

ECE 5101: Introduction to Wireless Networking

Course Description

Fundamental concepts in cellular design, Wireless-LANs, MANETs, and sensor networks will be explored. Specific topics will include propagation, fading, cellular-design, power-management, routing, scheduling, and control.

Transcript Abbreviation: Intro Wire Netwrks

Grading Plan: Letter Grade

Course Deliveries: Classroom

Course Levels: Undergrad, Graduate

Student Ranks: Junior, Senior, Masters, Doctoral

Course Offerings: Spring

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: 3561 (561) or CSE 3461 (677), or Grad standing in Engineering or Math and Physical Sciences.

Exclusions: Not open to students with credit for CSE 5463.

Cross-Listings: Cross-listed in CSE 5463.

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: 14.1001

Subsidy Level: Doctoral Course

Programs

Abbreviation	Description
CpE	Computer Engineering
EE	Electrical Engineering

Course Goals

Be exposed to basics of propagation and fading
Be familiar with notions of SINR and cell design, as well as notions of handoffs and channel allocation.
Be familiar with different forms of multi-access systems (FDMA, CDMA, TDMA, OFDMA, etc.).
Be familiar with power management and current implementations in cellular systems.

Be familiar with routing and current implementations in both cellular.
Be familiar with cellular scheduling as well as be exposed to scheduling in multi-hop networks.
Be familiar with various wireless systems such as cellular, Wireless LAN, sensor, mobile ad hoc, sensor, etc.
Be exposed to some major issues facing the design of future wireless systems.

Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Historical milestones and current wireless networks	3.0							
Understanding the wireless communication channel	5.0							
Multiple access techniques (FDMA, TDMA, CDMA)	3.0							
Concept of cellular communications, handoff, and location management	5.0							
Power control	3.0							
Opportunistic scheduling for cellular networks and extensions to multi-hop networks	4.0							
Proactive and reactive routing	5.0							
Congestion control	2.0							
System case studies (802.11, Bluetooth, etc.)	5.0							
Energy management in sensor networks	5.0							

Grades

Aspect	Percent
Project	40%
Midterm	20%
Final	40%

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.

CpE ABET-EAC Criterion 9 Program Criteria Outcomes

Course Contribution		Program Outcome
***	1	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
***	2	an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
**	3	an ability to communicate effectively with a range of audiences
*	4	an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
**	5	an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
**	6	an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
*	7	an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

EE ABET-EAC Criterion 9 Program Criteria Outcomes

Course Contribution		Program Outcome
***	1	an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
***	2	an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
**	3	an ability to communicate effectively with a range of audiences
*	4	an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
**	5	an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
**	6	an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
*	7	an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Additional Notes or Comments

added exclusion for cross listed course. Update prereqs, exclusions, and goals and topics to match university format.

Change ECE 3367 to ECE 3561 May 7 2012

Added new outcomes 6/18. 2019 BLA

Prepared by: Betty Lise Anderson