Purdue University  
School of Electrical and Computer Engineering  
ECE60022

Title: Wireless Communication Networks  
Graduate Areas: Communications, Networking, Signal & Image Processing  
Number of Credits: 3  
Time and Room: MWF 2:30-3:20pm, EE226  
Webpage: http://engineering.purdue.edu/~ee695n

Instructor: Xiaojun Lin,  
Email: linx@ecn.purdue.edu  
Office: MSEE340  
Office Hour: Thursday 10-11am, or by appointment

Recommended Background:

This offering of ECE 60022 does not require ECE547 as a pre-requisite. Some background understanding of networking is helpful, but not required. Students are expected to have a basic understanding of probability obtained from a typical undergraduate EE program.

Course Description:

This course will cover fundamental concepts in mobile wireless systems such as propagation and fading, cellular systems, resource allocation (including channel assignment, scheduling, power control, routing), capacity and delay. It will also cover system and standards issues including 2G/3G/4G and future 5G networks, wireless LANs and ad hoc networks. Besides understanding the performance of current technologies, an emphasis on the course will also be to identify the challenges that face the engineering of wireless communications networks.

Course Objectives:

Students should leave the course with a fundamental understanding of the principles of wireless communications. This ranges from a basic understanding of the physical channel that these networks operate over, to network design, control, and protocol issues. They should have a familiarity with the state-of-the art technologies and key challenges that need to be addressed if high-quality multimedia applications are to be run on wireless channels.
Text:

2. Related papers.

Grades:

Homework: 25%
Midterm Exam (1): 30%
- Thurs 03/29, Evening. Time and place TBA
Projects: One assigned project (15%) and one final project selected by the student (30%)

Course Outline

Week 1: Historic Milestones and Current Wireless Networks
Week 2: Understanding the Wireless Communication Channel
Week 3: Cellular Capacity and Channel Allocation
Week 4-5: Modern View of Optimal Resource Management. Scheduling, Power Control, Routing and Cross-Layer Design in Ad Hoc Networks
Week 6-7: Scaling Laws and Stochastic Geometry
Week 8-9: Random Access, Wireless LAN, Internet-of-Things
Week 10: Understanding Wireless Delay Performance
Week 11-12: Towards Distributed and Adaptive Control in Wireless Networks
Week 13-14: System Case Studies, 4G/5G Systems and beyond.
Week 15: Project presentation