Lovely Professional University, Punjab

Course Code	Course Title	Lectures	Tutorials	Practicals	Credits	
INT333	DEVOPS ADVANCE CONFIGURATION MANAGEMENT	2	0	2	3	
Course Weightage	ATT: 5 CA: 45 ETP: 50	**Exam Category: X6: Mid Term Exam: Not Applicable – End Term Exam: Practical**				
Course Focus	EMPLOYABILITY,SKILL DEVELOPMENT					

Course Outcomes :Through this course students should be able to

CO1 :: Understand the basics of Puppet.

CO2 :: Demonstrate configuration management skills using Puppet.

CO3 :: Learn how to install and configure Nagios for continuous monitoring.

CO4 :: Understand and implement infrastructure automation using Terraform.

CO5 :: Describe the fundamentals of Ansible and its installation process.

CO6 :: Construct Ansible playbooks to automate multiple system administration tasks.

	Reference Books (R)		
Sr No	**Title**	**Author**	**Publisher Name**
R-1	MASTERING PUPPET 5	RYAN RUSSELL-YATES	PACKT PUBLISHING
R-2	ANSIBLE FOR DEVOPS: SERVER AND CONFIGURATION MANAGEMENT FOR HUMANS	JEFF GEERLING	N.A
R-3	LEARNING NAGIOS	WOJCIECH KOCJAN	AMAZON.COM

Relevant Websites (RW)		
Sr No	**(Web address) (only if relevant to the course)**	**Salient Features**
RW-1	https://www.guru99.com/puppet-tutorial.html	Puppet Tutorial for Beginners
RW-2	https://www.tutorialspoint.com/nagios/index.htm	Learn Nagios Absolute Beginners
RW-3	https://www.javatpoint.com/ansible	Ansible
RW-4	https://youtu.be/F-NGOvYiV9g	Puppet Full Course

Audio Visual Aids (AV)		
Sr No	**(AV aids) (only if relevant to the course)**	**Salient Features**
AV-1	https://youtu.be/knCO6wzCW3w	Nagios Essential Tutorial for Beginners
AV-2	https://youtu.be/dCQpaTTTv98	Ansible Playbook Tutorial
AV-3	https://www.youtube.com/watch?v=7xngnjfIlK4	Infrastructure as code with terraform

LTP week distribution: (LTP Weeks)	
Weeks before MTE	7
Weeks After MTE	7
Spill Over (Lecture)	

Detailed Plan For Lectures

Week Number	Lecture Number	Broad Topic(Sub Topic)	Chapters/Sections of Text/reference books	Other Readings, Relevant Websites, Audio Visual Aids, software and Virtual Labs	Lecture Description	Learning Outcomes	Pedagogical Tool Demonstration/ Case Study / Images / animation / ppt etc. Planned	Live Examples
Week 1	Lecture 1	Puppet Basics(Configuration Management System: Configuration Management, Pull, Push)	R-2 R-3	RW-1 RW-4	L1: Zero lecture for the introduction to the course objective, structure and detail of academic task. L2: Learning the basics of Puppet	Students will know about the basics of puppet.	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Server Provisioning and Configuration
		Puppet Basics(Introduction to Puppet: Puppet)	R-2 R-3	RW-4	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Puppet Architecture

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Week 1	Lecture 1	Puppet Basics(Why Puppet)	R-1 R-2 R-3	RW-1 RW-4	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	PPT & Talk (Self□learning, Real-life problems, Discussion Method and Thematic Teaching)	Template, Files, Certificate Authority
		Puppet Basics(Components of Puppet)	R-2 R-3	RW-4	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	PPT & Talk (Self learning, Real-life problems, Discussion Method and Thematic Teaching)	Puppet Master: Manifest, Template, Files, Certificate Authority
		Puppet Basics(Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority)	R-2 R-3	RW-1	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Puppet Architecture: Puppet Master:
		Puppet Basics(Puppet Clients: Agent, Facter)	R-2 R-3	RW-1	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	PPT & Talk (Self learning, Real-life problems, Discussion Method and Thematic Teaching)	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority
		Puppet Basics(Installation of Puppet)	R-2 R-3	RW-1	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	PPT & Talk (Self learning, Real-life problems, Discussion Method and Thematic Teaching)	Puppet Master: Manifest, Template, Files,
		Puppet Basics(Puppet Development in Isolation)	R-2 R-3	RW-4	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	PPT & Talk (Self learning, Real-life problems, Discussion Method and Thematic Teaching)	Certificate Authority

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Week 1	Lecture 2	Puppet Basics(Configuration Management System: Configuration Management, Pull, Push)	R-2 R-3	RW-1 RW-4	L1: Zero lecture for the introduction to the course objective, structure and detail of academic task. L2: Learning the basics of Puppet	Students will know about the basics of puppet.	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Server Provisioning and Configuration
		Puppet Basics(Introduction to Puppet: Puppet)	R-2 R-3	RW-4	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Puppet Architecture
		Puppet Basics(Why Puppet)	R-1 R-2 R-3	RW-1 RW-4	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	PPT & Talk (Self□learning, Real-life problems, Discussion Method and Thematic Teaching)	Template, Files, Certificate Authority
		Puppet Basics(Components of Puppet)	R-2 R-3	RW-4	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	PPT & Talk (Self learning, Real-life problems, Discussion Method and Thematic Teaching)	Puppet Master: Manifest, Template, Files, Certificate Authority
		Puppet Basics(Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority)	R-2 R-3	RW-1	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Puppet Architecture: Puppet Master:

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Week 1	Lecture 2	Puppet Basics(Puppet Clients: Agent, Facter)	R-2 R-3	RW-1	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	PPT & Talk (Self learning, Real-life problems, Discussion Method and Thematic Teaching)	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority
		Puppet Basics(Installation of Puppet)	R-2 R-3	RW-1	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	PPT & Talk (Self learning, Real-life problems, Discussion Method and Thematic Teaching)	Puppet Master: Manifest, Template, Files,
		Puppet Basics(Puppet Development in Isolation)	R-2 R-3	RW-4	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	PPT & Talk (Self learning, Real-life problems, Discussion Method and Thematic Teaching)	Certificate Authority
Week 2	Lecture 3	Puppet Basics(Configuration Management System: Configuration Management, Pull, Push)	R-2 R-3	RW-1 RW-4	L1: Zero lecture for the introduction to the course objective, structure and detail of academic task. L2: Learning the basics of Puppet	Students will know about the basics of puppet.	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Server Provisioning and Configuration
		Puppet Basics(Introduction to Puppet: Puppet)	R-2 R-3	RW-4	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Puppet Architecture
		Puppet Basics(Why Puppet)	R-1 R-2 R-3	RW-1 RW-4	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	PPT & Talk (Self□learning, Real-life problems, Discussion Method and Thematic Teaching)	Template, Files, Certificate Authority

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Week 2	Lecture 3	Puppet Basics(Components of Puppet)	R-2 R-3	RW-4	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	PPT & Talk (Self learning, Real-life problems, Discussion Method and Thematic Teaching)	Puppet Master: Manifest, Template, Files, Certificate Authority
		Puppet Basics(Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority)	R-2 R-3	RW-1	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Puppet Architecture: Puppet Master:
		Puppet Basics(Puppet Clients: Agent, Facter)	R-2 R-3	RW-1	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	PPT & Talk (Self learning, Real-life problems, Discussion Method and Thematic Teaching)	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority
		Puppet Basics(Installation of Puppet)	R-2 R-3	RW-1	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	PPT & Talk (Self learning, Real-life problems, Discussion Method and Thematic Teaching)	Puppet Master: Manifest, Template, Files,
		Puppet Basics(Puppet Development in Isolation)	R-2 R-3	RW-4	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	PPT & Talk (Self learning, Real-life problems, Discussion Method and Thematic Teaching)	Certificate Authority
	Lecture 4	Puppet Basics(Configuration Management System: Configuration Management, Pull, Push)	R-2 R-3	RW-1 RW-4	L1: Zero lecture for the introduction to the course objective, structure and detail of academic task. L2: Learning the basics of Puppet	Students will know about the basics of puppet.	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Server Provisioning and Configuration

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Week 2	Lecture 4	Puppet Basics(Introduction to Puppet: Puppet)	R-2 R-3	RW-4	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Puppet Architecture
		Puppet Basics(Why Puppet)	R-1 R-2 R-3	RW-1 RW-4	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	PPT & Talk (Self□learning, Real-life problems, Discussion Method and Thematic Teaching)	Template, Files, Certificate Authority
		Puppet Basics(Components of Puppet)	R-2 R-3	RW-4	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	PPT & Talk (Self learning, Real-life problems, Discussion Method and Thematic Teaching)	Puppet Master: Manifest, Template, Files, Certificate Authority
		Puppet Basics(Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority)	R-2 R-3	RW-1	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Puppet Architecture: Puppet Master:
		Puppet Basics(Puppet Clients: Agent, Facter)	R-2 R-3	RW-1	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	PPT & Talk (Self learning, Real-life problems, Discussion Method and Thematic Teaching)	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority

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Week 2	Lecture 4	Puppet Basics(Installation of Puppet)	R-2 R-3	RW-1	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	PPT & Talk (Self learning, Real-life problems, Discussion Method and Thematic Teaching)	Puppet Master: Manifest, Template, Files,
		Puppet Basics(Puppet Development in Isolation)	R-2 R-3	RW-4	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	Puppet Architecture: Puppet Master: Manifest, Template, Files, Certificate Authority	PPT & Talk (Self learning, Real-life problems, Discussion Method and Thematic Teaching)	Certificate Authority
Week 3	Lecture 5	Advanced Puppet(Puppet Configuration, Managing Packages in Puppet, Puppet Modules)	R-1 R-2	RW-1	Puppet Configuration, Managing Packages in Puppet, Puppet Modules	Puppet Configuration, Managing Packages in Puppet, Puppet Modules	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Puppet Configuration
		Advanced Puppet (Monitoring Web Servers, Load Balancing Clusters, Scaling Puppet Environment)	R-1 R-2	RW-4	Monitoring Web Servers, Load Balancing Clusters, Scaling Puppet Environment	Monitoring Web Servers, Load Balancing Clusters, Scaling Puppet Environment	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Monitoring Web Servers
		Advanced Puppet (Connecting Puppet Agent with Puppet Master, Making Configuration Dynamic)	R-1 R-2	RW-4	Connecting Puppet Agent with Puppet Master, Making Configuration Dynamic	Connecting Puppet Agent with Puppet Master, Making Configuration Dynamic	PPT & Talk (Self□learning, Real-life problems, Discussion Method and Thematic Teaching)	Connecting Puppet Agent
		Advanced Puppet(Extending Puppet, Puppet Classes and Functions (including Custom Functions))	R-1 R-2	RW-4	Extending Puppet, Puppet Classes and Functions (including Custom Functions)	Extending Puppet, Puppet Classes and Functions (including Custom Functions)	PPT & Talk (Self learning, Real-life problems, Discussion Method and Thematic Teaching)	Puppet Classes and Functions

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Week 3	Lecture 5	Advanced Puppet(Using Puppet via Command Line, Managing Resources with puppet apply Command, Puppet Manifests)	R-1 R-2 R-3	RW-4	Using Puppet via Command Line, Managing Resources with puppet apply Command, Puppet Manifests	Managing Resources with puppet apply Command	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Puppet via Command Line
	Lecture 6	Advanced Puppet(Puppet Configuration, Managing Packages in Puppet, Puppet Modules)	R-1 R-2	RW-1	Puppet Configuration, Managing Packages in Puppet, Puppet Modules	Puppet Configuration, Managing Packages in Puppet, Puppet Modules	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Puppet Configuration
		Advanced Puppet (Monitoring Web Servers, Load Balancing Clusters, Scaling Puppet Environment)	R-1 R-2	RW-4	Monitoring Web Servers, Load Balancing Clusters, Scaling Puppet Environment	Monitoring Web Servers, Load Balancing Clusters, Scaling Puppet Environment	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Monitoring Web Servers
		Advanced Puppet (Connecting Puppet Agent with Puppet Master, Making Configuration Dynamic)	R-1 R-2	RW-4	Connecting Puppet Agent with Puppet Master, Making Configuration Dynamic	Connecting Puppet Agent with Puppet Master, Making Configuration Dynamic	PPT & Talk (Self□learning, Real-life problems, Discussion Method and Thematic Teaching)	Connecting Puppet Agent
		Advanced Puppet(Extending Puppet, Puppet Classes and Functions (including Custom Functions))	R-1 R-2	RW-4	Extending Puppet, Puppet Classes and Functions (including Custom Functions)	Extending Puppet, Puppet Classes and Functions (including Custom Functions)	PPT & Talk (Self learning, Real-life problems, Discussion Method and Thematic Teaching)	Puppet Classes and Functions
		Advanced Puppet(Using Puppet via Command Line, Managing Resources with puppet apply Command, Puppet Manifests)	R-1 R-2 R-3	RW-4	Using Puppet via Command Line, Managing Resources with puppet apply Command, Puppet Manifests	Managing Resources with puppet apply Command	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Puppet via Command Line

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Week 4	Lecture 7	Advanced Puppet(Puppet Configuration, Managing Packages in Puppet, Puppet Modules)	R-1 R-2	RW-1	Puppet Configuration, Managing Packages in Puppet, Puppet Modules	Puppet Configuration, Managing Packages in Puppet, Puppet Modules	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Puppet Configuration
		Advanced Puppet (Monitoring Web Servers, Load Balancing Clusters, Scaling Puppet Environment)	R-1 R-2	RW-4	Monitoring Web Servers, Load Balancing Clusters, Scaling Puppet Environment	Monitoring Web Servers, Load Balancing Clusters, Scaling Puppet Environment	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Monitoring Web Servers
		Advanced Puppet (Connecting Puppet Agent with Puppet Master, Making Configuration Dynamic)	R-1 R-2	RW-4	Connecting Puppet Agent with Puppet Master, Making Configuration Dynamic	Connecting Puppet Agent with Puppet Master, Making Configuration Dynamic	PPT & Talk (Self□learning, Real-life problems, Discussion Method and Thematic Teaching)	Connecting Puppet Agent
		Advanced Puppet(Extending Puppet, Puppet Classes and Functions (including Custom Functions))	R-1 R-2	RW-4	Extending Puppet, Puppet Classes and Functions (including Custom Functions)	Extending Puppet, Puppet Classes and Functions (including Custom Functions)	PPT & Talk (Self learning, Real-life problems, Discussion Method and Thematic Teaching)	Puppet Classes and Functions
		Advanced Puppet(Using Puppet via Command Line, Managing Resources with puppet apply Command, Puppet Manifests)	R-1 R-2 R-3	RW-4	Using Puppet via Command Line, Managing Resources with puppet apply Command, Puppet Manifests	Managing Resources with puppet apply Command	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Puppet via Command Line
	Lecture 8	Advanced Puppet(Puppet Configuration, Managing Packages in Puppet, Puppet Modules)	R-1 R-2	RW-1	Puppet Configuration, Managing Packages in Puppet, Puppet Modules	Puppet Configuration, Managing Packages in Puppet, Puppet Modules	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Puppet Configuration

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Week 4	Lecture 8	Advanced Puppet (Monitoring Web Servers, Load Balancing Clusters, Scaling Puppet Environment)	R-1 R-2	RW-4	Monitoring Web Servers, Load Balancing Clusters, Scaling Puppet Environment	Monitoring Web Servers, Load Balancing Clusters, Scaling Puppet Environment	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Monitoring Web Servers
		Advanced Puppet (Connecting Puppet Agent with Puppet Master, Making Configuration Dynamic)	R-1 R-2	RW-4	Connecting Puppet Agent with Puppet Master, Making Configuration Dynamic	Connecting Puppet Agent with Puppet Master, Making Configuration Dynamic	PPT & Talk (Self□learning, Real-life problems, Discussion Method and Thematic Teaching)	Connecting Puppet Agent
		Advanced Puppet(Extending Puppet, Puppet Classes and Functions (including Custom Functions))	R-1 R-2	RW-4	Extending Puppet, Puppet Classes and Functions (including Custom Functions)	Extending Puppet, Puppet Classes and Functions (including Custom Functions)	PPT & Talk (Self learning, Real-life problems, Discussion Method and Thematic Teaching)	Puppet Classes and Functions
		Advanced Puppet(Using Puppet via Command Line, Managing Resources with puppet apply Command, Puppet Manifests)	R-1 R-2 R-3	RW-4	Using Puppet via Command Line, Managing Resources with puppet apply Command, Puppet Manifests	Managing Resources with puppet apply Command	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Puppet via Command Line
Week 5	Lecture 9	Advanced Puppet(Puppet Configuration, Managing Packages in Puppet, Puppet Modules)	R-1 R-2	RW-1	Puppet Configuration, Managing Packages in Puppet, Puppet Modules	Puppet Configuration, Managing Packages in Puppet, Puppet Modules	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Puppet Configuration

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Week 5	Lecture 9	Advanced Puppet (Monitoring Web Servers, Load Balancing Clusters, Scaling Puppet Environment)	R-1 R-2	RW-4	Monitoring Web Servers, Load Balancing Clusters, Scaling Puppet Environment	Monitoring Web Servers, Load Balancing Clusters, Scaling Puppet Environment	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Monitoring Web Servers
		Advanced Puppet (Connecting Puppet Agent with Puppet Master, Making Configuration Dynamic)	R-1 R-2	RW-4	Connecting Puppet Agent with Puppet Master, Making Configuration Dynamic	Connecting Puppet Agent with Puppet Master, Making Configuration Dynamic	PPT & Talk (Self□learning, Real-life problems, Discussion Method and Thematic Teaching)	Connecting Puppet Agent
		Advanced Puppet(Extending Puppet, Puppet Classes and Functions (including Custom Functions))	R-1 R-2	RW-4	Extending Puppet, Puppet Classes and Functions (including Custom Functions)	Extending Puppet, Puppet Classes and Functions (including Custom Functions)	PPT & Talk (Self learning, Real-life problems, Discussion Method and Thematic Teaching)	Puppet Classes and Functions
		Advanced Puppet(Using Puppet via Command Line, Managing Resources with puppet apply Command, Puppet Manifests)	R-1 R-2 R-3	RW-4	Using Puppet via Command Line, Managing Resources with puppet apply Command, Puppet Manifests	Managing Resources with puppet apply Command	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Puppet via Command Line
	Lecture 10	Nagios Monitoring (Continuous Monitoring Concepts: Definition, Importance, and Benefits. Introduction to Nagios: Features, Architecture, Plugins, Soft and Hard States)	R-1 R-3	RW-2 AV-1	Definition, Importance, and Benefits. Introduction to Nagios: Features, Architecture, Plugins, Soft and Hard States	Introduction to Nagios: Features, Architecture, Plugins, Soft and Hard States	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Nagios: Features
		Nagios Monitoring (Installation of Nagios: Using Package Managers (apt-get/dpkg, yum/rpm), Installing Prerequisites, Compiling and Installing)	R-1 R-3	RW-2 AV-1	Installation of Nagios: Using Package Managers (apt-get/dpkg, yum/rpm), Installing Prerequisites, Compiling and Installing	Using Package Managers (apt-get/dpkg, yum/rpm), Installing Prerequisites, Compiling and Installing	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Compiling and Installing

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Week 5	Lecture 10	Nagios Monitoring(Setting up Web Server, Command-Line Interfaces)	R-1 R-3	RW-2 AV-1	Setting up Web Server, Command-Line Interfaces	Setting up Web Server,	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Web Server
		Nagios Monitoring(Nagios Configuration: Monitoring Web Servers, Using Built-in Web Interface (Managing Hosts, Services, Downtimes, Comments, Information))	R-1 R-2 R-3	AV-1	Monitoring Web Servers, Using Built-in Web Interface (Managing Hosts, Services, Downtimes, Comments, Information)	Monitoring Web Servers, Using Built-in Web Interface	PPT & Talk (Self□learning, Real-life problems, Discussion Method and Thematic Teaching)	Nagios Configuration
		Nagios Monitoring (Deploying a Simple Web Application on Server)	R-1 R-3	AV-1	Deploying a Simple Web Application on Server	Deploying a Simple Web Application on Server	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Web Application on Server
Week 6	Lecture 11	Nagios Monitoring (Continuous Monitoring Concepts: Definition, Importance, and Benefits. Introduction to Nagios: Features, Architecture, Plugins, Soft and Hard States)	R-1 R-3	RW-2 AV-1	Definition, Importance, and Benefits. Introduction to Nagios: Features, Architecture, Plugins, Soft and Hard States	Introduction to Nagios: Features, Architecture, Plugins, Soft and Hard States	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Nagios: Features
		Nagios Monitoring (Installation of Nagios: Using Package Managers (apt-get/dpkg, yum/rpm), Installing Prerequisites, Compiling and Installing)	R-1 R-3	RW-2 AV-1	Installation of Nagios: Using Package Managers (apt-get/dpkg, yum/rpm), Installing Prerequisites, Compiling and Installing	Using Package Managers (apt-get/dpkg, yum/rpm), Installing Prerequisites, Compiling and Installing	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Compiling and Installing

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Week 6	Lecture 11	Nagios Monitoring(Setting up Web Server, Command-Line Interfaces)	R-1 R-3	RW-2 AV-1	Setting up Web Server, Command-Line Interfaces	Setting up Web Server,	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Web Server
		Nagios Monitoring(Nagios Configuration: Monitoring Web Servers, Using Built-in Web Interface (Managing Hosts, Services, Downtimes, Comments, Information))	R-1 R-2 R-3	AV-1	Monitoring Web Servers, Using Built-in Web Interface (Managing Hosts, Services, Downtimes, Comments, Information)	Monitoring Web Servers, Using Built-in Web Interface	PPT & Talk (Self□learning, Real-life problems, Discussion Method and Thematic Teaching)	Nagios Configuration
		Nagios Monitoring (Deploying a Simple Web Application on Server)	R-1 R-3	AV-1	Deploying a Simple Web Application on Server	Deploying a Simple Web Application on Server	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Web Application on Server
	Lecture 12	Nagios Monitoring (Continuous Monitoring Concepts: Definition, Importance, and Benefits. Introduction to Nagios: Features, Architecture, Plugins, Soft and Hard States)	R-1 R-3	RW-2 AV-1	Definition, Importance, and Benefits. Introduction to Nagios: Features, Architecture, Plugins, Soft and Hard States	Introduction to Nagios: Features, Architecture, Plugins, Soft and Hard States	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Nagios: Features
		Nagios Monitoring (Installation of Nagios: Using Package Managers (apt-get/dpkg, yum/rpm), Installing Prerequisites, Compiling and Installing)	R-1 R-3	RW-2 AV-1	Installation of Nagios: Using Package Managers (apt-get/dpkg, yum/rpm), Installing Prerequisites, Compiling and Installing	Using Package Managers (apt-get/dpkg, yum/rpm), Installing Prerequisites, Compiling and Installing	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Compiling and Installing

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Week 6	Lecture 12	Nagios Monitoring(Setting up Web Server, Command-Line Interfaces)	R-1 R-3	RW-2 AV-1	Setting up Web Server, Command-Line Interfaces	Setting up Web Server,	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Web Server
		Nagios Monitoring(Nagios Configuration: Monitoring Web Servers, Using Built-in Web Interface (Managing Hosts, Services, Downtimes, Comments, Information))	R-1 R-2 R-3	AV-1	Monitoring Web Servers, Using Built-in Web Interface (Managing Hosts, Services, Downtimes, Comments, Information)	Monitoring Web Servers, Using Built-in Web Interface	PPT & Talk (Self□learning, Real-life problems, Discussion Method and Thematic Teaching)	Nagios Configuration
		Nagios Monitoring (Deploying a Simple Web Application on Server)	R-1 R-3	AV-1	Deploying a Simple Web Application on Server	Deploying a Simple Web Application on Server	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Web Application on Server
Week 7	Lecture 13	Nagios Monitoring (Continuous Monitoring Concepts: Definition, Importance, and Benefits. Introduction to Nagios: Features, Architecture, Plugins, Soft and Hard States)	R-1 R-3	RW-2 AV-1	Definition, Importance, and Benefits. Introduction to Nagios: Features, Architecture, Plugins, Soft and Hard States	Introduction to Nagios: Features, Architecture, Plugins, Soft and Hard States	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Nagios: Features
		Nagios Monitoring (Installation of Nagios: Using Package Managers (apt-get/dpkg, yum/rpm), Installing Prerequisites, Compiling and Installing)	R-1 R-3	RW-2 AV-1	Installation of Nagios: Using Package Managers (apt-get/dpkg, yum/rpm), Installing Prerequisites, Compiling and Installing	Using Package Managers (apt-get/dpkg, yum/rpm), Installing Prerequisites, Compiling and Installing	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Compiling and Installing

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Week 7	Lecture 13	Nagios Monitoring(Setting up Web Server, Command-Line Interfaces)	R-1 R-3	RW-2 AV-1	Setting up Web Server, Command-Line Interfaces	Setting up Web Server,	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Web Server
		Nagios Monitoring(Nagios Configuration: Monitoring Web Servers, Using Built-in Web Interface (Managing Hosts, Services, Downtimes, Comments, Information))	R-1 R-2 R-3	AV-1	Monitoring Web Servers, Using Built-in Web Interface (Managing Hosts, Services, Downtimes, Comments, Information)	Monitoring Web Servers, Using Built-in Web Interface	PPT & Talk (Self□learning, Real-life problems, Discussion Method and Thematic Teaching)	Nagios Configuration
		Nagios Monitoring (Deploying a Simple Web Application on Server)	R-1 R-3	AV-1	Deploying a Simple Web Application on Server	Deploying a Simple Web Application on Server	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Web Application on Server
		SPILL OVER						
Week 7	Lecture 14				Spill Over			
		MID-TERM						
Week 8	Lecture 15	Infrastructure as Code with Terraform(Introduction to Terraform: What is Terraform, Benefits and Use Cases)	R-1 R-2 R-3	AV-3	Introduction to Terraform: What is Terraform, Benefits and Use Cases	What is Terraform, Benefits and Use Cases	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Introduction to Terraform
		Infrastructure as Code with Terraform(Terraform Architecture and Workflow)	R-1 R-2 R-3	AV-3	Terraform Architecture and Workflow	Terraform Architecture and Workflow	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Terraform Architecture

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Week 8	Lecture 15	Infrastructure as Code with Terraform(Installing and Setting Up Terraform. Writing and Managing Terraform Configuration Files)	R-1 R-2 R-3	AV-3	Installing and Setting Up Terraform. Writing and Managing Terraform Configuration Files	Managing Terraform Configuration Files	PPT & Talk (Self□learning, Real-life problems, Discussion Method and Thematic Teaching)	Setting Up Terraform
		Infrastructure as Code with Terraform(Provisioning Infrastructure on AWS/Azure/GCP. Managing Resources and Dependencies)	R-1 R-3	AV-3	Provisioning Infrastructure on AWS/Azure/GCP. Managing Resources and Dependencies	Provisioning Infrastructure on AWS/Azure/GCP	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Managing Resources and Dependencies
		Infrastructure as Code with Terraform(Terraform State and State Management. Modules and Workspaces)	R-1 R-2 R-3	AV-3	Terraform State and State Management. Modules and Workspaces	Terraform State and State Management	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Modules and Workspaces
		Infrastructure as Code with Terraform(Terraform with Ansible for Advanced Automation. Best Practices and Security Considerations)	R-1 R-2 R-3	AV-3	Terraform with Ansible for Advanced Automation. Best Practices and Security Considerations	Terraform with Ansible for Advanced Automation	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Ansible for Advanced Automation
	Lecture 16	Infrastructure as Code with Terraform(Introduction to Terraform: What is Terraform, Benefits and Use Cases)	R-1 R-2 R-3	AV-3	Introduction to Terraform: What is Terraform, Benefits and Use Cases	What is Terraform, Benefits and Use Cases	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Introduction to Terraform

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Week 8	Lecture 16	Infrastructure as Code with Terraform(Terraform Architecture and Workflow)	R-1 R-2 R-3	AV-3	Terraform Architecture and Workflow	Terraform Architecture and Workflow	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Terraform Architecture
		Infrastructure as Code with Terraform(Installing and Setting Up Terraform. Writing and Managing Terraform Configuration Files)	R-1 R-2 R-3	AV-3	Installing and Setting Up Terraform. Writing and Managing Terraform Configuration Files	Managing Terraform Configuration Files	PPT & Talk (Self□learning, Real-life problems, Discussion Method and Thematic Teaching)	Setting Up Terraform
		Infrastructure as Code with Terraform(Provisioning Infrastructure on AWS/Azure/GCP. Managing Resources and Dependencies)	R-1 R-3	AV-3	Provisioning Infrastructure on AWS/Azure/GCP. Managing Resources and Dependencies	Provisioning Infrastructure on AWS/Azure/GCP	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Managing Resources and Dependencies
		Infrastructure as Code with Terraform(Terraform State and State Management. Modules and Workspaces)	R-1 R-2 R-3	AV-3	Terraform State and State Management. Modules and Workspaces	Terraform State and State Management	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Modules and Workspaces
		Infrastructure as Code with Terraform(Terraform with Ansible for Advanced Automation. Best Practices and Security Considerations)	R-1 R-2 R-3	AV-3	Terraform with Ansible for Advanced Automation. Best Practices and Security Considerations	Terraform with Ansible for Advanced Automation	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Ansible for Advanced Automation

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Week 9	Lecture 17	Infrastructure as Code with Terraform(Introduction to Terraform: What is Terraform, Benefits and Use Cases)	R-1 R-2 R-3	AV-3	Introduction to Terraform: What is Terraform, Benefits and Use Cases	What is Terraform, Benefits and Use Cases	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Introduction to Terraform
		Infrastructure as Code with Terraform(Terraform Architecture and Workflow)	R-1 R-2 R-3	AV-3	Terraform Architecture and Workflow	Terraform Architecture and Workflow	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Terraform Architecture
		Infrastructure as Code with Terraform(Installing and Setting Up Terraform. Writing and Managing Terraform Configuration Files)	R-1 R-2 R-3	AV-3	Installing and Setting Up Terraform. Writing and Managing Terraform Configuration Files	Managing Terraform Configuration Files	PPT & Talk (Self□learning, Real-life problems, Discussion Method and Thematic Teaching)	Setting Up Terraform
		Infrastructure as Code with Terraform(Provisioning Infrastructure on AWS/Azure/GCP. Managing Resources and Dependencies)	R-1 R-3	AV-3	Provisioning Infrastructure on AWS/Azure/GCP. Managing Resources and Dependencies	Provisioning Infrastructure on AWS/Azure/GCP	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Managing Resources and Dependencies
		Infrastructure as Code with Terraform(Terraform State and State Management. Modules and Workspaces)	R-1 R-2 R-3	AV-3	Terraform State and State Management. Modules and Workspaces	Terraform State and State Management	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Modules and Workspaces

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Week 9	Lecture 17	Infrastructure as Code with Terraform(Terraform with Ansible for Advanced Automation. Best Practices and Security Considerations)	R-1 R-2 R-3	AV-3	Terraform with Ansible for Advanced Automation. Best Practices and Security Considerations	Terraform with Ansible for Advanced Automation	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Ansible for Advanced Automation
	Lecture 18	Infrastructure as Code with Terraform(Introduction to Terraform: What is Terraform, Benefits and Use Cases)	R-1 R-2 R-3	AV-3	Introduction to Terraform: What is Terraform, Benefits and Use Cases	What is Terraform, Benefits and Use Cases	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Introduction to Terraform
		Infrastructure as Code with Terraform(Terraform Architecture and Workflow)	R-1 R-2 R-3	AV-3	Terraform Architecture and Workflow	Terraform Architecture and Workflow	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Terraform Architecture
		Infrastructure as Code with Terraform(Installing and Setting Up Terraform. Writing and Managing Terraform Configuration Files)	R-1 R-2 R-3	AV-3	Installing and Setting Up Terraform. Writing and Managing Terraform Configuration Files	Managing Terraform Configuration Files	PPT & Talk (Self□learning, Real-life problems, Discussion Method and Thematic Teaching)	Setting Up Terraform
		Infrastructure as Code with Terraform(Provisioning Infrastructure on AWS/Azure/GCP. Managing Resources and Dependencies)	R-1 R-3	AV-3	Provisioning Infrastructure on AWS/Azure/GCP. Managing Resources and Dependencies	Provisioning Infrastructure on AWS/Azure/GCP	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Managing Resources and Dependencies

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Week 9	Lecture 18	Infrastructure as Code with Terraform(Terraform State and State Management. Modules and Workspaces)	R-1 R-2 R-3	AV-3	Terraform State and State Management. Modules and Workspaces	Terraform State and State Management	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Modules and Workspaces
		Infrastructure as Code with Terraform(Terraform with Ansible for Advanced Automation. Best Practices and Security Considerations)	R-1 R-2 R-3	AV-3	Terraform with Ansible for Advanced Automation. Best Practices and Security Considerations	Terraform with Ansible for Advanced Automation	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Ansible for Advanced Automation
Week 10	Lecture 19	Introduction to Ansible (Introduction to Ansible and Configuration Management)	R-2	RW-3 AV-2	Introduction to Ansible and Configuration Management	Introduction to Ansible and Configuration Management	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Ansible
		Introduction to Ansible(How Ansible Works, Modern Infrastructure Management, Ansible and RedHat, Ansible Architecture)	R-2	RW-3 AV-2	How Ansible Works, Modern Infrastructure Management, Ansible and RedHat, Ansible Architecture	Modern Infrastructure Management, Ansible and RedHat	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Ansible Architecture
		Introduction to Ansible (Infrastructure Management: From Shell Scripts to Ansible)	R-2	RW-3 AV-2	Infrastructure Management: From Shell Scripts to Ansible	From Shell Scripts to Ansible	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Infrastructure Management

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Week 10	Lecture 19	Introduction to Ansible (Installing Ansible, Creating a Basic Inventory File)	R-2	RW-3 AV-2	Installing Ansible, Creating a Basic Inventory File	Installing Ansible, Creating a Basic Inventory File	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Installing Ansible
		Introduction to Ansible (Using Ansible with Vagrant: Setup and Usage)	R-2	RW-3 AV-2	Using Ansible with Vagrant: Setup and Usage	Setup and Usage	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Ansible with Vagrant
	Lecture 20	Introduction to Ansible (Introduction to Ansible and Configuration Management)	R-2	RW-3 AV-2	Introduction to Ansible and Configuration Management	Introduction to Ansible and Configuration Management	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Ansible
		Introduction to Ansible(How Ansible Works, Modern Infrastructure Management, Ansible and RedHat, Ansible Architecture)	R-2	RW-3 AV-2	How Ansible Works, Modern Infrastructure Management, Ansible and RedHat, Ansible Architecture	Modern Infrastructure Management, Ansible and RedHat	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Ansible Architecture
		Introduction to Ansible (Infrastructure Management: From Shell Scripts to Ansible)	R-2	RW-3 AV-2	Infrastructure Management: From Shell Scripts to Ansible	From Shell Scripts to Ansible	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Infrastructure Management

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Week 10	Lecture 20	Introduction to Ansible (Installing Ansible, Creating a Basic Inventory File)	R-2	RW-3 AV-2	Installing Ansible, Creating a Basic Inventory File	Installing Ansible, Creating a Basic Inventory File	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Installing Ansible
		Introduction to Ansible (Using Ansible with Vagrant: Setup and Usage)	R-2	RW-3 AV-2	Using Ansible with Vagrant: Setup and Usage	Setup and Usage	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Ansible with Vagrant
Week 11	Lecture 21	Introduction to Ansible (Introduction to Ansible and Configuration Management)	R-2	RW-3 AV-2	Introduction to Ansible and Configuration Management	Introduction to Ansible and Configuration Management	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Ansible
		Introduction to Ansible(How Ansible Works, Modern Infrastructure Management, Ansible and RedHat, Ansible Architecture)	R-2	RW-3 AV-2	How Ansible Works, Modern Infrastructure Management, Ansible and RedHat, Ansible Architecture	Modern Infrastructure Management, Ansible and RedHat	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Ansible Architecture
		Introduction to Ansible (Infrastructure Management: From Shell Scripts to Ansible)	R-2	RW-3 AV-2	Infrastructure Management: From Shell Scripts to Ansible	From Shell Scripts to Ansible	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Infrastructure Management

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Week 11	Lecture 21	Introduction to Ansible (Installing Ansible, Creating a Basic Inventory File)	R-2	RW-3 AV-2	Installing Ansible, Creating a Basic Inventory File	Installing Ansible, Creating a Basic Inventory File	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Installing Ansible
		Introduction to Ansible (Using Ansible with Vagrant: Setup and Usage)	R-2	RW-3 AV-2	Using Ansible with Vagrant: Setup and Usage	Setup and Usage	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Ansible with Vagrant
	Lecture 22	Introduction to Ansible (Introduction to Ansible and Configuration Management)	R-2	RW-3 AV-2	Introduction to Ansible and Configuration Management	Introduction to Ansible and Configuration Management	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Ansible
		Introduction to Ansible(How Ansible Works, Modern Infrastructure Management, Ansible and RedHat, Ansible Architecture)	R-2	RW-3 AV-2	How Ansible Works, Modern Infrastructure Management, Ansible and RedHat, Ansible Architecture	Modern Infrastructure Management, Ansible and RedHat	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Ansible Architecture
		Introduction to Ansible (Infrastructure Management: From Shell Scripts to Ansible)	R-2	RW-3 AV-2	Infrastructure Management: From Shell Scripts to Ansible	From Shell Scripts to Ansible	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Infrastructure Management

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Week 11	Lecture 22	Introduction to Ansible (Installing Ansible, Creating a Basic Inventory File)	R-2	RW-3 AV-2	Installing Ansible, Creating a Basic Inventory File	Installing Ansible, Creating a Basic Inventory File	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Installing Ansible
		Introduction to Ansible (Using Ansible with Vagrant: Setup and Usage)	R-2	RW-3 AV-2	Using Ansible with Vagrant: Setup and Usage	Setup and Usage	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Ansible with Vagrant
Week 12	Lecture 23	Introduction to Ansible (Introduction to Ansible and Configuration Management)	R-2	RW-3 AV-2	Introduction to Ansible and Configuration Management	Introduction to Ansible and Configuration Management	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Ansible
		Introduction to Ansible(How Ansible Works, Modern Infrastructure Management, Ansible and RedHat, Ansible Architecture)	R-2	RW-3 AV-2	How Ansible Works, Modern Infrastructure Management, Ansible and RedHat, Ansible Architecture	Modern Infrastructure Management, Ansible and RedHat	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Ansible Architecture
		Introduction to Ansible (Infrastructure Management: From Shell Scripts to Ansible)	R-2	RW-3 AV-2	Infrastructure Management: From Shell Scripts to Ansible	From Shell Scripts to Ansible	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Infrastructure Management

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Week 12	Lecture 23	Introduction to Ansible (Installing Ansible, Creating a Basic Inventory File)	R-2	RW-3 AV-2	Installing Ansible, Creating a Basic Inventory File	Installing Ansible, Creating a Basic Inventory File	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Installing Ansible
		Introduction to Ansible (Using Ansible with Vagrant: Setup and Usage)	R-2	RW-3 AV-2	Using Ansible with Vagrant: Setup and Usage	Setup and Usage	PPT & Talk (Discussion, Real□life problems, Classroom Lecture using chalk and talk technique, and Peer Teaching using MOOC)	Ansible with Vagrant
	Lecture 24	Advanced Ansible(Ansible Roles and Command Line Usage)	R-2	RW-3 AV-2	Ansible Roles and Command Line Usage	Ansible Roles and Command Line Usage	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Advanced Ansible
		Advanced Ansible (Playbooks: Structure, Writing and Running Playbooks with ansible-playbook. Real-world Playbook Examples)	R-2	RW-3 AV-2	Playbooks: Structure, Writing and Running Playbooks with ansible-playbook. Real-world Playbook Examples	Structure, Writing and Running Playbooks with ansible-playbook.	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Real-world Playbook Examples
		Advanced Ansible(Handlers, Environment Variables, Variables, Facts, Prompts, Tags, Blocks)	R-2	RW-3 AV-2	Handlers, Environment Variables, Variables, Facts, Prompts, Tags, Blocks	Handlers, Environment Variables, Variables, Facts, Prompts, Tags, Blocks	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Environment Variables

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Week 12	Lecture 24	Advanced Ansible(Ansible with AWS for Application Deployment)	R-2	RW-3 AV-2	Ansible with AWS for Application Deployment	Ansible with AWS for Application Deployment	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Ansible with AWS
Week 13	Lecture 25	Advanced Ansible(Ansible Roles and Command Line Usage)	R-2	RW-3 AV-2	Ansible Roles and Command Line Usage	Ansible Roles and Command Line Usage	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Advanced Ansible
		Advanced Ansible (Playbooks: Structure, Writing and Running Playbooks with ansible-playbook. Real-world Playbook Examples)	R-2	RW-3 AV-2	Playbooks: Structure, Writing and Running Playbooks with ansible-playbook. Real-world Playbook Examples	Structure, Writing and Running Playbooks with ansible-playbook.	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Real-world Playbook Examples
		Advanced Ansible(Handlers, Environment Variables, Variables, Facts, Prompts, Tags, Blocks)	R-2	RW-3 AV-2	Handlers, Environment Variables, Variables, Facts, Prompts, Tags, Blocks	Handlers, Environment Variables, Variables, Facts, Prompts, Tags, Blocks	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Environment Variables

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Week 13	Lecture 25	Advanced Ansible(Ansible with AWS for Application Deployment)	R-2	RW-3 AV-2	Ansible with AWS for Application Deployment	Ansible with AWS for Application Deployment	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Ansible with AWS
	Lecture 26	Advanced Ansible(Ansible Roles and Command Line Usage)	R-2	RW-3 AV-2	Ansible Roles and Command Line Usage	Ansible Roles and Command Line Usage	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Advanced Ansible
		Advanced Ansible (Playbooks: Structure, Writing and Running Playbooks with ansible-playbook. Real-world Playbook Examples)	R-2	RW-3 AV-2	Playbooks: Structure, Writing and Running Playbooks with ansible-playbook. Real-world Playbook Examples	Structure, Writing and Running Playbooks with ansible-playbook.	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Real-world Playbook Examples
		Advanced Ansible(Handlers, Environment Variables, Variables, Facts, Prompts, Tags, Blocks)	R-2	RW-3 AV-2	Handlers, Environment Variables, Variables, Facts, Prompts, Tags, Blocks	Handlers, Environment Variables, Variables, Facts, Prompts, Tags, Blocks	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Environment Variables

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Week 13	Lecture 26	Advanced Ansible(Ansible with AWS for Application Deployment)	R-2	RW-3 AV-2	Ansible with AWS for Application Deployment	Ansible with AWS for Application Deployment	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Ansible with AWS
Week 14	Lecture 27	Advanced Ansible(Ansible Roles and Command Line Usage)	R-2	RW-3 AV-2	Ansible Roles and Command Line Usage	Ansible Roles and Command Line Usage	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Advanced Ansible
		Advanced Ansible (Playbooks: Structure, Writing and Running Playbooks with ansible-playbook. Real-world Playbook Examples)	R-2	RW-3 AV-2	Playbooks: Structure, Writing and Running Playbooks with ansible-playbook. Real-world Playbook Examples	Structure, Writing and Running Playbooks with ansible-playbook.	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Real-world Playbook Examples
		Advanced Ansible(Handlers, Environment Variables, Variables, Facts, Prompts, Tags, Blocks)	R-2	RW-3 AV-2	Handlers, Environment Variables, Variables, Facts, Prompts, Tags, Blocks	Handlers, Environment Variables, Variables, Facts, Prompts, Tags, Blocks	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Environment Variables

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Week 14	Lecture 27	Advanced Ansible(Ansible with AWS for Application Deployment)	R-2	RW-3 AV-2	Ansible with AWS for Application Deployment	Ansible with AWS for Application Deployment	Video & PPT (Brainstorming, Discussion method (Estimation techniques), Analysis of critical incidents originating in familiar and non familiar situations	Ansible with AWS
		SPILL OVER						
Week 14	Lecture 28				Spill Over			
Week 15	Lecture 29				Spill Over			
	Lecture 30				Spill Over			

Scheme for CA:

CA Category of this Course Code is:A0202 (2 out of 2)

Component	Weightage (%)	Mapped CO(s)
BYOD-Practical	50	CO1, CO2, CO3
Project	50	CO1, CO2, CO3, CO4, CO5, CO6

Details of Academic Task(s)

Academic Task	Objective	Detail of Academic Task	Nature of Academic Task (group/individuals)	Academic Task Mode	Marks	Allottment / submission Week
BYOD-Practical	CA1	CA1	Individual	Offline	30	5 / 6
Project	Student will learn how to practically implement all the tools mentioned in syllabus.	50 marks Implementation 30 marks Viva 20 marks Written	Individual	Offline	100	4 / 13

MOOCs/ Certification etc. mapped with the Academic Task(s)

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Academic Task	Name Of Certification/Online Course/Test/Competition mapped	Type	Offered By Organisation
BYOD-Practical	NAGIOS CERTIFIED PROFESSIONAL	Industry Certification	NAGIOS

Where MOOCs/ Certification etc. are mapped with Academic Tasks:
1. Students have choice to appear for Academic Task or MOOCs etc.
2. The student may appear for both, In this case best obtained marks will be considered.

Detailed Plan For Practicals

Practical No	Broad topic	Subtopic	Other Readings	Learning Outcomes
Practical 1	1. Install and Configure Virtualization Platform	Download and set up Oracle VirtualBox. Import Puppet and Ansible learning VMs		Practical 1
Practical 2	2. Puppet Installation and Initial Setup	Install Puppet on a virtual machine and perform basic configuration tasks.	RW-1 RW-4	Practical 2
	3. Develop and Apply Puppet Manifests	Create and apply basic Puppet manifests to manage system resources.	RW-1 RW-4	Practical 2
	4. Puppet Module Creation and Deployment	Design custom Puppet modules and deploy them in a simulated environment.	RW-1 RW-4	Practical 2
	5. Setup Puppet Master-Agent Architecture	Configure Puppet Master and Agent, and test communication and certificate exchange.	RW-1 RW-4	Practical 2
	6. Dynamic Resource Management Using Puppet	Use facts and templates in Puppet to manage dynamic configurations.	RW-1 RW-4	Practical 2
Practical 3	7. Install and Configure Nagios Core	Install Nagios on CentOS/Ubuntu, configure basic host and service monitoring.	RW-2 AV-1	Practical 3
	8. Create Custom Nagios Plugins	Write and integrate basic Bash or Python plugins with Nagios.	RW-2 AV-1	Practical 3
	9. Monitor a Web Server with Nagios	Configure Nagios to monitor Apache/Nginx web server status, services, and logs.	RW-2 AV-1	Practical 3
	10. Use Nagios Web Interface for System Monitoring	Manage hosts, services, comments, and view alerts through the Nagios web interface.	RW-2 AV-1	Practical 3

Practical 4	11. Install and Configure Ansible	Set up Ansible, create inventory files, and use basic ad-hoc commands.	RW-1 RW-4	Practical 4
	12. Write and Execute Ansible Playbooks	Create playbooks to automate tasks like package installation and service configuration.	RW-1 RW-4	Practical 4
	13. Deploy Applications Using Ansible with AWS	Use Ansible to provision and deploy a sample web application on an AWS EC2 instance.	RW-1 RW-4	Practical 4
Practical 5	14. Install and Configure Terraform	Set up Terraform and write basic configuration files to provision cloud infrastructure.	AV-3	Practical 5,6
	15. Use Terraform with Ansible for End-to-End Automation	Automate infrastructure provisioning with Terraform and configure it using Ansible.	AV-3	Practical 5,6
Practical 6	15. Use Terraform with Ansible for End-to-End Automation	Automate infrastructure provisioning with Terraform and configure it using Ansible.	AV-3	Practical 5,6
	14. Install and Configure Terraform	Set up Terraform and write basic configuration files to provision cloud infrastructure.	AV-3	Practical 5,6
	SPILL OVER			
Practical 7	Spill Over			