

Electrical, Computer And Systems Engineering Department  
**ESCE-6660 Broadband and Optical Networking**  
Spring 2007 Syllabus

Class Time: **Mon, Thu 10:00-11:20 am**  
Class Venue: **DCC 240**

**Instructor:**

Koushik Kar  
Assistant Professor  
JEC 6048  
Phone: (518) 276-2653  
Email: [kark@rpi.edu](mailto:kark@rpi.edu)

**Teaching Assistant:**

Jing Ai  
JEC 7304  
Phone: (518) 276-8424  
Email: [aij@rpi.edu](mailto:aij@rpi.edu)

**Description:**

This course will cover fundamental concepts and protocols of broadband and optical networking. Broadband networking has been driven by the imminent convergence of telephony (voice), Internet (data), cable (video), and wireless networks. We will review fundamental ideas in each of these areas, and then study architectural and protocol concepts for integrating their traffic into a scalable, high-speed optical networking infrastructure. Concepts and architectures covered in this course will include: high-speed switching & router-design, traffic engineering (MPLS, ATM, frame-relay), fiber optic communications, optical networking concepts, protection/restoration/survivability, optical link layers (SONET, WDM), quality-of-service (QoS) architectures & building blocks,, protocol issues for multimedia (VoIP, video streaming/conferencing), broadband last-mile technologies (cable-modem, DSL, 3G wireless, 802.11 networks,). The course will involve substantial reading and a term project to help student synthesize the variety of concepts and appreciate the broad technological challenges.

**Prerequisites:**

Computer Communication Networks (ECSE-4670) or equivalent.

**Textbook (Required):**

Srinivasan Keshav, **An Engineering Approach to Computer Networking**, Addison-Wesley; ISBN: 0201634422; 1st Edition, 2001.

**References:**

1. Rajiv Ramaswami, Kumar Sivarajan, **Optical Networks: A Practical Perspective**, Morgan Kaufmann Publishers; ISBN: 1558606556; 2nd edition, 2001.
2. John Bellamy, **Digital Telephony**, John Wiley; ISBN: 0471345717, 3rd Edition, 2000.
3. James Farmer, David Large, Walter S. Ciciora, **Modern Cable Television Technology: Video, Voice, & Data Communications**, Morgan Kaufmann Publishers; ISBN: 1558604162; 1st edition, 1999.

**Computing:**

Email and World Wide Web access required for course communications and printing of course notes. Access to WebCT, Rensselaer's online course management tool, is required. Course material and video streams of the class will be available on WebCT.

## **Format and Grading Percentages:**

Primarily lecture-based class. There will be a lot of reading assignments, 4-6 homeworks, a term project/paper and 3 exams.

Homeworks ..... 20%  
Term Project/Paper .... 15-20%  
Exams/Quizzes..... 60-65%

## **Exams:**

Since the **exams will be held during class hours**, you should not have any conflicts. There will be **NO make-up exams**. All exams will be **open book/notes**. Exams will typically consist of quantitative problems, design questions, true-false questions and short answer questions and will focus on concepts. Exams will cover both text and additional reading material.

## **Exams:**

*EXAM 1 (Mid-semester Exam): (~20%) February 22 (Thu)*  
*EXAM 2 (Mid-semester Exam): (~20%) March 22 (Thu)*  
*EXAM 3 (Final Exam): (~25%) Apr 30 (Mon)*

## **PDE Point-of-contact:**

### ***Administrative Issues:***

Mecaila Smith  
Phone: (518) 276 3048  
Email: [smithm12@rpi.edu](mailto:smithm12@rpi.edu)

### ***Production Issues:***

Steve Tytko  
Phone: (518) 276-2575  
Email: [tytkos@rpi.edu](mailto:tytkos@rpi.edu)

## **General Policies Regarding Graded Material:**

1. The exams and problems sets are based upon lectures and required reading. The lectures and other course material will also be available through the WebCT.
2. Our policy will be to return graded material to you within one week of handing it in. All issues regarding graded material should be resolved within one week of the date graded material is returned.
3. Usually, we do not accept late homework submissions. Exceptions will require a valid and documented reason (eg: doctor's letter). There will be no makeups for homeworks.
4. If you feel that an error was made in grading, you should submit a re-grading request to us WITHIN A WEEK of the date the graded material was returned to the class. Requests for re-grading or any questions regarding graded material **WILL NOT BE ACCEPTED** after that time. Any graded material that is not picked up within two weeks will be discarded.
5. **Academic Honesty:** Please refer to the university's academic honesty statements. While we encourage you to interact with your colleagues, your submissions must be only your own work. Issues of academic dishonesty will be dealt with severely.