Engineering Faculty Document No. 71-07
March 31, 2008

TO: The Engineering Faculty
FROM: The Faculty of the School of Electrical and Computer Engineering
RE: New Graduate Level Course: ECE 60087

The faculty of the School of Electrical and Computer Engineering has approved the following new course. This action is now submitted to the Engineering Faculty with a recommendation for approval.

ECE 60087 Wireless Communication Networks
Sem: 2. Class: 3; Credit: 3.
Prerequisite: ECE 54700

This course will cover fundamental concepts in mobile wireless systems such as propagation and fading, cellular systems, channel assignment, power control, handoff, mobility management. It will also cover system and standards issues including second-generation circuit switched and third-generation packet switched networks, wireless LANs, mobile IP, and ad hoc networks. Besides providing an overview of current technologies, the emphasis on the course will be to identify the challenges that face the engineers of wireless communications networks.

Reason: This course will focus the on the networking issues in wireless communication systems, which have not been covered by other ECE courses. The course will not only provide an overview of current technologies, but also identify challenges that face the engineers of wireless communications networks, and therefore prepare the students for research in both academia and industry. This course has been offered as ECE 69500 in Fall 2005 (6 students) and Spring 2008 (10 students).

M. J. T. Smith, Head
School of Electrical and Computer Engineering

March 31, 2008

Supporting Documentation

Required Text: Mischa Schwartz, Mobile Wireless Communications, Cambridge University Press, 2005 (in addition to class notes).

Course Outcomes: A student who successfully fulfills the course requirements will have demonstrated:

a) Understanding of the fundamental concepts in mobile wireless systems such as propagation and fading, cellular systems, channel assignment, power control, handoff, mobility management.
b) Familiarity with current wireless system and standards, including second-generation circuit switched and third-generation packet switched networks, wireless LANs, and ad hoc networks.
c) Capability to identify the challenges in future wireless communications networks.

Assessment of Outcomes: The course outcomes will be assessed through homeworks, class projects and exams.

Weeks	***Principal Topics***
1	Historic Milestones and Current Wireless Networks
2	Understanding the Wireless Communication Channel
3	Concept of Cellular Communications, Handoff, and Location Management
4-5	Channel Allocation Techniques
6	Modulation and Multiple Access Techniques (FDMA, TDMA, CDMA)
7	Power Control for CDMA Networks
8	Case Studies of 2G Systems (GSM and IS-95)
9-10	3G Systems (Opportunistic Scheduling and Dynamic Resource Allocation
11	Mobile IP
12	Wireless LANs (e.g. 802.11, Bluetooth, etc.)
13-15	Ad hoc and Sensor Networks (Routing, Scheduling, Capacity-Delay Tradeoff and Cross-Layer Design)