COMP 350 (01) INTRODUCTION TO DEVOPS

Fall 2024

1. Course Information

Instructor:	Hakan Ayral, HAYRAL@KU.EDU.TR
KU Credits:	3.00
ECTS Credits:	6.00
Prerequisite(s):	
Class Location & Meeting Times:	SNA B152 - Tuesday, Thursday 08:30-09:40
PS (Yes/No):	No
DS (Yes/No):	No
Lab (Yes/No):	No
Language of Instruction:	English
Office Hours:	TBA

2. Course Description

3. Course Overview

This course will cover DevOps which is a set of tools and best practices to automate and integrate the tasks and common workflows related to software development (Dev) and IT operations (Ops). Course contents include installation, administration and maintenance of OS and services on production environment servers, automation of common tasks and tracking in software development and deployment cycles.

4. Course Learning Outcomes (CLOs):

CLO #	**Upon successful completion of this course, students will be able to**…
1	Perform the setup, deployment, configuration and maintenance of operating systems on production environment servers.
2	Configure, manage and maintain storage hardware, drivers and modern file systems.
3	Design, setup, manage, and maintain network communication that satisfy given requirements.
4	Setup, manage, maintain and deploy, common server applications and services for monitoring, logging, remote access, user management, and software updates.
5	Setup, update and deploy, programming and scripting platforms along with their packet management systems and other necessary software ecosystem.
6	Understand fundamental concepts and applications for virtualization, isolation and scalability to the point of being able to design a basic solution for a given deployment.
7	Actively use deployment automation, continuous integration, code repositories and source code management tools.

5. Assessment Methods

Method	Description	Weight %
Project	Two Projects	30.00

Midterm Exam	Written or MCQ exam	25.00
Final Exam	Written or MCQ exam	35.00
Participation	Participation and attendance	10.00
	Total:	100.00

6. Instructional Material and Learning Resources

- The Linux Command Line, Edition: 5th (ISBN: 978-1-59327-389-7)
  Author: William E. Shotts
  Publisher: No Starch Press (Year: 2019)
  Material Type: Textbook
  Material Status: Recommended
  Additional Notes: Available for free under CC license on author's web page

- Infrastructure as Code: Dynamic Systems for the Cl, Edition: 2nd (ISBN: 978-1098114671)
  Author: Kief Morris
  Publisher: O'Reilly Media (Year: 2020)
  Material Type: Textbook
  Material Status: Recommended

- Practical DevOps (ISBN: 978-1-78588-287-6)
  Author: Joakim Verona
  Publisher: Packt Publishing Ltd. (Year: 2016)
  Material Type: Textbook
  Material Status: Required

- Active Use of Course Page on Blackboard: https://ku.blackboard.com/
- KOLT Tutoring: http://kolt.ku.edu.tr/

7. Course Schedule

Meeting Times	Subject
1	Linux Operating System, Kernel and kernel modules, Kernel boot parameters, Boot process of Linux. Initial ram disk, systemd/initStorage Management and File Systems on Linux. ● Common file systems ● Access Control for files and directories, permissions
2	Devices, Block devices, mounting block devices for storage ● Create and manage basic volumes, spanning volumes, redundancy, volume management and RAID configurations ● Swap partition, virtual memory
3	What's a process? How to manage processes in Linux? ● Monitoring processes ● StdIO, StdErr, I/O Redirection, Pipes, Filtering with grep
4	Shell as a process, CLI interaction and scripting ● Terminal multiplexers ● Secure shell remote access ● User management, access control and System Users ● cron ● System Logs
5	Package management systems and scripting/programming ecosystems: ● Apt, yum, deb, rpm ● Python, pip, conda ● Nodejs and npm ● Ruby and gemsBuild tools: make, cmake, GNU Build System (aka autotools), Apache Ant/Maven, Gradle
6	Code repositories, Versioning, Git and github in depth
7	Container systems, virtualization and scaling: ● Quick look at the beginnings: Chroot jail ● Virtualization ● Containerization ● Docker, docker file, docker compose
8	Networking in virtualized/containerized environments ● NAT, Port forwarding, Routing, Packet filtering
9	Container Orchestration: Docker swarm, Kubernetes, Amazon Elastic Container Service (ECS) ● Load balancing for scaling

10	Microservice Architecture: philosophy, building APIs, REST APIs, SOAP, gRPC, XML, YAML
11	Cloud service providers: Amazon Web Services, Microsoft Azure, Google Cloud PlatformServerless: AWS Lambda, Google Cloud Functions, Azure Serverless
12	Infrastructure as Code (IaC): Terraform, OpenTF, AWS CloudFormation,
13	Continuous Integration (CI)/Continuous Delivery (CD) : ● Gitlab CI, Azure pipelines, AWS Code pipeline ● Jenkins, Travis, Teamcity, Circle CI
14	Configuration Management: Chef, Puppet, Salt, Ansible, Terraform, CFEngine

8. Student Code of Conduct and Academic Grievance Procedure

Student Code of Conduct

Statement on Academic Honesty with Emphasis on Plagiarism

Academic Grievance Procedure

9. Course Policies

Prerequisites: COMP 202 or consent of the instructor (will be checked by the instructor)All deadlines are final. Late homework and project submissions will receive 0 credit.Course Elements: There will be projects and homework related to concepts covered in class. Besides, there will be a midterm and a final exam. During class/PS hours, quizzes may be given, in order to help students better understand the material and follow the course attentively. Quizzes will not be graded.Final makeup exam and remedial exam will take place on the same day at the same time. A student can take either of them but not both. Midterm makeup exam is on the last week of the instructions at the PS hour. Midterm makeups are not cumulative.

10. Other

• Attendance and Policy: Attendance and participation will be graded. The students are required to attend classes on time. At the time of the lecture, attendance will randomly be taken in all face-to-face classes.
• Only students whose long-term online attendance requests have been approved by the University Executive Council (UEC) will be able to to attend live classes remotely synchronously (online). These students are defined on KUSIS and will be allowed access by IT only to their relevant courses.
• A student who does not need the approval of the UEC, however and who wants to attend the lesson online for a short time, will not be able to access the link even if it is suitable for his/her instructor. These students will not be able to participate in live lessons and will only have access to the recorded if the instructor approves lectures.
• The synchronous sessions are recorded (audiovisual recordings). The sole authority as regards the recording process belongs to Koç University. Koç University students can attend the synchronous sessions regardless of their course enrollment. The students are not required to keep their cameras on during class.
• The audiovisual recordings, presentations, readings, and any other works offered as the course materials aim to support remote and online learning. They are only for the personal use of the students enrolled in the relevant course. Further use of course materials other than the personal and educational purposes as defined in this disclaimer, such as making copies, reproductions, replications, submission, and sharing on different platforms including the digital ones or commercial usages are strictly prohibited and illegal.
• The persons violating the above-mentioned prohibitions can be subject to the administrative, civil, and criminal sanctions under the Law on Higher Education Nr. 2547, the By-Law on Disciplinary Matters of Higher Education Students, the Law on Intellectual Property Nr. 5846, the Criminal Law Nr. 5237, the Law on Obligations Nr. 6098, and any other relevant legislation.
• The academic expressions, views, and discussions in the course materials including the audio-visual recordings fall within the scope of the freedom of science and art.