INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad -500 043

COMPUTER SCIENCE AND ENGINEERING

COURSE DESCRIPTOR

Course Title	CLOUD APPLICATION DEVELOPMENT LABORATORY				
Course Code	ACS110				
Programme	B. Tech				
Semester	VII	CSE/IT			
Course Type	Core				
Regulation	IARE - R16				
Course Structure	**Theory**			**Practical**	
	Lectures	**Tutorials**	**Credits**	**Laboratory**	**Credits**
	-	-	-	3	2
Chief Coordinator	Mr. P Anjaiah, Assistant Professor, Dept. of CSE				
Course Faculty	Dr. D Kishor Babu, Assistant Professor, Dept. of CSE Mr. C Praveen Kumar, Assistant Professor, Dept. of CSE Ms. Vijaya Durga, Assistant Professor, Dept. of CSE				

I.   COURSEOVERVIEW:

Cloud Computing provides us means by which we can access the applications as utilities over the internet. It allows us to create, configure, and customize the business applications online. a cloud application, or cloud app, is a software program where cloud-based and local components work together. This model relies on remote servers for processing logic that is accessed through a web browser with a continual internet connection. Hadoop is an open-source framework that allows to store and process big data in a distributed environment across clusters of computers using simple programming models. It is designed to scale up from single servers to thousands of machines, each offering local computation and storage.

II.   COURSEPRE-REQUISITES:

Level	Course Code	Semester	Prerequisites	Credits
UG	AIT003	V	Virtualization in Computer Networking	4
UG	ACS104	IV	Database Management Systems	4
UG	ACS106	IV	Operating systems	4

III.   MARKSDISTRIBUTION:

Subject	SEE Examination	CIA Examination	Total Marks
Cloud Application Development Laboratory	70 Marks	30 Marks	100

IV. DELIVERY / INSTRUCTIONALMETHODOLOGIES:

✗	Chalk & Talk	✗	Quiz	✗	Assignments	✗	MOOCs
✓	LCD / PPT	✗	Seminars	✗	Mini Project	✓	Videos
✓	Open Ended Experiments						

V. EVALUATIONMETHODOLOGY:

Each laboratory will be evaluated for a total of 100 marks consisting of 30 marks for internal assessment and 70 marks for semester end lab examination. Out of 30 marks of internal assessment, continuous lab assessment will be done for 20 marks for the day to day performance and 10 marks for the final internal lab assessment.

Semester End Examination (SEE): The semester end lab examination for 70 marks shall be conducted by two examiners, one of them being Internal Examiner and the other being External Examiner, both nominated by the Principal from the panel of experts recommended by Chairman, BOS.

The emphasis on the experiments is broadly based on the following criteria:

20 %	To test the preparedness for the experiment.
20 %	To test the performance in the laboratory.
20 %	To test the calculations and graphs related to the concern experiment.
20 %	To test the results and the error analysis of the experiment.
20 %	To test the subject knowledge through viva – voce.

Continuous Internal Assessment (CIA):
CIA is conducted for a total of 30 marks (Table 1), with 20 marks for continuous lab assessment during day to day performance, 10 marks for final internal lab assessment.

Table 1: Assessment pattern for CIA

Component	Laboratory		Total Marks
Type of Assessment	**Day to day performance**	**Final internal lab assessment**	
CIA Marks	20	10	30

Continuous Internal Examination(CIE):
One CIE exams shall be conducted at the end of the 16th week of the semester. The CIE exam is conducted for 10 marks of 3 hours duration.

Preparation	Performance	Calculations and Graph	Results and Error Analysis	Viva	Total
2	2	2	2	2	10

VI. HOW PROGRAM OUTCOMES AREASSESSED:

	Program Outcomes (POs)	Strength	Proficiency assessed by
PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex Engineering problems.	3	Videos
PO 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	Case Studies
PO 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 healthand safety, and the cultural, societal, and environmental considerations.	3	Assignments
PO 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.	3	Case Studies
PO 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.	3	Videos

3 = High; 2 = Medium; 1 = Low

VII. HOW PROGRAM SPECIFIC OUTCOMES AREASSESSED:

	Program Specific Outcomes (PSOs)	Strength	Proficiency assessed by
PSO 1	**Professional Skills:** The ability to understand, analyze and develop computer programs in the areas related to algorithms, system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying complexity.	3	Videos
PSO 2	**Problem-Solving Skills:** The ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success	3	Case Studies
PSO 3	**Successful Career and Entrepreneurship:** The ability to employ modern computer languages, environments, and platforms in creating innovative career paths to be an Entrepreneur, and a zest for higher studies.	3	Case Studies

3 = High; 2 = Medium; 1 = Low

VIII. COURSE OBJECTIVES:

The course should enable the students to:	
I	Learn to run virtual machines of different configuration
II	Develop Big data application using Hadoop
III	Exposed to tool kits for cloud environment
IV	Developing web services/Applications in cloud framework

IX. COURSE LEARNING OUTCOMES(CLOs):

CLO Code	CLO's	At the end of the course, the student will have the ability to:	PO's Mapped	Strength of Mapping
ACS110.01	CLO 1	Install Oracle Virtual box and create two VMs on your laptop	PO 1	3
ACS110.02	CLO 2	Install Turbo C in guest OS and execute C program	PO 1, PO 4	3
ACS110.03	CLO 3	Write down the test cases for any online system	PO 1, PO 2	3
ACS110.04	CLO 4	Test ping command to test the communication between the guest OS and Host OS.	PO 1, PO 2	3
ACS110.05	CLO 5	Install Hadoop single node setup	PO 2, PO 3	3
ACS110.06	CLO 6	Develop hadoop application to count no of characters, no of words and each character frequency	PO 1, PO 5	3
ACS110.07	CLO 7	Develop hadoop application to process given data and produce results such as finding the year of maximum usage, year of minimum usage.	PO 2, PO 5	3
ACS110.08	CLO 8	Develop hadoop application to process given data and produce results such as how many female and male students in both schools the results should be in following format. GP-F #number GP-M #numbers MS-F #number MS-M #number	PO 2	2
ACS110.09	CLO 9	Establish an AWS account. Use the AWS Management Console to launch an EC2 instance and connect to it.	PO 1, PO 3	3
ACS110.10	CLO 10	Design a protocol and use Simple Queue Service(SQS) to implement the barrier synchronization after the first phase.	PO 1	3
ACS110.11	CLO 11	Use the Zookeeper to implement the coordination model in Problem 10. Develop a Hello World application using Google App Engine	PO 1, PO 2	3
ACS110.12	CLO 12	Develop a Guestbook Application using Google App Engine and Develop a Windows Azure Hello World application using google app engine. Create a Mash up using Yahoo! Pipes	PO 3, PO 5	3

3 = High; 2 = Medium; 1 = Low

X. MAPPING COURSE LEARNING OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFICOUTCOMES:

Course Learning Outcomes (CLOs)	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CLO 1	3												3		2
CLO 2	3			3									2		2
CLO 3	3	3												2	
CLO 4	3	3											2		
CLO 5		3	3												2
CLO 6	3				3										
CLO 7		3			3								2		
CLO 8		3													
CLO 9	3		3										2	2	
CLO 10	3												3		
CLO 11	3	3											3		
CLO 12			3		3								3		

3 = High; 2 = Medium; 1 = Low

XI. ASSESSMENT METHODOLOGIES –DIRECT

CIE Exams	PO1, PO2 PO3, PO5	SEE Exams	PO1, PO2 PO5, PO9	Assignments	-	Seminars	-
Laboratory Practices	PO1,PO3 PO5,PO9	Student Viva	PO1, PO2 PO3, PO4	Mini Project	PO3,PO5	Certification	-

XII. ASSESSMENT METHODOLOGIES –INDIRECT

✓	Early Semester Feedback	✓	End Semester OBE Feedback
✗	Assessment of Mini Projects by Experts		

XIII. SYLLABUS

LIST OF EXPERIMENTS	
Week-1	**VIRTUALIZATION**
Install Oracle Virtual box and create two VMs on your laptop.	
Week -2	**VIRTUALIZATION**
Install Turbo C in guest OS and execute C program.	
Week-3	**VIRTUALIZATION**
Test ping command to test the communication between the guest OS and Host OS.	
Week -4	**HADOOP**

Install hadoop single node setup.	
Week -5	**HADOOP**
Develop a simple hadoop application called Word Count. It counts the number of occurrences of each word in a given input set.	
Week-6	**HADOOP**
Develop hadoop application to count no of characters, no of words and each character frequency	
Week-7	**HADOOP**
Develop Hadoop application to process given data and produce results such as finding the year of maximum usage, year of minimum usage.	
Week-8	**HADOOP**

Develop hadoop application to process given data and produce results such as how many female and male students in both schools the results should be in following format.
  GP-F #number
  GP-M #numbers
  MS-F #number
  MS-M #number	

Week-9	**CLOUD PROGRAMMING**
Establish an AWS account. Use the AWS Management Console to launch an EC2 instance and connect to it.	
Week-10	**CLOUD PROGRAMMING**
Design a protocol and use Simple Queue Service(SQS)to implement the barrier synchronization after the first phase.	
Week -11	**CLOUD PROGRAMMING**
Use the Zookeeper to implement the coordination model in Problem 10.	
Week -12	**CLOUD PROGRAMMING**
Develop a Hello World application using Google App Engine.	
Week -13	**CLOUD PROGRAMMING**
Develop a Guestbook Application using Google App Engine.	
Week -14	**WINDOWS AZURE**
Develop a Windows Azure Hello World application using.	
Week -15	**PIPES**
Create a Mashup using Yahoo! Pipes.	

Reference Books

1. Dan Marinescu, ―Cloud Computing: Theory and Practice‖, M K Publishers, 1st Edition, 2013.
2. Kai Hwang, Jack Dongarra, Geoffrey Fox, ―Distributed and Cloud Computing, From Parallel Processing to the Internet of Things, M K Publishers, 1st Edition, 2013.
3. Anthony T. Velte, Toby J. Velte, Robert Elsenpeter, ―Cloud Computing: A Practical Approach‖, McGraw-Hill, 1st Edition, 2009.
4. Arshdeep Bahga, Vijay Madisetti, ―Cloud computing A Hands on Approach‖, Universities Publications, 1st Edition, 2013

Web References:

1. http://www.howtogeek.com/196060/beginner-geek-how-to-create-and-use-virtual-machines/
2. http://www.tutorialspoint.com/hadoop/
3. https://aws.amazon.com/
4. http://www.tutorialspoint.com/zookeeper/
5. https://cloud.google.com/appengine/docs/java/gettingstarted/creating-guestbook
6. https://www.google.co.in/gfe_rd=cr&ei=SZIJWOnpIanqugTDyrewCw&gws_rd=ssl#q=yahoo+pipes+mashup+tutorial

Course Home Page:

SOFTWARE AND HARDWARE REQUIREMENTS FOR 36 STUDENTS:
HARDWARE: Standalone desktops with internet facility: 36 nos.
SOFTWARE : Globus Toolkit or equivalent Eucalyptus or Open Nebula.

XIV. COURSEPLAN:

The course plan is meant as a guideline. Probably there may be changes.

Week No.	Topics to be covered	Course Learning Outcomes (CLOs)	Reference
1	Install Oracle Virtual box and create two VMs on your laptop	CLO 1	T1: 1.1, 1.2,T1:1.3
2	Install Turbo C in guest OS and execute C program	CLO 1, CLO 2	T1: 1.1 T1:3.8
3	Test ping command to test the communication between the guest OS and Host OS	CLO 1, CLO 2	T1:4.2,4.3 T2:6.10
4	Install Hadoop single node setup.	CLO 1, CLO 2	T1:4.9 T1:5.1,5.2
5	Develop a simple hadoop application called Word Count. It counts the number of occurrences of each word in a given input set.	CLO 3, CLO 4, CLO 5	T1:5.1 R1:6.1,6.4
6	Develop hadoop application to count no of characters, no of words and each character frequency.	CLO 6	T1:4.2,4.3 R2:6.5,6.7
7	Develop hadoop application to process given data and produce results such as finding the year of maximum usage, year of minimum usage.	CLO 7	T1:4.3,4.4 R2:6.14
8	Develop hadoop application to process given data and produce results such as how many female and male students in both schools the results should be in following format. GP-F #number GP-M #numbers MS-F #number MS-M #number	CLO 8	T1:4.9 R2:6.14
9	Establish an AWS account. Use the AWS Management Console to launch an EC2 instance and connect to it.	CLO 9	T1:4.9 R2:9.6
10	Design a protocol and use Simple Queue Service(SQS)to implement the barrier synchronization after the first phase.	CLO 10	T1:5.1,5.4 R2:9.6
11	Use the Zookeeper to implement the coordination model in Problem 10.	CLO 11	T1.9.1 R2.9.6
12	Develop a Hello World application using Google App Engine.	CLO11, CLO 12	T1.9.1 R1:9.9
13	Develop a Guestbook Application using Google App Engine.	CLO11, CLO 12	R1:9.9
14	Develop a Windows Azure Hello World application	CLO11, CLO 12	T1:9.1
15	Create a Mashup using Yahoo! Pipes.	CLO11, CLO 12	T1:9.2

XV. GAPS IN THE SYLLABUS - TO MEET INDUSTRY / PROFESSIONREQUIREMENTS:

S No.	Description	Proposed actions	Relevance with POs	Relevance with PSOs
1	HDFS, MAPREDUCING, PIG,HIVE,KAPKA	Seminars	PO 5	PSO 3

Prepared by:
Mr. P Anjaiah, Assistant Professor,

HOD, CSE