

ELECTRICAL AND COMPUTER ENGINEERING 5565
COMPUTER SCIENCE 5565
NETWORK ARCHITECTURE AND PROTOCOLS I

PART I.

• Catalog Description:

: Principles and concepts of networking and protocols, with emphasis on data link, network, and transport protocols. Contemporary and emerging networks and protocols to illustrate concepts and to provide insight into practical networks including the Internet. Quantitative and qualitative comparisons of network architectures and protocols.

Pre: 5565: Graduate standing in EE, CPE, CS, IT; STAT 4714. (3H, 3C)

- Transcript Title: NETWORK ARCH AND PROTOCOLS

PART II.

Major, Measurable Learning Objectives

Having successfully completed this course, the student will be able to:

- (a) Describe the relationships and features of each layer in the ISO Open Systems Interconnect reference model;
- (b) Describe the features and evaluate the performance of automatic retransmission request schemes for error recovery in point-to-point links;
- (c) Describe the features and evaluate the relative performance of common medium access control protocols;
- (d) Describe the features and evaluate the performance of standard switched data networks..

PARTIII. Texts and Special Teaching Aids

• Required Texts:

J. F. Kurose and K. W. Ross, *Computer Networking: A Top-Down Approach*, 2008, 4th Edition, 880 pp. (ISBN: 0-321-49770-8).

• Other Course Materials:

Supplemental journal and conference papers, Internet Engineering Task Force (IETF) Request for Comment (RFC) documents, and other supplemental readings will be used to introduce the latest developments and to provide more detailed documentation for projects.

PART IV. Topics

Follows the textbook coverage of topics.

- Basic Definitions and Layered Protocol Models 5%

- Application Layer protocols 15%
- End-to-End Protocols - UDP, TCP, RPC 20%
- Routing and Internetworking 25%
- Data Link Layer 15%
- Performance Evaluation 10%
- Security 10%

PART V. Tentative Grading

| Type of assignment | Percent of Grade |
|--|------------------|
| Homework (including paper summary reports) | 10% |
| Class presentations and discussions | 5% |
| Survey paper | 10% |
| Midterm Exam | 15% |
| Term project progress report | 5% |
| Term project and paper | 25% |
| Final exam | 30% |

A course map including topics and papers will be provided to the students. A subset of these papers will be presented by the instructor, introducing students to concepts, research challenges and results in each topic. Students will prepare for class by submitting a critical analysis summary of their reading assignments. Class participation will be graded on the basis of interaction and quality of discussion. Students will be required to submit a survey paper on a relevant topic selected with instructor's consent. The survey paper must include a well structured representation of the surveyed topic.

Students are required to conduct in-depth research utilizing methodology and tools for modeling, (comparative) analysis, simulation, implementation, and/or experimentation. A list of suggested projects will be posted on the course website. Students will be encouraged to define their own project that must be approved by the instructor. A term project proposal will be due in the 6th week and a progress report will be due in the 10th week. A poster/demo session will be scheduled before the final exam week. A term paper with fully documented project code is due in the final exam week. A comprehensive take-home final exam will be administered.

Part VI: Honor Code

The Virginia Tech honor code will be strictly enforced.