ECE 6101 (Approved): Computer Communication Networks

Course Description

Foundational understanding of network analysis, error-control, routing, congestion-control, multi-access, and their examples in the context of the existing communication networks.

Prior Course Number: ECE 861, ECE 862
Transcript Abbreviation: Comp Comm Networks
Grading Plan: Letter Grade
Course Deliveries: Classroom
Course Levels: Graduate
Student Ranks: Masters, Doctoral
Course Offerings: Autumn
Flex Scheduled Course: Never
Course Frequency: Every Year
Course Length: 14 Week
Credits: 3.0
Repeatable: No
Time Distribution: 3.0 hr Lec
Expected out-of-class hours per week: 6.0
Graded Component: Lecture
Credit by Examination: No
Admission Condition: No
Off Campus: Never
Campus Locations: Columbus
Prerequisites and Co-requisites: Prereq: 6001 (804), Stat 3470 (428), 520, Math 530, or another undergraduate course in Probability.
Exclusions: Not open to students with credit for 861, 862, CSE 6461, 861, or 862.
Cross-Listings: Cross-listed in CSE 6461.

Course Rationale: Existing course.

The course is required for this unit's degrees, majors, and/or minors: No
The course is a GEC: No
The course is an elective (for this or other units) or is a service course for other units: Yes

Subject/CIP Code: 11.0901
Subsidy Level: Doctoral Course

Course Goals

Be exposed to a basic history of networking
Be familiar with architectural concepts of layering and circuit and packet switching
Master various error control techniques and their analysis
Be familiar with different queuing models and their application to networking
Master concepts in shortest path routing including analysis of correctness, convergence, and complexity, asynchronous routing protocols, routing on the Internet, and routing on other historical networks
Be familiar with window-based flow control and its analysis using closed queueing networks
Be familiar with TCP congestion control and its advantages and disadvantages
Be familiar with multi-access systems such as polling and random access
Be exposed to some of the open research problems in networking

Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Historical Perspective in Networking	2.0							
Circuit/Packet Switching and Statistical Multiplexing	1.0							
Importance of Layering for Network Architecture	1.0							
Description of Error Detection, Correction, and Recovery Mechanisms	1.0							
Analysis of Error Recovery Mechanisms	3.0							
Network Dimensioning and Elementary Queuing Analysis	10.0							
Fundamentals of Routing	7.0							
Internet Routing	2.0							
Flow/Congestion Control	7.0							
Multi-access Resource Shared Networks	8.0							

Grades

Aspect	Percent
Homework	20%
Project	20%
Midterm	25%
Final	35%

Representative Textbooks and Other Course Materials

Title	Author
Telecommunication Networks: Protocols, Modeling, and Analysis	Mischa Schwartz
Communication Networks: Fundamental Concepts and Key Architectures	A. Leon-Garcia and I. Widjaja

ABET-EAC Criterion 3 Outcomes

Course Contribution		College Outcome
***	a	An ability to apply knowledge of mathematics, science, and engineering.
	b	An ability to design and conduct experiments, as well as to analyze and interpret data.
	c	An ability to design a system, component, or process to meet desired needs.
	d	An ability to function on multi-disciplinary teams.
**	e	An ability to identify, formulate, and solve engineering problems.
	f	An understanding of professional and ethical responsibility.
*	g	An ability to communicate effectively.
	h	The broad education necessary to understand the impact of engineering solutions in a global and societal context.
**	i	A recognition of the need for, and an ability to engage in life-long learning.
	j	A knowledge of contemporary issues.
***	k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Additional Notes or Comments

Corrected typo in text, 4/3/12.

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