

Course Code	18CSE316J	Course Name	ESSENTIALS IN CLOUD AND DEVOPS	Course Category	E	Professional Elective	L	T	P	C
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Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Networking and Communications	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning	Program Learning Outcomes (PLO)
CLR-1 :	To introduce students to the basic concepts and techniques of the entire application Lifecycle	1 2 3	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
CLR-2 :	Understanding of the Quality Assurance throughout the application lifecycle	Level of Thinking (Bloom)	Engineering Knowledge
CLR-3 :	Understanding of the Security Terms integrated with development and Operations	Expected Proficiency (%)	Problem Analysis
CLR-4 :	To study the various use of technology stack and tooling for reliability	Expected Attainment (%)	Design & Development
CLR-5 :	To study the various deploying code and Provisioning Infrastructure		Analysis, Design, Research
CLR-6 :	To introduce students to the basic concepts and techniques of the entire application Lifecycle		Modern Tool Usage
			Society & Culture
			Environment & Sustainability
			Ethics
			Individual & Team Work
			Communication
			Project Mgt. & Finance
			Life Long Learning
			PSO - 1
			PSO - 2
			PSO - 3
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Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:
CLO-1 :	Analyses the entire application lifecycle through techniques
CLO-2 :	Identify and apply quality and security throughout the lifecycle
CLO-3 :	Suggest and ensure a good quality for any given application updates and infrastructure changes
CLO-4 :	Apply the appropriate computing resources elastic and responsive to frequent changes.
CLO-5 :	Design systems by using micro services architecture, decouples large, complex systems into simple independent projects
CLO-6 :	Modify existing traditional software development and management process to improve speed enabled organization

Duration (hour)	INTRODUCTION	LINUX and SCRIPTING	TERRAFORM&ANSIBLE	DOCKER & KUBERNTESE	DevOps OPERATION and MANAGEMENT
S-1	SLO-1 Introduction to Cloud Fundamentals	Bash Shell Scripting Overview	Infrastructure as Code Defined	Docker Engine Architecture	DevOps Foundations and Automatic Testing
	SLO-2 Fundamentals of AWS	Basics Steps to Write and Execute Bash Shell Scripting With an Example	Impotence and Consistency	Docker Image	Statergy for Application Deploymenet
S-2	SLO-1 Managing IAM	List of General Purpose Commands and Help to Understand the Usage of a Command	Push or Pull Benefits of Infrastructure as Code	Basic Container Operations	Monitoring
	SLO-2 Introduction to S3 simple storage service	Redirection Operators and STDIN, STDOUT & STDERR	Describe plugin based architecture	Interacting with a Running Container	
S-3	SLO-1 Security	Complete Echo Command	Working with Data in Terraform Input Variable Syntax Terraform Data Types	Inspecting a Container	Introduction to GIT ,Gradle, Selinium, Jenkins
	SLO-2 EC2 Instance	Working with Variables	Adding Outputs to the Configuration Validate the Configuration Using the Validate Command	Copying Contents into Container Publishing Ports, Troubleshooting Docker Daemon	
S 4-5	SLO-1 Lab1: Creating AWS	Lab 4: Installation of Linux	Lab7:Handle Terraform and provider installation and versioning	Lab 10: Installing Docker Service with Configuration	Lab 13: Installation of GIT, Gradle, Selinium, Jenkins
	SLO-2				
S-6	SLO-1 Creating AWS Account, Identity and Access Management (IAM) Basics	Practice with grep Command and Usage of Patterns in grep Command Cut command Practice with cut Command awk command	Need of Ansible	Kubernetes Architecture	Case Study 1: Three Tier web application using docker and Kubernetes
	SLO-2	Input and Output Commands for Shell Scripting	Architecture and Process flow of Ansible	Kubernetes-Scheduling	
S-7	SLO-1 Adding an IAM Admin - GENERAL ACCOUNT	Command Chaining using Logical operators	Package, Services	Logging & Monitoring	Case Study 2:Infrastructure as Code Using Terraform (Modules)
	SLO-2 Adding an IAM Admin User - PRODUCTION ACCOUNT	Scheduling jobswith crontab	Ansible Module Fundamentals	Cluster Maintenance	
S-8	SLO-1 Access Keys	Configure networking and hostname resolution statically or dynamically	Advanced Execution -gather_facts Accelerated Mode and Pipelining	Security & Storage	Case Study 3:Configuration Management using Ansible (Roles)
	SLO-2				
S 9-10	SLO-1 Lab 2: Creating Access keys and setting up AWS	Lab 5:	Lab 8: How to install Ansible	Lab 11: Deployment of kubeadm	Lab 14 :Mini project on the above technology
	SLO-2				

S-11	SLO-1	EC2 Basics	Configure network services to start automatically at boot		Choosing Kubernetes infrastructure	Case Study 1: Application code management using Git
	SLO-2	EC2 Creation	Start, stop, and check the status of network services	Troubleshooting, Testing and Validation	Creating Helm charts	
S-12	SLO-1	EC2 Storage services	Configure HTTP server log files	Syntax-Check & Dry-Run: syntax-check	Role Based Access Control	Case study 2: Building CI/CD pipeline to deploy new version of Application (Jenkins)
	SLO-2	Simple automation with cloud formation			Troubleshooting Kubernetes	
S-13	SLO-1	Virtual Private cloud	Restrict access to a web page, Manage and configure containers	Debugging	Designing a Kubernetes cluster	Case Study 3: Building Monitoring for application
	SLO-2	Router R3 fundamentals			Helm	
S 14-15	SLO-1	Lab 3: Instance creation EC2 S3 life cycle configuration	Lab 6: Manage and configure Virtual Machines	Lab 9: Create Roles in Ansible	Lab 12: Installing Kubernetes without Helm	Lab 15 : Mini Project on the above technology

Learning Resources	1. The DevOps Handbook, Gene Kim, Jez Humble, Patrick Debois, John Allspaw and John Willis Jason Bell, IT revolution Press, 2016.	3. Mastering Linux Shell Scripting : A practical guide to Linux command-line, Bash scripting, and Shell programming, Andrew Mallett Mokhtar Ebrahim, Ingram short title, Second Edition, 2018.
	2. The DevOps Adoption Playbook: A Guide to Adopting DevOps in a Multi-Speed IT Enterprise. Sanjeev Sharma 1st Edition, Wiley, 2017.	

Learning Assessment								
	Bloom's Level of Thinking	Continuous Learning Assessment (CLA) (60% weightage)					Final Examination (40% weightage)	
		CLA-1 (20%)		CLA-2 (25%)		CLA-3 (15%)		
		Theory	Practice	Theory	Practice		Theory	Practice
Level 1	Remember	20%	20%	20%	20%	20%	20%	20%
	Understand							
Level 2	Apply	20%	20%	20%	20%	20%	20%	20%
	Analyse							
Level 3	Evaluate	10%	10%	10%	10%	20%	10%	10%
	Create							
	Total	100 %		100 %		100 %	100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry EPAM	Experts from Higher Technical Institutions	Internal Experts Dr.L.Anand Dr.R.Radhika