

**DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
UNIVERSITY OF ALBERTA**

Wireless Communication Networks

Calendar Description:

Wireless Communication Networks

* This course is concerned with the architecture, protocols, modeling, and evaluation of wireless communication networks in transport of multimedia traffic. Specifically, this course studies queueing theory, traffic and channel modeling, radio resource allocation, end-to-end quality-of-service guarantee, mobility management, and cross-layer design in existing and emerging advanced wireless networks.

Wireless Communication Networks		
Topic	Time in Weeks	Concepts to be Learned
Introduction to wireless communication networks	0.5	Packet switching versus circuit switching, open system interconnection (OSI) reference model, wireline networks versus wireless networks, cellular systems.
Queueing theory	1.5	Birth-death process, Little's Law, M/M/1 queue, M/M/1/N queue, M/M/N queue
Multimedia traffic modeling	1	Voice on-off model, voice fluid model, video fluid model, bursty traffic model
Wireless fading channels and modeling	1	Wireless propagation channels, finite state Markov model
Centralized wireless resource allocation	1.5	Code-division multiple access (CDMA), channel and power allocation, system capacity, power control, packet scheduling
Distributed wireless access	1.5	Carrier-sense multiple access and its variants, IEEE 802.11 Standard, performance analysis of system throughput and delay in IEEE 802.11.
End-to-end quality-of-service guarantee	1	Deterministic bounds, generalized processor sharing and its variants, stochastic delay bounds, effective capacity
Mobile IP and wireless TCP	1	Mobile IP, congestion control, indirect TCP, snooping TCP, mobile TCP
Mobility management and call admission control	1	Hard handoff, soft handoff, evaluation of handoff priority solutions
Cross-layer design and optimization	1	Cross-layer design of physical, link, and network layers
Advanced wireless networks	1	WiMax, cognitive radio, etc.

Course Texts

Recently published research papers in wireless networking.

J. Schiller, *Mobile Communications*, 2nd ed., Addison-Wesley, 2003.

M. Schwartz, *Broadband Integrated Networks*, Prentice Hall, 1996.

J. W. Mark and W. Zhuang, *Wireless Communications and Networking*, Prentice Hall, 2003

G.L. Stuber, *Principles of Mobile Communications*, 2nd ed., Kluwer Academic Publishers, 2001.

D. Bertsekas and R. Gallager, *Data Networks*, Prentice Hall, 1992.