

# 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
<i>Telecommunication Networks: Protocols, Modeling, and Analysis</i>	Mischa Schwartz
<i>Communication Networks: Fundamental Concepts and Key Architectures</i>	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.

**Prepared by:** Betty Lise Anderson