CSE 5463: 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: IntroWireNetwrks
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: CSE 3461 or 677 or ECE 3367 or 561 or graduate standing in engineering or math & physical sciences.
Exclusions:
Cross-Listings: Cross-listed with ECE 5101.

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
BS CSE	BS Computer Science and Engineering
MS CSE	MS Computer Science and Engineering
PhD CSE	PhD Computer Science and Engineering

Course Goals

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.)	4.0							
Energy management in sensor networks	5.0							
Project presentations	3.0							

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.

BS CSE Program Outcomes

Course Contribution		Program Outcome
***	a	an ability to apply knowledge of computing, mathematics including discrete mathematics as well as probability and statistics, science, and engineering;
	b	an ability to design and conduct experiments, as well as to analyze and interpret data;
***	c	an ability to design, implement, and evaluate a software or a software/hardware system, component, or process to meet desired needs within realistic constraints such as memory, runtime efficiency, as well as appropriate constraints related to economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability considerations;
	d	an ability to function on multi-disciplinary teams;
***	e	an ability to identify, formulate, and solve engineering problems;
	f	an understanding of professional, ethical, legal, security and social issues and responsibilities;
	g	an ability to communicate effectively with a range of audiences;
	h	an ability to analyze the local and global impact of computing on individuals, organizations, and society;
	i	a recognition of the need for, and an ability to engage in life-long learning and continuing professional development;
	j	a knowledge of contemporary issues;
	k	an ability to use the techniques, skills, and modern engineering tools necessary for practice as a CSE professional;
**	l	an ability to analyze a problem, and identify and define the computing requirements appropriate to its solution;
**	m	an ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices;
*	n	an ability to apply design and development principles in the construction of software systems of varying complexity.

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