

# CSE 6461 (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:** CSE 861, CSE 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:** Undergraduate course in probability or Stat 3470 or Math 530 or Stat 428 or Stat 520 or ECE 6001 or ECE 804

**Exclusions:** Not open to students with credit for CSE 861, CSE 862, ECE 6101, ECE 861, or ECE 862

**Cross-Listings:** Cross-listed with ECE 6101

**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:** 14.0901

**Subsidy Level:** Doctoral Course

## Programs

Abbreviation	Description
MS CSE	MS Computer Science and Engineering
PhD CSE	PhD Computer Science and Engineering

## 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 analyses.
Be familiar with different queueing 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 Queueing 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.

Course Contribution		College Outcome
	j	A knowledge of contemporary issues.
***	k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

**Prepared by:** Bruce Weide