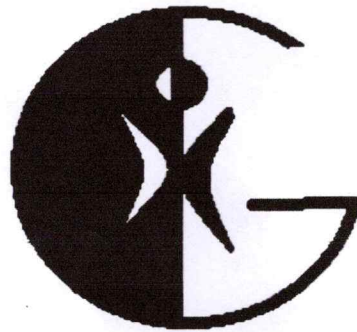


Geethanjali College of Engineering and Technology
(Autonomous)

Cheeryal (V), Keesara (M), Medchal District – 501 301 (T.S)

CLOUD COMPUTING

COURSE FILE



Geethanjali

DEPARTMENT OF
COMPUTER SCIENCE & ENGINEERING
(2019-2020)

Faculty In charge

M.Sujitha

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HOD-CSE

Dr.D.S.R.Murthy

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Name of the Subject/Lab Course: **CLOUD COMPUTING**

JNTU CODE: 16CS4104

Programme: UG

Branch: **COMPUTER SCIENCE & ENGINEERING**

Version No : 01

Year: **IV**

Updated on :

Semester: **I**

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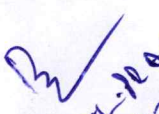
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3) Date :

Course coordinator 

Program Coordinator 

HOD 


COMPUTER SCIENCE & ENGINEERING
DEPARTMENT HEAD

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2. SYLLABUS

16CS4104-CLOUD COMPUTING

Unit-I

Introduction: Network-Centric Computing and Network-Centric Content, Peer-to-Peer Systems, Distributed computing, Cloud Computing, Cloud Computing Delivery Models and Services, Ethical Issues in Cloud Computing, Cloud Vulnerabilities, Major Challenges of Cloud Computing

Cloud Infrastructure: Cloud Computing at Amazon, Cloud Computing: The Google Perspective, Microsoft Windows Azure and Online Services, Open-Source Software Platforms for Private Clouds, Cloud Computing Interoperability: The Intercloud, Energy Use and Ecological Impact of Large-Scale Data Centers, Service- and Compliance-Level Agreements.

Unit-II

Cloud Computing: Applications and Paradigms, Challenges for Cloud Computing, Existing Cloud Applications and New Application Opportunities, Architectural Styles for Cloud Applications, Workflows: Coordination of Multiple Activities, Coordination Based on a State Machine Model: The ZooKeeper , The MapReduce Programming Model.

Cloud Resource Virtualization: Virtualization, Layering and Virtualization, Virtual Machine Monitors , Virtual Machines , Performance and Security Isolation , Full Virtualization and Para virtualization , Hardware Support for Virtualization , Case Study: Xen, a VMM Based on Para virtualization , Optimization of Network Virtualization in Xen , vBlades: Para virtualization Targeting an Itanium Processor , A Performance Comparison of Virtual Machines , The Darker Side of Virtualization , Software Fault Isolation

Unit-III

Cloud Resource Management: Policies and Mechanisms for Resource Management , Applications of Control Theory to Task Scheduling on a Cloud , Stability of a Two-Level Resource Allocation Architecture , Feedback Control Based on Dynamic Thresholds , Coordination of Specialized Autonomic Performance Managers, A Utility-Based Model for Cloud-Based Web Services, Resource Bundling: Combinatorial Auctions for Cloud Resources

Unit-IV

Storage Systems: The Evolution of Storage Technology, Storage Models, File Systems, and Databases, Distributed File Systems: General Parallel File System, Google File System, Apache Hadoop, Locks and Chubby: A Locking Service, Transaction Processing and NoSQL Databases, BigTable, Megastore Cloud

Application Development Amazon Web Services: EC2 Instances, Connecting Clients to Cloud Instances Through Firewalls, Security Rules for Application and Transport Layer Protocols in EC2, How to Launch an EC2 Linux Instance and Connect to it, How to Use S3 in Java, How to Install the Simple Notification Service on Ubuntu.

Unit-V

Cloud Security: Cloud Security Risks, Security: The Top Concern for Cloud Users, Privacy and Privacy Impact Assessment, Trust, Operating System Security, Virtual Machine Security, Security of Virtualization, Security Risks Posed by Shared Images, Security Risks Posed by a Management OS, Xoar: Breaking the Monolithic Design of the TCB, A Trusted Virtual Machine Monitor.

TEXT BOOK

1. Cloud Computing Theory and Practice, Dan C. Marinescu, Elsevier, 2nd edition, 2018.

REFERENCE BOOKS

1. Cloud Computing ,A practical approach, Anthony T. Velte, Toby J. Velte, Robert Elsenpeter, Indian Edition
2. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing: From parallel processing to the Internet of Things, Kai Hwang, Geoffrey C. Fox, Jack J.Dongarra
3. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp2011.

3. Vision of the Department

To produce globally competent and socially responsible computer science engineers contributing to the advancement of engineering and technology which involves creativity and innovation by providing excellent learning environment with world class facilities.

4. Mission of the Department

1. To be a center of excellence in instruction, innovation in research and scholarship, and service to the stake holders, the profession, and the public.
2. To prepare graduates to enter a rapidly changing field as a competent computer science engineer.
3. To prepare graduate capable in all phases of software development, possess a firm understanding of hardware technologies, have the strong mathematical background necessary for scientific computing, and be sufficiently well versed in general theory to allow growth within the discipline as it advances.

4. To prepare graduates to assume leadership roles by possessing good communication skills, the ability to work effectively as team members, and an appreciation for their social and ethical responsibility in a global setting.

5. PEOs and POs

PROGRAM EDUCATIONAL OBJECTIVES

1. To provide graduates with a good foundation in mathematics, sciences and engineering fundamentals required to solve engineering problems that will facilitate them to find employment in industry and / or to pursue postgraduate studies with an appreciation for lifelong learning.
2. To provide graduates with analytical and problem solving skills to design algorithms, other hardware / software systems, and inculcate professional ethics, inter-personal skills to work in a multi-cultural team.
3. To facilitate graduates to get familiarized with the art software / hardware tools, imbibing creativity and innovation that would enable them to develop cutting-edge technologies of multi-disciplinary nature for societal development.

PROGRAM OUTCOMES

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **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.
3. **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.
4. **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.

5. **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.
6. **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.
7. **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.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **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.
11. **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.
12. **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.

PSO (Program Specific Outcome):

PSO 1: To identify and define the computing requirements for its solution under given constraints.

PSO 2: To follow the best practices namely SEI-CMM levels and six sigma which varies from time to time for software development project using open ended programming environment to produce software deliverables as per customer needs.

6.Course Objectives and Outcomes

Course Objectives

The major objectives of the course is to

1. Understand different computing models.
2. Introduce various types of virtualizations and hypervisors.
3. Use and adopt Cloud Computing services and tools in their real life scenarios.
4. Explore some important cloud computing driven commercial systems such as Amazon Web Services, Google cloud services, Microsoft Azure etc.
5. Describe the security aspects in cloud.

Course Outcomes

Upon successful completion of this course, students will be able to:

16CS4104.1: Distinguish different types of Distributed Computing models and Identify different cloud computing models and services provided by cloud providers.

16CS4104.2: Illustrate Cloud Applications and Paradigms.

16CS4104.3: Demonstrate virtualization of clusters and data centers.

16CS4104.4: Apply and design Cloud Resource Management and scheduling algorithms.

16CS4104.5: Explain Storage models and security aspects of Cloud.


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7. Course mapping with Pos

Mapping of Course with Programme Educational Objectives

S.No	Course component	code	course	Semester	PEO 1	PEO 2	PEO 3
1	Professional Core	16CS4104	Cloud Computing	I	3	2	3

Mapping of Course outcomes to Program Outcomes

Course name: Cloud Computing	Program Outcomes														
	1	2	3	4	5	6	7	8	9	10	11	12	PSO 1	PSO 2	
16CS4104.1: Distinguish different types of Distributed Computing models and Identify different cloud computing models and services provided by cloud	2	3	1	1			1					2	1	2	1
16CS4104.2: Illustrate Cloud Applications and Paradigms.	3	2	1	2			2					2	1	1	1
16CS4104.3: Demonstrate virtualization of clusters and data centers.	2	2	1	1		1	1					2	1	2	1

16CS4104.4: Apply and design Cloud Resource Management and scheduling algorithms.	2	3	2	1		1	1				2	1	1	2
16CS4104.5: Explain Storage models and security aspects of Cloud.	3	3	2	2	2		1				2	1	3	2

8. Brief Importance of the Course and how it fits into the curriculum

a. What role does this course play within the Program?

- Cloud computing is the latest buzzword in today's industry and this course will help students understand industry needs and scenario. As the shift to the cloud is accelerating: while today only 16% of all enterprise applications are deployed in the cloud, that number will grow to 41% in few years.

b. How is the course unique or different from other courses of the Program?

- This is the only course wherein students learn the basic concepts of cloud computing, which is the core competency of all IT organizations.
- Another unique feature of the course is it demonstrates competence and gaining a competitive edge in the job market.

c. What essential knowledge or skills should they gain from this experience?

- Students acquire base level skills of cloud computing which would help the student fetch a job in the respective domain.

d. What knowledge or skills from this course will students need to have mastered to perform well in future classes or later (Higher Education / Jobs)?

- Obtaining knowledge of this course is a good way to improve personal marketability and continue this as his/her career.

e. Why is this course important for students to take?

- In order to understand the latest industry trends, needs and scenarios.

f. What is/are the prerequisite(s) for this course?

- Operating Systems, computer Networks and Information Security.
- g. When students complete this course, what do they need know or be able to do?**
- Able to demonstrate autonomy with high agility and cost reduction due to cloud computing.
- h. Is there specific knowledge that the students will need to know in the future?**
- In future, students have to apply these concepts for the technical skills required for cloud computing specific domain.
- i. Are there certain practical or professional skills that students will need to apply in the future?**
- YES. Most of the mini and major projects are generally based on cloud computing.
- j. Five years from now, what do you hope students will remember from this course?**
- As the internet of things grows, so will cloud computing and as IOT and cloud computing are emerging technologies in today's world, clearly these are the most important course for future.
- k. What is it about this course that makes it unique or special?**
- It is the only fundamental course that facilitates students in the attainment of all levels of Bloom's taxonomy.
- l. Why does the program offer this course?**
- This is the basic course in cloud computing field. Without this course, students cannot get the basic idea about cloud.
- m. Why can't this course be "covered" as a sub-section of another course?**
- It is not possible as it covers many topics such as different types of clouds, their architectures, functioning, techniques used for security in cloud computing and if one tries to cover these as part of another course, it would be too heavy to be taught in one semester.
- n. What unique contributions to students' learning experience does this course make?**
- It helps in executing mini and major projects that involve cloud computing during the later years of the program.
- o. What is the value of taking this course? How exactly does it enrich the program?**

- This course plays a vital role in today's IT industry, the movement to cloud computing is the disruptive change that information technology (IT) departments will soon face as cloud computing begins to have an effect on the modern enterprise. Students must learn how to give as well as take information in this new, shareable environment, while still protecting their career requirements. Innovative companies will take advantage of these new resources, such as cloud computing, and reinvent themselves as unstoppable forces in their markets. Those who don't take advantage of this revolution will become quickly outdated, perhaps out of business.

p. What are the major career options that require this course

Specific occupations that employ cloud computing include:

- Cloud computing engineer
- Cloud Computing developer
- Cloud computing admin
- Cloud computing Technical support

9. Prerequisites

- i. Operating systems
- ii. Computer Networks

10. Instructional Learning Outcomes

Upon completing this course, it is expected that a student will be able to do the following:

UNIT-I

1. Understand different distributed system models and enabling technologies
2. Understand the working of hypervisors to create virtual machines.
3. Understand Ethical Issues in Cloud Computing

4. Perform virtualization of clusters and data centers.
5. Understand SLA management in cloud

UNIT-II

1. Understand how Virtualization is implemented.
2. Understand Coordination of Multiple Activities in various cloud application.
3. Differentiate different types of services provided by the cloud like IAAS,PAAS, SAAS
4. Understand how to Manage the virtual machines for cloud infrastructures
5. Usage of Xen ,the hypervisor.

UNIT-III

1. Understand Policies and mechanisms of cloud resource management.
2. Understand Model for Cloud-Based Web Services.
3. Understand Applications of Control Theory to Task Scheduling on a Cloud.

UNIT-IV

1. Understand Storage in Google File System and Databases.
2. Understand Storage of data in NoSQL,Bigtables and Megastore cloud.
3. Understand Apache Hadoop Framework to deal with large volumes of data.
4. Will be able to run applications on different cloud computing service providers.

UNIT-V

1. Understand Cloud security risks.
2. Understand Security of Virtualization.
3. Understand Design and working of Xoar system.
4. Understand security risks posed by Operating system and Virtual Machines.

Geethanjali College of Engineering and Technology
Department of ECE

Course Coordinator Meeting - I

Date on which meeting was Conducted: 6/03/2021

Name of the Course along with Code: Probability Theory and Stochastic Processes (18EC2202)

Academic Year: 2020-21

Semester: II

Class: II B.Tech

Mode of Meeting: Online (Google meet-Time: 6pm to 7pm)

Number of periods scheduled .46 and is mentioned in below table.

S.No	Unit No	Title	Duration (Dates)		Total No. Periods
			From	To	
1.	I	Probability and Random Variables			10
2.	II	Operations On A Random Variable			10
3.	III	Multiple Random Variables			10
4.	IV	Multiple Random Variables			8
5.	V	Linear Systems With Random Inputs			8
			Total		46



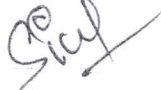

Course Outcomes: Course outcomes are discussed and are mapped with program outcomes as shown in below table

CO-PO/PSO Mapping with levels														
Course code with outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9		PO11	PO12	PSO1	PSO2
18EC2202.1	2	3	1	2	3							2	2	3
18EC2202.2	2	2	1	2	3							2	2	3
18EC2202.3	2	3	1	2	3	2						3	2	3
18EC2202.4	3	3	1	2	3	2						3	2	3
18EC2202.5	3	3	1	2	3	2						3	2	3
18EC2202	2.4	2.8	1	2	3	2						2.6	2	3


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Course Coordinator Meeting

First Minutes of the meeting held on 02/07/20 for CSE course
(Faculty dealing CSE course with the course coordinator)

Nature of meeting	Course Coordinator Meeting	
Venue	Google meet (online)	
Course	CONTROL SYSTEMS ENGINEERING(CSE)	Scheduled date: 02/07/20
TIME: FROM 12:00 PM TO 12:30 NOON		
List of faculty present	<p>1.Dr.C.Venkata Narasimhulu</p> <p>2. Mr.A.Shanker </p> <p>3. Mr.M.Krishna </p> <p>4. Mr.Y.Shiva Rama Krishna </p> <p>5.Mr.Ch. Suresh kumar </p>	
Agenda points	Details of discussion	Action Points
<ol style="list-style-type: none"> 1. Review on previous CO-PO attainment level(18-19) (Overall 2.7)(19-20 Exams are not yet conducted) 2. Syllabus related to CSE 3. Text books to be followed (topic wise). 4. Course File Finalization. 5. Grouping of students based on previous results. 6. Pre-requisites of the subject and topics to be revised. 7. COs of CSE 8. Textbooks to be purchased additionally for the library 9. Readiness of Assignments and Tutorial problems. 10. Planning of Remedial Classes 11. Measures for completion of Syllabus 12. Curriculum gaps if any 	<ol style="list-style-type: none"> 1. The syllabus of the course has been revised and the topics that are vast have been listed and the methodology for explaining such topics has been discussed. 2. The detailed discussion has been made among the group members unit-wise and topic-wise and came to a common conclusion related to the text books to be followed and the same is noted by all the members of the group. 3. Course files: The existing course file has to be updated (AR18) by the course coordinator by taking suggestions from other sections CSE course faculty. 4. It is decided to group the students into groups to improve the peer learning among the students. The group size is limited to 5 (five) and has to ensure that the group must contain the range of students from slow learners to fast learners. 5. The pre-requisites of the course were reviewed and these concepts had to be explained briefly in the initial classes. 6. Modification of Cos from AR16 syllabus which are covering to Autonomous Syllabus. 7. The number of text books and 	<ol style="list-style-type: none"> a. Updation of the Course file (AR18 Question paper A.Y.2018-19, assignment and tutorial questions, question bank,etc.,) to be done by the course coordinator and other course faculty. b. Text books to be referred for each topic is being finalized. c. Finalized course file to be forwarded to HOD/department →action Course Coordinator. d. Grouping of students based on their previous semester/year results →action concerned faculty. e. Recommendation of Textbooks / Reference books to be purchased additionally → subject dealing faculty. f. Measures to improve the attainment level to be given by the faculty dealing CSE Course.

C.C   ✓