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Spring 2020

## CS 656-104: Internet and Higher Layer Programming

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### Recommended Citation

Rahman, Moshiur, "CS 656-104: Internet and Higher Layer Programming" (2020). *Computer Science Syllabi*. 93.

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**Syllabus CS 656, Spring 2020**  
**NJIT**

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Kurose and Ross, "Computer Networking: A Top-Down Approach", 7th Edition, ISBN-13: 9780132856201

Some course materials could be found in:

[Student Resources - Pearson Education:](#)

[http://wps.pearsoned.com/ecs\\_kurose\\_compnetw\\_6/216/55463/14198700.cw/](http://wps.pearsoned.com/ecs_kurose_compnetw_6/216/55463/14198700.cw/)

The objective of this course is to provide a unified view of data and computer communications, emphasizing on the application and design of TCP/IP networking. In this course, students gain the knowledge and skills required to analyze and develop solutions to solve TCP/IP networking problems of modern data communications, services and related tools and technologies. Within this scope, the aspect of broadband high speed access technologies, LAN, WLAN, WAN, DNS, Cellular, VoIP, Video streaming over IP, Cable Telephony and related evolving technologies and protocols are covered. Upon successful completion of the course, students will have gained a deep understanding of the broad concepts and principles of designing and implementing modern TCP/IP supported computer data networking applications.

Home Works:

HW will include the following Programming assignments, in addition to the selected problems given at the end of the each Chapter:

Assignments:

1. TCP/UDP Socket Programming (Java/Python))
2. Implementing a Reliable Transport Protocol (Chapter 3)
3. Implementing a Distributed, Asynchronous Distance Vector Routing Algorithm (Chapter 4)
4. ICMP design/programming for Ping/traceroute
5. DNS Simulation
6. RTP/RSTP programming (Chapter 7)
7. Term papers: TCP/IP related topics

Text book Chapters:

1. Data Networking: Computer Networks and the Internet; Performance Analysis
2. The Application layer: Principles of Networking and socket programming
3. The Transport Layer: Principles of reliable data transfer and Connection oriented TCP; Congestion control
4. The Network Layer: Virtual Circuit and Datagram networks; Routing Algorithms; IP addressing

5. Advanced wireless and mobile data networks: Architecture, protocol and performance analysis; TCP/IP over wireless
6. Multimedia Networking: UDP streaming and HTTP streaming; RTP/SIP
7. Network Management: Protocols and TCP/IP based fault and performance monitoring

Weekly topics

Class	Lecture	Topics	Assignment
1	1 (Chap 1)	Computer Networks, the Internet, core, edge, IETF	HW
2	2 (Notes)	Introduction of Networking and TCP/IP	HW
3	3 (Chap 2)	App layer: Web, HTTP/TCP, FTP, SMTP, DNS, P2P	HW
4	4 (Chap 2)	App Layer: Socket programming with TCP/UDP	HW
5	5 (Chap 3)	Transport Layer: TCP/IP Implementation and Reliable data transfer	HW
6	6 (Chap 3)	Transport layer: TCP Flow /Congestion control; Review	HW
7	7 (Notes)	Transport layer performance issues; Review	HW
8		<b>Mid term</b>	
9	8 (Chap 4)	Network Layer: Data Plane - Routing/IP addressing	HW
9	9 (Chap 5)	Network Layer: Data Plane – Subnet design	HW
10	10 (Chap 5)	Network Layer: Control Plane; Routing Algorithm	HW
11	11 (Chapter 7)	Wireless and mobile networks; TCP/IP over wireless	HW
12	12 (chapter 8)	Network Security	HW
13	13 (Chap 9)	Multimedia networking/streaming; Review materials	No HW
		<b>Final Exam</b>	

Grading policy:

Homework assignment	10%
Quiz (each class)	10%
Term paper	8%
Midterm	35%
Final	37%

Homework:

From lecture notes and text book. No late homework.