



Systems Engineering & DevOps Fundamentals Bootcamp

Course Outline

Course Overview

Duration: 12 Weeks (24 Sessions)

Total Contact Hours: 72 Hours

Schedule: Fridays & Saturdays, 7:00 PM – 11:00 PM (CET)

Delivery Mode: Online (Zoom)

Collaboration Platform: Slack

Registration: Free

Target Audience

This course is designed for:

- Beginners in IT
- Aspiring Systems Administrators
- Entry-level DevOps Engineers
- Infrastructure & Cloud enthusiasts

Requirements

-  Laptop (Minimum 8GB RAM)
-  Stable internet connection
-  Commitment of 8–10 hours/week (classes + labs)

Expected Outcomes

By the end of the program, you will be able to:

-  Understand enterprise IT operations
-  Work confidently with Linux servers
-  Troubleshoot infrastructure issues
-  Understand networking fundamentals
-  Use Git and GitHub professionally
-  Write basic Bash scripts
-  Deploy workloads in AWS
-  Configure web servers
-  Build CI/CD pipelines using GitHub Actions
-  Understand DevOps roles in organizations

Career Path Alignment

This bootcamp aligns with entry-level roles such as:

- Systems Administrator
- Cloud Support Engineer
- Junior DevOps Engineer



Course Structure

The program is divided into 5 progressive phases, each building practical, job-ready skills.



PHASE 1: IT FUNDAMENTALS & OPERATIONS (Weeks 1–3)



Goal

Build a strong foundational understanding of IT systems before advancing to servers and cloud infrastructure.



Week 1



Session 1a: Introduction to IT & Systems Engineering

Topics Covered:

- What is IT?
- Career paths:
 - Systems Engineering
 - Cloud Engineering
 - DevOps Engineering
 - etc
- How modern companies run infrastructure
- Course expectations



Practical:

- Install VS Code
- Install Git
- Create AWS Free Tier account



Session 1b: Introduction to Computers

Topics Covered:

- Hardware components (CPU, RAM, Storage)
- Operating Systems
- Applications vs Services
- Virtualization basics
- Introduction to Git



Practical:

- Identify local hardware specs, Explore Task Manager & Resource Monitor
 - Create first Ubuntu VM on AWS
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Session 2: AI Basics

Topics Covered:

- TBD
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Week 2



Session 3: Operating Systems Fundamentals

Topics Covered:

- Windows vs Linux
- Processes, memory, services
- Users & permissions
- System startup



Practical:

- View processes
 - Manage services & users
 - OS comparison exercises
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Session 4: Virtualization & Server Fundamentals

Topics Covered:

- What is a server?
- Physical vs Virtual servers
- Hypervisors & VMs
- Client-server architecture
- SSH basics



Practical:

- Create Linux VM
- Configure networking
- Enable SSH
- Remote connection setup



Mini Lab

Students should be able to:

- Build a VM
- Connect remotely
- Understand IP addressing
- Explain server functionality



Week 3



Session 5: Networking Fundamentals I

Topics Covered:

- Network basics (LAN, WAN, Internet)
- IP Addressing
- Public vs Private IPs
- IPv4 basics

Practical:

- Find local & public IP
 - IP exercises
 - Draw home network diagram
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Session 6: Networking Fundamentals II

Topics Covered:

- DNS, DHCP, NAT
- Routing
- Firewalls
- VPN concepts

Practical:

- ping
 - traceroute
 - nslookup
 - ipconfig / ifconfig
 - Explore router settings
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PHASE 2: LINUX SYSTEM ADMINISTRATION **(Weeks 4–6)**

Goal

Gain hands-on proficiency in managing Linux servers.

Week 4

Session 7: Linux Fundamentals

Topics Covered:

- Distributions & architecture
- Shell basics
- File system structure
- Permissions

Practical:

- Linux installation
- SSH access setup

Session 8: Linux CLI Essentials

- Text Editors
 - nano
 - Vim
- Navigating the file system
 - pwd, ls, cd
- Working with Files and Directories
 - pwd, touch, echo, cat, less, cp, rm, find, grep

Practical:

- File system exercises
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Week 5

Session 9: Linux Administration

Topics Covered:

- Users & groups
- Permissions & sudo
- Package management
- Services

Commands:

- useradd, passwd, systemctl, apt
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Session 10: Monitoring & Troubleshooting

Tools:

- top, htop
- df, free
- ps, kill

Practical:

- Troubleshooting scenarios
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Week 6

Session 11: Bash Scripting Fundamentals

Topics Covered:

- Variables
- Loops & conditions
- Functions
- Script execution

Practical:

- Build automation scripts
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Session 12: Bash Automation Project

Use Cases:

- User creation automation
- Log cleanup
- Scheduled tasks

Practical:

- Cron jobs
- Backup scripts

Mini Project

Create a Linux health-check script.

PHASE 3: SYSTEMS ENGINEERING & WEB SERVICES (Weeks 7–8)

Goal

Understand how applications are deployed and managed in real environments.

Week 7 Your Path into Tech.

Session 13: Web Server Fundamentals

Topics Covered:

- How websites work
- HTTP vs HTTPS
- DNS flow
- Reverse proxies
- Load balancing basics

Practical:

- Install Apache/Nginx
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Session 14: Nginx Administration

Topics Covered:

- Virtual hosts
- SSL certificates
- Logs
- Reverse proxy setup

Practical:

- Host website on Linux
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Week 8

Session 15: Databases for Sysadmins

Topics Covered:

- Relational DB concepts
- SQL basics
- MySQL/PostgreSQL overview
- Backup strategies

Practical:

- Install MySQL
 - Execute basic queries
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Session 16: Monitoring & Logging

Topics Covered:

- Importance of monitoring
- Logs & metrics
- Alerting
- Observability

Practical:

- Linux logging
 - Intro to Grafana
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PHASE 4: CLOUD ENGINEERING (Weeks 9–10)

Goal

Introduce cloud infrastructure concepts and hands-on AWS experience.

Week 9

Session 17: AWS Fundamentals

Topics Covered:

- Cloud concepts
- Regions & Availability Zones
- Shared Responsibility Model
- Core Services:
 - EC2
 - S3

- IAM
- Cost & Billing basics

Practical:

- Launch EC2 instance
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Session 18: AWS Networking

Topics Covered:

- VPC
- Subnets
- Security Groups
- Internet Gateway
- Route Tables

Practical:

- Build basic AWS network
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Week 10

Session 19: AWS Operations Services

Topics Covered:

- CloudWatch
- Load Balancers
- Auto Scaling
- Systems Manager

Practical:

- Monitor EC2
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Session 20: Infrastructure Design Exercise

Scenario: Build a simple production environment

Practical:

- Deploy EC2
 - Configure security groups
 - Use S3
 - Set up monitoring
 - Manage IAM users
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PHASE 5: DEVOPS FUNDAMENTALS (Weeks 11–12)

 Week 11

Session 21: Git & GitHub

Topics Covered:

- Version control basics
- Commits, branches, merges
- Pull Requests

 Practical:

- Create repository
 - Collaboration workflow
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⚡ Session 22: CI/CD Fundamentals

Topics Covered:

- CI/CD concepts
- Pipelines
- Automation
- Testing basics

 Practical:

- Intro to GitHub Actions
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⚡ Session 23: Introduction to YAML

Topics Covered:

- Basic syntax
- Key-Value Pairs
- Indentation
- Comments
- Data types
- Lists
- Dictionaries
- Nested structures

 Practical:

- Write a simple yml file for GitHub Actions
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 Week 12

🚀 Session 24: GitHub Actions

Build Pipeline That:

- Pulls code
- Runs validation
- Deploys the website automatically

 Practical:

- End-to-end CI/CD pipeline
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 Session 25: Final Capstone Project

Students Build:

- Linux Server
- Nginx Web Server
- Git Repository
- GitHub Actions Pipeline
- AWS Deployment

 Deliverables:

- Presentation and Live demo
- Technical review

PHASE 6: Terraform and Infrastructure as Code (Bonus Phase)

Topics Covered:

- Terraform Fundamentals
- Provisioning AWS infrastructure using Terraform