CS 5390 : NETWORK ARCHITECTURE AND APPLICATIONS

Semester Hours:	3.0	*Contact Hours:* 3
Coordinator:	Ray Kresman	
Text:	Computer Networking: A Top-Down Approach	
Author(s):	KUROS AND ROSS	
Year:	2017, 7th edition	

SPECIFIC COURSE INFORMATION

Catalog Description:

Layered architectures and protocols. TCP/IP protocol suite. Client-server communication paradigm. Application architectures such as push and pull technologies, web services, cloud and microservices, multimedia. Scalability and performance. Prerequisite: Full Admission to MS in CS program or consent of department. Credit cannot be earned for both CS 4390 or CS 5390.

Course type: **REQUIRED**

SPECIFIC COURSE GOALS

- Justify the need for, and describe the working of, layered protocol suites, such as TCP/IP.

- Develop client-server applications using TCP/IP.

- Assemble/disassemble packets and translate address as it traverses networks.

- Solve sample problems using popular routing protocols.

- Motivate the need for and summarize the details of service architectures, such as web services and micro-services.

- Describe the details, including payload types and synchronization of multimedia application protocols.

- Explain and distinguish the various service types supported by internet applications – for example, best effort, streaming.

- Construct the working of certain types of congestion control mechanisms.

- I can analyze relevant research and communicate my findings.

LIST OF TOPICS COVERED

- Layered Protocol Architectures (~ 5%)
  - TCP/IP and OSI
- TCP/IP (~ 10%)
  - LAN and other components
  - Service view
  - TCP vs UDP, and more
  - Packet formats
- Client-server Applications (~ 15%)
  - Thread vs Process
  - Sockets, RPC, etc
  - Scalability
- Transport and Routing (~ 15%)
  - Reliable vs. unreliable transfer
  - Congestion control
  - Routing protocols
- Service Architectures (~ 15%)
  - Web services
  - Microservices
  - P2P and others
- Multimedia (~ 10%)
  - Real-time/streaming, VoIP
  - Quality of Service
- Wireless Communication (~ 10%)
  - Wi-Fi
  - Cell networks
- Media and Performance (~ 10%)
  - Signal strength
  - Compression and error detection
  - Delay, loss, throughput

- Emerging/Future Trends (~ 10%)
  - Parallel and distributed computing
  - Security
  - Others