Swarnandhra College of Engineering & Technology

Autonomous and recognized under 2(F) and 12(B) by UGC

Recognized by AICTE, permanently affiliated to JNTUK Kakinada

Accredited by NAAC with 'A' Grade (2nd Cycle)

Seetharamapurm, Narsapur – 530280 (Andhra Pradesh)

DEPARTMENT OF INFORMATION TECHNOLOGY

TEACHING PLAN

Course Code	Course Title	Semester	Branch	Contact Periods /Week	Academic Year	Date of commencement
20CD7J01	DevOps	VII	CSE(DS)	5	2025-26	09-06-2025

COURSE OUTCOMES

1	Outline the principles of continuous development and deployment, automation of configuration management, inter-team collaboration, and IT service agility (K2)
2	Develop DevOps & DevSecOps methodologies and their key concepts (K3)
3	Illustrate the types of version control systems, continuous integration tools, continuous monitoring tools, and cloud models (K2)
4	Build the complete private infrastructure using version control systems and CI/CD tools (K3)
5	Discover DevOps maturity model. (K4)

UNIT	Out Comes / Bloom's Level	Topics No.	Topics/ Activity	Text Book/ Ref	Contact Hour	Delivery Method
			Unit-1: Phases of Software Development Life Cycle:			
		1.1	Introduction to SDLC	T2	1	
		1.2	Phases in SDLC	T2	1	Chalk & Board
		1.3	Waterfall, V-Model	T2	1	
		1.4	Spiral Model, Iterative Model	T2	1	
I	CO – 1	1.5	Limitations of Traditional SDLC	T2	1	Power point presentations
		1.6	Agile Software Development model	T2	1	
		1.7	Agile Manifesto: 4 Values	T2	2	
		1.8	Agile Principles (12)	T2	2	Assignment
		1.9	Scrum, XP, Kanban (Overview)	T2	1	
		1.10	Values and principles of agile software development.	T2	1	Test
Content beyond syllabus		1.11	**DevSecOps Introduction:** Understand how security is integrated early into Agile & DevOps practices (Shift-Left Security).	R1	1	NPTEL Video
			Total		13	

			Unit-2: Fundamentals of DevOps			
II	CO – 2	2.1	DevOps Definition & Goals	T1,T2	1	Chalk & Board Power point presentations Assignment Test
		2.2	DevOps vs Traditional IT	T1,T2	1	
		2.3	DevOps Architecture	T1	2	
		2.4	Application Instances & Environments	T1,T2	1	
		2.5	DevOps Delivery Pipeline	T1,T2	2	
		2.6	DevOps Ecosystem Tools (Git, Jenkins, Docker overview)	T1	2	Example framework walkthrough
		2.7	Need for DevOps (Industry drivers)	T1,T2	2	
Content beyond syllabus		2.8	**Infrastructure as Code (IaC) – Overview:** Introduce the concept of managing infrastructure using code (e.g., Terraform, Ansible basics)	R2	1	Video Lecture
				Total	12	
			Unit-3: DevOps adoption in projects			
III CO – 3		3.1	Technology Aspects	T1,T2	2	Chalk & Board Power point presentations Assignment Test
		3.2	Agility Capabilities	T1,T2	2	
		3.3	Tool Stack Implementation	T1,T2	2	
		3.4	People Aspect: Collaboration	T1,T2	2	
		3.5	Processes: Automation, Feedback Loops	T2	2	
		3.6	DevOps Challenges & Solutions	T1	1	
Content beyond syllabus		3.7	**Site Reliability Engineering (SRE) – Introduction:** Learn how SRE practices support DevOps adoption in large-scale deployments.	R1	1	Experimental Learning
				Total	12	
			Unit-4: CI/CD			
IV	CO – 4	4.1	Continuous Integration	T1,T2	2	Chalk & Board Power point presentations Assignment Test
		4.2	Continuous Delivery vs Deployment	T1,T2	2	
		4.3	Benefits of CI/CD	T1,T2	1	
		4.4	CI/CD Pipeline Design	T1,T2	2	
		4.5	Tools: Jenkins, GitLab CI, GitHub Actions	T1,T2	2	
		4.6	Metrics: Lead time, MTTR, CFR, DORA Metrics	T1,T2	2	

Content beyond syllabus		4.7	**GitOps – Git-based CI/CD Automation:** Explore modern Git-centric automation practices for infrastructure and application deployment.	T2	1	**NPTEL Vide**
				Total	12	
V	CO – 5		**Unit-5: DevOps Maturity Model**			
		5.1	Maturity Model Introduction	T1,T2, R3	2	Chalk & Board Power point presentations Assignment Test
		5.2	Key Factors: Culture, Automation, Metrics	T2,R3	2	
		5.3	Maturity Stages: Initial to Optimized	T2,R3	2	
		5.4	Maturity Assessment Tools	T1,T2, R3	2	
		5.5	Building a Roadmap	T1,T2	1	
		5.6	Industry Case Studies	T1,T2	2	
Content beyond syllabus		5.7	**Platform Engineering Overview:** Introduce the role of internal developer platforms in mature DevOps ecosystems.	T1, R1	1	**Experiments Learning**
				Total	12	
				Cumulative Proposed Periods	61	

Text Books:

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1	The DevOps Handbook: How to Create World-Class Agility, Reliability, and Security Technology Organizations, Gene Kim , John Willis , Patrick Debois , Jez Humb,1st Editio O'Reilly publications, 2022.
2	What is Devops? Infrastructure as code, 1st Edition, Mike Loukides ,O'Reilly publications, 202

Reference Books:

S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1	Building a DevOps Culture, 1st Edition, Mandi Walls, O'Reilly publications, 2013.
2	The DevOps 2.0 Toolkit: Automating the Continuous Deployment Pipeline With Containerized Microservices, 1st Edition, Viktor Farcic, CreateSpace Independent Publishing Platform publications, 2016
3	Continuous Delivery: Reliable Software Releases Through Build, Test, and Deployment Automation, 1st Edition, Jez Humble and David Farley, 2010.
4	Achieving DevOps: A Novel About Delivering the Best of Agile, DevOps, and microservices, 1st Edition, Dave Harrison, Knox Lively, Apress publications, 2019

Web Details:

1	https://www.agilealliance.org
2	**DevSecOps.org** – https://www.devsecops.org

		Name	Signature with Date
i	Faculty	Mrs. R Uma Aruna Devi	R.OAD
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Principal