Year: 2023
Semester: IV

1. Name of the Faculty: Dr. Anurag Jain — Course Code: CSVT2007
2. Course : Cloud Computing Architecture — L: 3
3. Program : B. Tech. – CSE - CCVT — T: 0
4. Target : Level-2 — P: 0
   C: 3

COURSE PLAN

Target	50% (marks)
Level-1	40% (population)
Level-2	50% (population)
Level-3	60% (population)

1. Method of Evaluation

UG	**PG**
Quizzes/Tests, Assignments (30%)	Quizzes/Tests, Assignments, seminar (50%)
Mid Examination (20%)	End semester (50%)
End examination (50%)	

2. Passing Criteria

Scale	**PG**	**UG**
Out of 10 point scale	SGPA – "6.00" in each semester CGPA – "6.00" Min. Individual Course Grade – "C" Course Grade Point – "4.0"	SGPA – "5.0" in each semester CGPA – "5.0" Min. Individual Course Grade – "C" Course Grade Point – "4.0"

*for PG, passing marks are 40/100 in a paper
*for UG, passing marks are 35/100 in a paper

3. Pedagogy-

- Synchronous Mode using BB Collaborate aided with power point presentations.
- Asynchronous Mode using Recorded Lectures/Voice over Power Points.
- Regular Communication for Tests/Quizzes/Assignments as well as discussions will be ensured by the faculty through email or Blackboard announcements.

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4. References:

Text Books	Web resources	Journals	Reference books
Cloud Computing Architecture (IBM ICE Publication)	IBM Cloud Computing http://www.ibm.com/cloud-computing/us/en/		1. Cloud Computing For Dummies (November, 2009), Judith Hurwitz, Robin Bloor, Marcia Kaufman, Fern Halper 2. cloud computing: concepts, technology & architecture by thomas erl, ricardo puttini, zaigham mahmood

GUIDELINES TO STUDY THE SUBJECT

Instructions to Students:

1. Go through the 'Syllabus' in the Black Board section of the web-site (https://learn.upes.ac.in) in order to find out the Reading List.
2. Get your schedule and try to pace your studies as close to the timeline as possible.
3. Get your on-line lecture notes (Content, videos) at Lecture Notes section. These are our lecture notes. Make sure you use them during this course.
4. Check your blackboard regularly
5. Go through study material.
6. Check mails and announcements on blackboard.
7. Keep updated with the posts, assignments and examinations which shall be conducted on the blackboard
8. Be regular, so that you do not suffer in any way
9. C**ell Phones and other Electronic Communication Devices:** Cell phones are not permitted in classes during Tests or the Mid/Final Examination. Such devices MUST be turned off in the class room.
10. **E-Mail and online learning tool:** Each student in the class should have an e-mail id and a password to access the LMS system regularly. Regularly, important information – Date of conducting class tests, guest lectures, via online learning tool. The best way to arrange meetings with us or ask specific questions is by email and prior appointment. All the assignments preferably should be uploaded on online learning tool. Various research papers/reference material will be mailed/uploaded on online learning platform time to time.
11. **Attendance:** Students are required to have minimum attendance of 75% in each subject. Students with less than said percentage shall NOT be allowed to appear in the end semester examination.

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This much should be enough to get you organized and on your way to having a great semester! If you need us for anything, send your feedback through e-mail anurag.jain@ddn.upes.ac.in . Please use an appropriate subject line to indicate your message details.

RELATED OUTCOMES

1. The expected outcomes of the Program are:

PO1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

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PO8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO9	**Individual and teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

2. The expected outcomes of the Specific Program are: (upto3)

PSO1	Perform system and application programming using computer system concepts, concepts of Data Structures, algorithm development, problem solving and optimizing techniques.
PSO2	Apply software development and project management methodologies using concepts of front-end and back-end development and emerging technologies and platforms.
PSO3	Ability to understand and apply Cloud Computing architecture for scalable, secure and dynamically provisioned business-oriented environment with optimized performance tuning and data reliability.

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3. **The expected outcomes of the Course are: (minimum 3 and maximum 6)**

CO 1	Discuss the workflows in business functions and service delivery model.
CO 2	Discuss service provisioning, configuration, metering, and billing.
CO 3	Summarize the cloud delivery models and services.
CO 4	Analyze cloud computing reference architecture

4. Co-Relationship Matrix

Program Outcomes / Course Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO 1	1	1			2								1	1	3
CO 2	1	1			2								1	1	3
CO 3	1	1			2								1	1	3
CO 4	1	1			2								1	1	3
Average	1	1			2								1	1	3

1=weak 2= moderate 3=strong

5. Course outcomes assessment plan:

components / Course Outcomes	Assignment	Test/Quiz	Mid Semester	End Semester	Any other
CO 1	✓	✓	✓	✓	
CO 2	✓	✓	✓	✓	

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CO 3	✓	✓	✓	✓	
CO 4	✓	✓		✓	

BROAD PLAN OF COURSE COVERAGE

Course Activities:

S. No.	Description	Planned			Actual			Remarks
		From	To	No. of Sessions	From	To	No. of Sessions	
1.	Infrastructure as a Service (IaaS), Platform as a Service (PaaS) & Software as a Service (SaaS)	9th Jan	30th Jan	7				
2.	Cloud Computing Architecture	31st Jan	20th Feb	6				Assignment 1+Quiz 1
3.	Advanced Cloud Architectures	21st Feb	14th Mar	7				Mid Semester
4.	Cloud Computing Reference Architecture (CCRA)	20th Mar	10th Mar	7				Assignment 2+Quiz 2
5.	IBM Cloud Computing Reference Architecture (IBM CCRA)	11th April	25th April	5				End Semester

Sessions: Total No. of Instructional periods available for the course

Signature of HOD/Dean — Signature of Faculty

Date: — Date:

Year: 2023
Semester: IV

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SESSION PLAN

UNIT-I

Lect No	Date	Topics to be Covered	CO Mapped	Lect No	Date	Topics Actually Covered	CO Achieved
1	09-01-2023	Subject introduction & review of virtualization	1, 3				
2	10-01-2023	Introduction to Infrastructure as a Service delivery model, characteristics of IaaS, Architecture, examples of IaaS	1, 3				
3	16-01-2023	Applicability of IaaS in the industry, Comparing ISPs and IaaS, Motivations for renting the infrastructure; IaaS Case studies; IaaS enabling Technology; Trusted cloud	1, 3				
4	17-01-2023	Introduction to Platform as a Service delivery model, characteristics of PaaS, patterns, architecture, and examples of PaaS	1, 3				
5	23-01-2023	Applicability of PaaS in the industry; Integrated Lifecycle Platform; Anchored Lifecycle platform; Enabling Technologies as a Platform; PaaS – best option or not	1, 3				
6	24-01-2023	Introduction to Software as a Service delivery model, characteristics of SaaS, SaaS Origin; Evolvement of SaaS – Salesforce.com's approach; SaaS Economics and Ecosystem; Types of SaaS Platforms	1, 3				
7	30-01-2023	Architecture, SaaS – Providers; Collaboration as a Service; Enabling and Management tools as a Service; Applicability of SaaS in the industry	1, 3				

Signature of Faculty:

Date

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SESSION PLAN

UNIT-II

Lect No	Date	Topics to be Covered	CO Mapped	Lect No	Date	Topics Actually Covered	CO Achieved
1	31-01-2023	Fundamental Cloud Architectures - Workload Distribution Architecture	2				
2	06-02-2023	Resource Pooling Architecture - Dynamic Scalability Architecture	2				
3	07-02-2023	Elastic Resource Capacity Architecture -Service Load Balancing Architecture	2				
4	13-02-2023	– Cloud Bursting Architecture - Elastic Disk Provisioning Architecture	2				
5	14-02-2023	Redundant Storage Architecture	2				
6	20-02-2023	Class test/Quiz & Assignment	1, 2, 3				

Signature of Faculty:

Date

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SESSION PLAN

UNIT-III

Lect No	Date	Topics to be Covered	CO Mapped	Lect No	Date	Topics Actually Covered	CO Achieved
1	21-02-2023	Hypervisor Clustering Architecture - Load Balanced Virtual Server Instances Architecture	4				
2	27-02-2023	NonDisruptive Service Relocation Architecture - Zero Downtime Architecture	4				
3	28-02-2023	Cloud Balancing Architecture - Resource Reservation Architecture	4				
4	06-03-2023	Dynamic Failure Detection and Recovery Architecture - Bare-Metal Provisioning Architecture	4				
5	07-03-2023	Rapid Provisioning Architecture	4				
6	13-03-2023	Storage Workload Management Architecture	4				
7	14-03-2023	mid sem exam	1, 2, 3				

Signature of Faculty:

Date

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   C: 3

SESSION PLAN

UNIT-IV

Lect No	Date	Topics to be Covered	CO Mapped	Lect No	Date	Topics Actually Covered	CO Achieved
1	20-03-2023	Introduction to Cloud computing reference architecture (CCRA), benefits of CCRA	4				
2	21-03-2023	Architecture overview – The conceptual Reference Model	4				
3	27-03-2023	Cloud Consumer; Cloud provider; Cloud Auditor; Cloud carrier	4				
4	28-03-2023	Scope of control between Provider and Consumer	4				
5	03-04-2023	CCRA: Architectural Components – Service deployment, Service Orchestration	4				
6	04-04-2023	Cloud Service Management, Security; Cloud Taxonomy	4				
7	10-04-2023	Assignment 2	4				

Signature of Faculty:

Date

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4. Target : Level-2 — P: 0
   C: 3

SESSION PLAN

UNIT-V

Lect No	Date	Topics to be Covered	CO Mapped	Lect No	Date	Topics Actually Covered	CO Achieved
1	11-04-2023	IBM's Cloud Computing Reference Architecture (CCRA 2.0) – Introduction, roles	4				
2	17-04-2023	Architectural elements; CCRA evolution	4				
3	18-04-2023	Examples of Cloud Services	4				
4	24-04-2023	versions and application of CCRA for developing clouds	4				
5	25-04-2023	Class test/Quiz	1,2,3,4				

Signature of Faculty:

Date

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   C: 3

INDIRECT ASSESSMENT

Sample format for Indirect Assessment of Course outcomes:

NAME:
ENROLLMENT NO:
SAP ID:
COURSE: Cloud Computing Architecture, CSVT2007, Jan-May, 2023
PROGRAM: B. Tech CS+CCVT IV Semester

Please rate the following aspects of course outcomes of Introduction to Virtualization and Cloud Computing

Use the scale 1-3*

course Outcomes	Statement	1	2	3
CO 1	Discuss the workflows in business functions and service delivery model			
CO 2	Discuss service provisioning, configuration, metering, and billing.			
CO 3	Summarize the cloud delivery models and services.			
CO 4	Analyze cloud computing reference architecture			

* 1 WEAK 2 MODERATE 3 STRONG