

TEACHING PLAN (TP)/CIS

Academic Year: 2026-2027

Date: 01/07/2026

Institute Name & Code: K. K. Wagh Polytechnic, Nashik (0078)

Program Name and Code: Artificial Intelligence and Machine Learning(AN)

Course Index: 506

Course Name: Cloud Computing For Data Science

Course Abb and Code: CCD-315327

Semester: Vth **Scheme:** 'K' **Allocated Hrs:** 40

Name of Faculty: Mr.S.H.Sangale

Class: TYAN

• Teaching-Learning and Assessment Scheme:

Course Code	Course Title	Abbr	Course Category/s	Learning Scheme					Credits	Assessment Scheme													Total Marks
				Actual Contact Hrs./Week			SLH	NLH		Paper Duration	Theory				Based on LL & TL				Based on SL				
															Practical								
				CL	TL	LL					FA-TH	SA-TH	Total		FA-PR		SA-PR		SLA				
Max	Max	Max	Min	Max	Min	Max	Min	Max	Min														
315327	CLOUD COMPUTING FOR DATA SCIENCE	CCD	DSE	4	-	2	-	6	2	3	30	70	100	40	25	10	25#	10	-	-	150		

Abbreviations: CL- Classroom Learning, LL-Laboratory Learning, NLH-Notional Learning Hours,

FA - Formative Assessment, SA -Summative assessment,

Legends: # External Assessment,

Note :

1. FA-TH represents average of two class tests of 30 marks each conducted during the semester.
2. If candidate is not securing minimum passing marks in FA-PR of any course then the candidate shall be declared as "Detained" in that semester.
3. Notional Learning hours for the semester are (CL+LL+TL+SL)hrs.* 10 Weeks.
4. 1 credit is equivalent to 30 Notional hrs.

• Course Outcomes (COs) & Theory Learning Outcomes (TLOs):

By learning the course CLOUD COMPUTING FOR DATA SCIENCE (CCD-315327) Third year AIML students will be able to:

CO No.	TLO's No.	Course Outcomes (COs) / Theory Learning Outcomes (TLO's)
CO506.1		Use Cloud-Based software services by comprehending the cloud Computing Architecture.
	TLO 1.1	Explain the Evolution of Cloud Computing.
	TLO 1.2	Explain characteristics of Cloud Computing.
	TLO 1.3	Describe the Architecture of Cloud Computing.
	TLO 1.4	Explain the Evolution of Cloud Computing.
	TLO 1.5	Explain characteristics of Cloud Computing.
CO506.2		Configure Virtual Machines using Virtualization techniques
	TLO 2.1	Explain Concept of Virtualization.
	TLO 2.2	Explain the given type of Virtualization.
	TLO 2.3	Compare various cloud service models.
	TLO 2.4	Describe various Cloud Deployment Models.
	TLO 2.5	Explain role of Cloud computing in Data Science.

CO506.3		Implement Virtualized storage system in Cloud
	TLO 3.1	Explain Cloud Storage.
	TLO 3.2	Describe the given Cloud storage system.
	TLO 3.3	Explain features and limitations of Key-Value databases.
	TLO 3.4	Compare Batch data and Streaming data in Machine Learning.
	TLO 3.5	Explain GCP BigQuery Cloud Platform
CO506.4		Use Machine Learning algorithms in Cloud Environment
	TLO 4.1	Explain benefits of using Machine Learning in the Cloud.
	TLO 4.2	Explain the given type of Cloud-Based Machine Learning Service.
	TLO 4.3	Describe various Machine Learning Systems.
	TLO 4.4	Describe features of the given Cloud Machine Learning Platforms.
CO506.5		Deploy Machine Learning Models on Cloud
	TLO 5.1	Explain factors for Selection of Cloud Machine Learning Platform.
	TLO 5.2	Describe ETL and ELT Pipelines.
	TLO 5.3	Explain Pre-Tuned AI Services.
	TLO 5.4	Write step-wise procedure to train a Machine Learning Project

• **Teaching Plan:**

Unit No. (Allotted Hrs.)	TLOs	Title/Topic Details and Course Outcomes	Plan (From-To & No. of Lectures)	Actual Execution (From-To & No. of Lectures)	Teaching Method/ Media/ Tools	Remark
01 (06)		Unit - I Introduction to Cloud Computing				
	1.1	1.1 Introduction to Cloud Computing: Definition, Evolution (from Mainframes to Clouds), Service-Oriented Architecture, Web Services, Grid Computing, Utility Computing.	10/08/2026 To 11/08/2026 (02)		Chalk, Blackboard, LCD Projector, PPT	
	1.2	1.2 Characteristics of Cloud Computing	14/08/2026 (01)			
	1.3	1.3 Cloud Computing Architecture: Front-end platform, Back-end platform, Networking, Cloud-based delivery	14/08/2026 (01)			
	1.4	1.4 Cloud Service Models: SaaS, IaaS, PaaS, Continuous delivery using PaaS	17/08/2026 To 18/08/2026 (02)			
02 (08)		Unit - II Virtualization and Cloud Computing				
	2.1	2.1 Introduction to Virtualization, Types: Application, Network, Desktop, Storage, Server, Data Virtualization	21/08/2026 To 21/08/2026 (02)		Chalk, Blackboard, LCD Projector, PPT	
	2.2	2.2 Cloud Deployment Models: Public, Private, Community, Hybrid	22/08/2026 To 24/08/2026 (02)			
	2.3	2.3 Role of Cloud Computing in Data Science	25/08/2026 To 27/08/2026 (02)			

	2.4	2.4 Advantages of Cloud Computing in Machine Learning	28/08/2026 To 28/08/2026 (02)			
03 (08)		Unit - III Cloud Storage				
	3.1	3.1 Cloud Storage: Introduction, Benefits, Use Cases (Backup, Archiving, Disaster Recovery, Data Processing, Content Delivery)	01/09/2026 To 04/09/2026 (02)		Chalk, Blackboard, LCD Projector, PPT	
	3.2	3.2 Cloud Storage System: Block-Based, File-Based, Object-Based Storages	04/09/2026 To 05/09/2026 (02)			
	3.3	3.3 Key-Value Databases: Introduction, Features, Limitations	07/09/2026 (01)			
	3.4	3.4 Batch and Streaming Data in ML	08/09/2026 (01)			
	3.5	3.5 Cloud Data Warehouse – AWS Redshift	11/09/2026 (01)			
	3.6	3.6 Various Cloud-based tools used for data science in ML GCP BigQuery	11/09/2026 (01)			
04 (10)		Unit - IV Cloud Computing for Data Science				
	4.1	4.1 Machine Learning in the Cloud: Benefits and Limitations	12/09/2026 To 18/09/2026 (03)		Chalk, Blackboard, LCD Projector, PPT	
	4.2	4.2 Types of ML Services: Artificial Intelligence as a Service (AiaaS), GPU as a Service (GPUaaS)	18/09/2026 To 19/09/2026 (02)			
	4.3	4.3 Introduction to various ML Systems and Benefits of Managed ML Platforms	21/09/2026 To 22/09/2026 (02)			
	4.4	4.4 Cloud Machine Learning Platform: AWS SageMaker, Azure Machine Learning studio, Google Cloud AutoML	25/09/2026 To 28/09/2026 (03)			
05 (08)		Unit - V Training and Deployment of ML on Cloud				
	5.1	5.1 Factors for Selection of Cloud Machine Learning Platform, Support for ETL or ELT Pipelines, Support for Scale-Up and Scale-Out Training, Support for Machine Learning Frameworks, Pre-Tuned AI Services, Monitor Prediction Performance	29/09/2026 To 06/10/2026 (04)		Chalk, Blackboard, LCD Projector, PPT	
	5.2	5.2 Training Machine Learning Projects in the Cloud: Steps to train Machine Learning project in the Cloud, Identify and Understand Data Sources, Engineer the Features, Train and Validate Model, Deploy and Monitor Model	09/10/2026 To 12/10/2026 (04)			

• COs-POs & PSOs Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)							Programme Specific Outcomes* (PSOs)	
	PO-1 Basic and Discipline Specific Knowledge	PO-2 Problem Analysis	PO-3 Design/Development of Solutions	PO-4 Engineering Tools	PO-5 Engineering Practices for Society, Sustainability and Environment	PO-6 Project Management	PO-7 Life Long Learning	PSO-1	PSO-2
CO1	2	2	2	1	2	1	1	1	-
CO2	2	3	2	3	3	1	1	1	-
CO3	2	2	2	2	2	1	1	2	-
CO4	3	2	3	3	2	1	1	-	2
CO5	3	2	3	3	2	2	2	-	3

Legends :- High:03, Medium:02,Low:01, No Mapping: -

- PSO1: Apply fundamental concepts of Computer Engineering and Artificial Intelligence and machine learning to solve technical problems.
- PSO2: Implement the domain knowledge to achieve successful career as an engineering professional.

• Direct Assessment Criteria:

Formative assessment (Assessment for Learning)

- ✓ Each Practical will be assessed considering 60% weightage to the process, 40% weightage to the product.

Summative Assessment (Assessment of Learning)

- ✓ End Semester Exam based on Practical performance and Viva-voce.

• References:

1. Books:

Sr. No.	Title of Book	Author	Publication
01	Handbook of Cloud Computing	Dr. Anand Nayyar	BPB Publication First Edition (1 January 2019) ISBN-10:9388176669 ISBN-13:978-9388176668
02	Cloud Computing: A Practical Approach By Toby Velte, Anthony Velte, Robert C	Toby Velte, Anthony Velte, Robert C	McGraw Hill Professional ISBN-978-0-07-162965-8
03	Cloud Computing for Data Analysis	Noah Gift, Alfredo Deza	Pragmatic AI Labs (No ISBN)
04	Data Science on the Google Cloud Platform: Implementing End-to-End Real-Time Data Pipelines	Valliappa Lakshmanan	O'Reilly Media, Inc. ISBN: 9781098118952
05	Machine Learning in the AWS Cloud: Add Intelligence to Applications with Amazon SageMaker	Abhishek Mishra	Wiley Publication ISBN: 978-1-119-55671-8

2. Software Learning Websites:

Sr.No	Link / Portal	Description
1	https://www.geeksforgeeks.org/virtualization-cloud-computing-types/	Introduction to virtualization and cloud Computing and its types
2	https://www.javatpoint.com/virtualization-in-cloud-computing	Introduction to virtualization and cloud Computing
3	https://www.hostitsmart.com/blog/types-of-virtualization-in-cloud-computing-complete-overview/	Overview of cloud computing, types of Virtualization advantages and Application
4	https://aws.amazon.com/what-is/virtualization/	How can AWS help with virtualization and cloud computing?
5	https://www.run.ai/guides/machine-learning-in-the-cloud	Machine Learning in the Cloud, AWS Sagemaker Service for Machine Learning
Note : Teachers are requested to check the creative common license status/financial implications of the suggested online educational resources before use by the students		

3. URLs of Referred Videos:

1. AWS SageMaker Tutorial | Introduction To AWS SageMaker | AWS Tutorial For Beginners - <https://www.youtube.com/watch?v=AVNqdT5ilOg>
2. Introduction to Cloud Computing with Real Life Examples | Key Characteristics & Benefits - https://www.youtube.com/watch?v=3X4JfYf06_g
3. Virtualization | Virtualization Technology | What Is Virtualization- <https://www.youtube.com/watch?v=Wb68Exu6jtU>
4. What is Cloud Storage and How Does it Work | Cloud Storage Explained - <https://www.youtube.com/watch?v=56GVjTN6Mzc>
5. Why Cloud Computing is Critical for a Data Scientist - <https://www.youtube.com/watch?v=Ta2xatM9UBE>
6. Tutorial 1- Deployment of Models- Premises VS IAAS vs PAAS cloud Platforms – <https://www.youtube.com/watch?v=bjsJOl8gz5k&list=PLZoTAELRMXVOAvUbePX1ITdxQR8EY35Z1>

4. Tools :

- VmWare Workstation Software, Aws, EC2 and Sagemaker instance with services,
- MKCL ERA & Google Classroom used for Uploading Learning Material of Course, Assignments, Practice Test etc.

Mr. S.H.Sangale
Name & Signature of the Faculty

Prof. R.Y.Thombare
(H.O.D AN-Dept.)

Cc: 1. Course File- CCD(315327)