EE 543 Telecommunications Switching and Transmission Systems  
Fall 2007  
Course Outline

3 credits, three lectures per week  
**Semester taught:** Fall

**Prerequisites:** EE445  
Recommended: EE446, EE447, CS 440 or similar course on layered network models

**Room and Time:** MWF 1:10 – 2:00 PM, 632 Cobleigh Hall

**Instructor:** Richard S. Wolff, 509 Cobleigh Hall, 994-7172, rwolff@montana.edu

**Topics:** Circuit and packet networks, switching systems, telecommunication transmission networking and media selection (fiber optics, cable, wireless), network configuration, network technologies, equipment selection, system design examples and project.

**Approach:** This course will take a systems view of communications, integrating perspectives from computer science, electrical engineering, operations research and economics. Students will learn to consider tele-traffic demands, quality of service, scalability, performance and cost into consideration to develop requirements and architectures. Examples will be drawn from emerging underlying technologies and applications including wireless communications, including mobility, optical communications, wavelength routing, packet networks and the Internet. Students will learn to solve telecommunications problems using modeling and simulation with OPNET IT Guru.

This course will be coordinated with CS 440, Computer Networks, where communication protocols and the TCP/IP protocol suite are addressed.

**Texts:**

**Requirements and Grading:**
Problem sets and labs: 40%  
Mid term exam: 35%  
Project: 25%

**Projects:** Each student will define and carry out a project involving a communication system problem. The project report will be written and completed at the end of the
semester. The project will include definition of the problem, analysis of requirements, selection of system architecture including relationships within and between network functions, and design, including selection of technologies, equipment and protocols. The project should address performance, scalability, extensibility and cost. Modeling and simulation will be used to obtain results where appropriate. Before conducting the project, each student will prepare a one page project description and outline for discussion with the instructor and approval. Final project reports are expected to be 10 to 20 pages in length and include discussion of the state of the art, alternative approaches, trade offs and references.

Syllabus:

- Network services and architecture: top down, application-driven view of networks, including a layered approach
- Packet networks, OSI model, packet switching
- Internet protocols, addressing, routing and transport
- Circuit networks, core and access technologies, circuit switching, intelligent networks
- SONET and ATM networks
- Network control and operations, quality of service

Supplemental Reading Material

Communications Systems Principles


Data Networks


Wireless

Optical Networks