"> <li>1. <a href="https://www.mygreatlearning.com/cloud_iot/certification">https://www.mygreatlearning.com/cloud_iot/certification</a></li> <li>2. <a href="https://www.intellipaat.com/cloud-computing/certification">https://www.intellipaat.com/cloud-computing/certification</a></li> <li>3. <a href="https://www.edureka.co/">https://www.edureka.co/</a></li> <li>4. <a href="https://www.coursera.org/browse/information-technology/cloud-computing">https://www.coursera.org/browse/information-technology/cloud-computing</a></li> </ol>



Part A - Introduction			
Programme – B.C.A. (Computer Applications - Major)	Class – B.C.A. VI Semester	Year- 2025	Session- 2024-25
Course Type (Computer Applications) – Major			
Course Code	S6-BCAIT		
Course Title	Cloud Computing		

Part – D Assessment and Evaluation				
<b>Internal Assessment: Continuous Comprehensive Evaluation (CCE)/ Formative Assessment: 40 Marks</b>  Formative Assessment shall be based on – Quiz, Seminar, Presentation, Written test, Case Study, Project, Assignment etc.  The division of marks is as follows:			<b>External Evaluation (Summative Assessment):</b> <b>End Semester Exam: 60 Marks</b> Time: 03 hours	
Test I	20 Marks	Best two test Marks = (20 + 20)	Section (A): 5 Objective Questions (1 mark each)	5 x 1 = 5
Test II	20 Marks		Section (B): 5 Short Questions out of eight questions (200 words each) (7 Marks each)	5 x 7 = 35
Test III	20 Marks		Section (C): Two long questions out of four questions ( 500 Words each) (10 Marks each)	2 x 10 = 20
Total Internal Assessment (CCE) Marks		40 Marks	Total External Evaluation (Theory) Marks (A+B+ C)	60 Marks
Note:	1.	For Major, Minor, Open Elective, Foundation and Vocational Courses, Part D will be as per the scheme of marks given.		
	2.	The student should secure 35% marks in Internal Assessment (CCE) and External Evaluation (theory) combined.		

**Dr. Pradeep Sharma**  
**HEAD**

**Department of Computer Science**  
**Govt. Holkar Science College**

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Government Holkar (Model, Autonomous) Science  
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Computer Science Department

Part A- Introduction (Practical)			
Programme – B.C.A. (Computer Applications - Major)		Class – B.C.A. VI Semester	Year- 2025 Session- 2024-25
Course Type (Computer Applications) – Major			
1.	Course Code	S6-BCA1TP	
2.	Course Title	Cloud Computing Lab	
3.	Pre-requisite (if any)	-	
4.	Course Learning Outcomes (CLO)	<p>On successful completion of this course, the students will be able to:</p> <ol style="list-style-type: none"><li>1. Recall steps to download and install virtualization software and create an AWS free tier account.</li><li>2. Understand virtual machine control processes, the concept of AWS Custom AMI, and the key features and use cases of cloud platforms such as Google App Engine, Microsoft Azure, Hadoop, Amazon, and Aneka.</li><li>3. Apply knowledge to edit virtual machine hardware configurations, share a custom AMI with AWS accounts, and utilize case study methodology to explore practical applications of cloud platforms in real-world scenarios.</li><li>4. Analyze the importance of image snapshots for virtual machines and assess benefits of containerized applications using Docker.</li><li>5. Design procedures for importing/exporting virtual machine images and creating custom Docker images.</li><li>6. Evaluate the significance of software updates in virtual machines and the impact of pulling/pushing Docker images from Docker Hub.</li></ol>	
5.	Credit Value	2 Credits	
6	Total Marks	Formative Assessment (CCE) – 40 Marks Summative Assessment (End Semester Exam) – 60 Marks Total 40+60= 100 Marks	Minimum Pass Marks – 35



Part B- Content of the Course	
Total no. of lectures – As per UGC rules	
Suggestive List of Practicals	
<b>Note -</b> The students shall explore development of web applications in cloud. They must practically design and develop processes involved in creating a cloud-based application and programming using Hadoop.	
1.	Download and Install Virtual Machine (Virtual Box, VMware and KVM).
2.	Installing Virtual Machine
3.	Controlling Virtual Machine (Start, restart, power off)
4.	Editing Virtual Machine Hardware
5.	Creating and Using Image snapshot
6.	Importing and Exporting Virtual Machine images
7.	Installing and updating Software packages
8.	Create AWS free tier account
9.	Create AWS Custom AMI
10.	Share AMI with AWS account
11.	Containerized Application Using Docker container
12.	Install docker on EC2 Instance
13.	Creating and managing Docker containers
14.	Pull and push docker images from docker hub
15.	Creating Docker custom Images
16.	Case Study on The following : <ol style="list-style-type: none"> <li>1. Google App Engine</li> <li>2. Microsoft Azure</li> <li>3. Hadoop</li> <li>4. Amazon</li> <li>5. Aneka</li> </ol>

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## Part C- Learning Resources

### Textbooks, References Books, Other resources

#### Suggested Readings:

##### Text Books:

1. A. Srinivasan, J.Suresh, Cloud Computing A Practical approach for learning and implementation, Pearson India, [ISBN-978131776513]
2. Gautam Shroff, Enterprise Cloud Computing Technology Architecture Applications [ISBN:978-0521137355]
3. Kumar Saurabh "Cloud Computing insights in to New-Era Infrastructure", Wiley India, 2011
4. मध्य प्रदेश हिंदी ग्रंथ अकादमी की पुस्तकें

##### Reference Books:

1. Dimitris N. Chorafas, Cloud Computing Strategies [ISBN: 1439834539]
2. Buyya, Selvi, Mastering Cloud Computing, TMH Pub
3. Krutz, Vnes, Cloud Security, Wiley Pub
4. Antohy T Velte, "Cloud Computing: A Practical Approach", McGraw Hill
5. Michael Miller, "Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online".
6. James E Smith, Ravi Nair, "Virtual Machines", Morgan Kaufmann Publishers.

##### Suggested Digital Platforms Web Links:

1. <https://onlinecourses.nptel.ac.in/noc22cs20/preview>
2. <https://nptel.ac.in/courses/106105223>
3. <https://nptel.ac.in/courses/106104182>
4. [https://www.tutorialspoint.com/cloud\\_computing/index.htm](https://www.tutorialspoint.com/cloud_computing/index.htm)
5. <https://www.classcentral.com/course/swayam-cloud-computing-10027>

##### Suggested Equivalent Online Courses:

1. [https://www.mygreatlearning.com/cloud\\_iot/certification](https://www.mygreatlearning.com/cloud_iot/certification)
2. <https://www.intellipaat.com/cloud-computing/certification>
3. <https://www.edureka.co/>
4. <https://www.coursera.org/browse/information-technology/cloud-computing>

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Part D- Assessment and Evaluation	
Suggested Continuous Evaluation methods:	
Internal Assessment/Formative Examination(A):	40 Marks
Lab Record	15 Marks
Attendance in the Lab	05 Marks
Assignments (It can be in different modes)	20 Marks
End Semester External Evaluation (B):	60 Marks
Viva Voce on Practical	10 Marks
Practical Record File	10 Marks
Experiments	40 Marks
Total Marks (A+B)	(40 + 60 =100 Marks)

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DEPARTMENT OF COMPUTER SCIENCE  
 VI. Holkar Science College  
 INDORE (M. P.)

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