CSE 6031 Computer Networks

2023 – 2024 Spring Term

Syllabus & Work Plan

Prof. Dr. Murat Taylı

m.tayli@iku.edu.tr

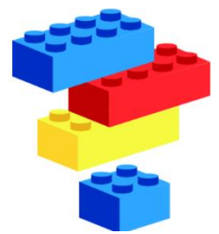
Course Organization

- Lecture Sessions (2 hours/week) @ class-room

Computer Networks organization & components are presented using the Internet architecture as the reference model; network layers & protocols *HTTP*, *DNS*, *TCP*/*UDP*, *IP*, *ICMP*, *ARP* .. are examined in action, over **real systems**

Lecture slides *are provided to support lecture sessions; their coverage is partial; they are not meant to be a substitute for the* ***course textbook & references***

- Laboratory Sessions (2 hours/week) @ Department Computer Laboratory



Students develop realistic projects, closely integrated to lecture topics, experiment on live systems using contemporary technologies

Formal contact hours to assist students:

- ✓ on the design & development their **current** project
- ✓ to discuss the problems & solutions of former projects

Projects' Emphasis & Work Procedures

- Projects are vital components of ***Computer Engineering Curricula;*** they do not only play primary role in the **learning process**, but also:

  - ✓ develop students' analysis, synthesis & design skills,
  - ✓ foster their professional proficiencies working on realistic cases deployed over industry-standard platforms using contemporary tools

- Projects are designed as **self-paced** learning activities, posted at course portal CATS **ahead of laboratory sessions**; students are expected :

  → to read & analyze the case as soon as possible, start the design, and development phases

  → to attend lab. sessions ready to discuss design, implementation problems, and get the support they may need

Students are strongly advised to use **CATS Forums any time** to post:

- ✓ their questions on the **design** and **implementation** issues; and
- ✓ their problems on the test & development platform

Project Development Platform

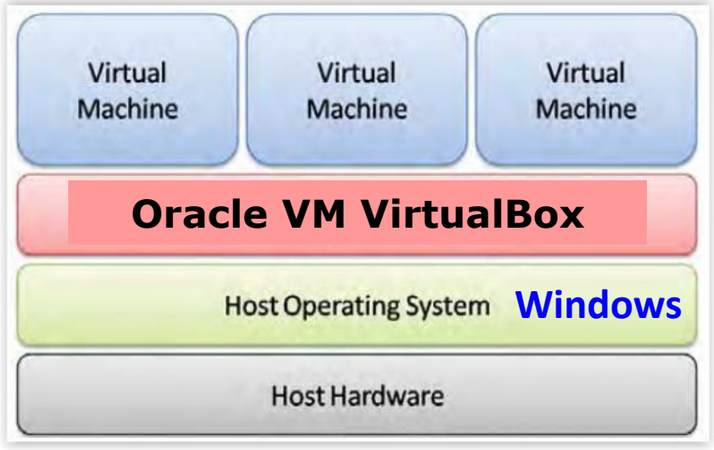
Computing & Networking Infrastructure

Projects are designed to be deployed on Dept. Laboratory workstations running W'10, connected to the wired laboratory network.

Students who own a **personal computer** equipped with at least i5 CPU, 8+ GB memory, 30 GB disks/virtual machine running W'10, may use them at home *(at the labs the PC must be connected to the wired network)*

Development Platform

Students will deploy their network over the **Oracle VM VirtualBox** hypervisor using Virtual Machines running commercial OSs that are customized for the laboratory systems



Project Platform Rationale

→ Virtualization is the essential technology used to create today's complex infrastructures

→ W'10 and Oracle VM VirtualBox pairing allows students to port project development platform to their personal premises

Teaching & Assessment Methodologies

Course Motto

I hear and I forget. I see and I remember. I do and I understand

Confucius 551 - 479 BC

I listen in lectures, and I forget….

I read my book and my notes, and I remember…

I develop & implement my project, and I understand!

Assessment Focus

Midterm and final examination will aim at:

- ✓ assessing your comprehension of topics covered in lectures & projects, and
- ✓ testing your ability in using your knowledge.

You will be asked to **analyze** a case, to **identify** system components & **explain** how they are built & interoperate, and implement a solution

Projects are integral part of course contents & **assessed in examinations**

Course Assessment & Grading

Assessment Components

- ✓ Projects (45%)
- ✓ Mid Term (15%)
- ✓ Final (40%)

are your personal work; you may collaborate with your peers yet **submitted work** must be fully your own!

- are **open book** assessments
- cover **lecture** + **project** topics

Grading Method

- ✓ Lecturer defines lower & upper limits /100 for "**F**" and "**A**" grades grading range is divided **linearly in 10 steps**;
- ✓ Your grade is derived from the step corresponding toyour weighted total score

For instance, typical lower & upper limits are **A ≥ 85** and **F < 35**

grades **A-** to **D-** are derived from the range **] 85 .. 35]** split in **5-point** steps

Collaboration, Plagiarism, Cheating

What are the Collaboration Rules in Projects?

Collaboration is a great way to learn. Students are encouraged to discuss project concepts and confer on implementation procedures with their peers.

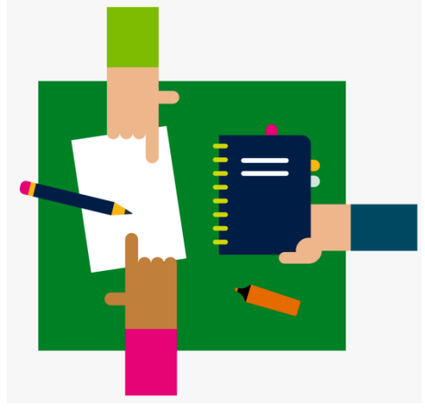
The **key** is to use collaboration as a way to **enhance** learning, and not as a way of sharing answers without understanding

Plagiarism

All prose and code that you write for projects must be your own original work. **Any other source** you use must be clearly **identify** and accurately **cited**.

Cheating

Submitted work should be exclusively yours, copying or getting help from a 3d party is prohibited. Your submissions should be kept confidential; **sharing them** with others is cheating.



No **distinction** will be made between those **who cheat** and **who facilitate** cheating by revealing their submissions

Syllabus & Targeted Work Plan (*updated as the term progress*)

	Weeks	**Lectures** (Tue. 09-11 and 13-15)	**Lab. Sessions** (Wed. 09-18 & Thu 9-11)
1	19/02 – 23/02	✓ Computer Networks & Internet ✓ Layered Protocol Model	Project#1 Deploying Test Platform ✓Installing and Testing VirtualBox Platform ✓Testing Wireshark Protocol Analyzer
2	26/02 – 01/03	✓ Link Layer: Interconnecting Technologies ✓ ARP	
3	04/03 – 08/03	✓ Application Layer: Architecture, Socket API	Project#2 Analyzing Protocol Layers ✓Analyzing DNS Protocol & Service
4	11/03 – 15/03	✓ DNS protocol and Service	
5	18/03 – 22/03	✓ WWW and HTTP	Project#3 AL-TL Interface ✓Client-Server App. using UDP Sockets API
6	25/03 – 29/03	✓ Transport Layer: Multiplexing, UDP	
7	01/04 – 05/04	**Mid Term Examination**	
8	08/04 – 12/04	Official Holiday	
9	15/04 – 19/04	✓ Trans. Layer: TCP reliable data transfer	Project#4 Transport Layer ✓Analyzing HTTP 1.1 protocol pipelining ✓Analyzing TCP connections
10	22/04 – 26/04	✓ Trans. Layer: TCP flow control	
11	29/04 – 03/05	✓ Trans. Layer: TCP congestion control	Project#5 Network Layer ✓ Static Routing ✓ Subnetting
12	06/05 – 10/05	✓ Network Layer: IP, Static Routing	
13	13/05 – 17/05	✓ Network Layer: IP subnetting, NAT	Project#6 Corporate Network Architecture ✓ Configuring DHCP, DNS forwarders ✓ Deploying Port Forwarding, NAT services
14	20/05 – 24/05	✓ Content Provision Networks	

Course References

Textbook

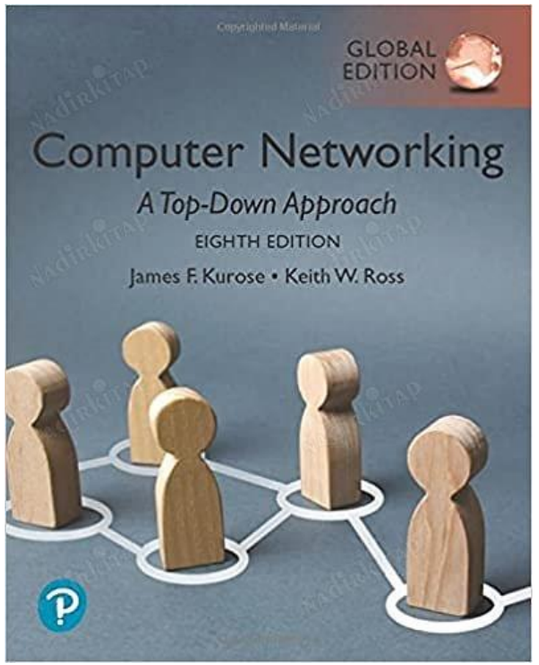
Computer Networking: A Top-Down Approach

James Kurose and Keith Ross

8/E Global Edition, Pearson, 2021

ISBN-13: 978-1-292-40546-9

https://gaia.cs.umass.edu/kurose_ross/index.php



Authors' Web Site

- ✓ **Textbook Power Point Slides**

  https://gaia.cs.umass.edu/kurose_ross/ppt.php

- ✓ **On-line Lectures**

  https://gaia.cs.umass.edu/kurose_ross/lectures.php

- ✓ **Knowledge Checks**

  https://gaia.cs.umass.edu/kurose_ross/knowledgechecks/

- ✓ **End-of-Chapter Exercises**

  https://gaia.cs.umass.edu/kurose_ross/interactive/