



King Saud University
College of Computer and Information Sciences
Department of Computer Engineering

1. Course number and name: **CEN449, Broadband and High Speed Networks**

2. Credits and contact hours: **3 (3, 0, 1)**

3. Instructor's or course coordinator's name: Aasem Nasser Alyahya
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4. Text book, title, author, and year:

Broadband Network Architectures: Designing and Deploying Triple-Play Services, Chris Hellberg, Dylan Greene, and Truman Boyes, 2007, Prentice Hall.

a. other supplemental materials:

Local and Metropolitan Area Networks, William Stallings, 6th Edition, 2000, Prentice Hall.

5. Specific course information

a. Course description (catalog)

Introduction to broadband networks; Switches: Crossbar, Multistage Interconnection Networks (MINs), High performance switches; Network Control and Management Protocols in High Speed Networks; SDH/SONET: protocol layers, configuration, and frame structures; ATM networks: protocols, services, layering and architecture; High speed networks: MPLS, 10-Gigabit Ethernet, Broadband Wireless networks.

b. prerequisites or co-requisites: CEN445 (prerequisite).

c. Required, elective, or selected elective course: Elective.

6. Assessment Plan for the Course

Homework/Quizzes	20%
Midterm I	20%
Midterm II	20%
Final Exam	40%

7. Specific goals for the course

a. **Course Learning Outcomes:** This course requires the student to demonstrate the following

1. Characterize high-speed networks and Classify high-performance switches.
2. Solve internal blocking in electronic/optical switches.
3. Classify routing, congestion, and error control protocols.
4. Analyze management protocols in high-speed networks and evaluate quality of service performance.
5. Apply fault tolerance techniques.
6. Recognize current high-speed networks in the local market.
7. Identify standards and migration paths to future technologies.

b. **Relationship of Course to Student Outcomes**

Outcome	Student Outcome Description	Contribution
(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 within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d)	an ability to function on multidisciplinary 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, economic, environmental, 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.	√

8. Brief list of topics to be covered and schedule in weeks

Characteristics of high-speed networks	1
High performance switches	2
Network Control/Management Protocols	2
SDH/SONET	3
High speed networks	5
Review and evaluation	2