Overview

- Introductions: course description & calendar
- Answers to frequently asked questions
- Prerequisites
- Informal Quizzes
Who’s Who

- **Instructor**: Shiv Kalyanaraman; kalyas@rpi.edu, Room: JEC 6042, Phone: x8979
- **Course secretary**: (on-campus) Melissa Reardon; reardm@rpi.edu, Room: JEC 6049; Phone: x6313
- **PDE & Production Point-of-contacts**: Nadeen Thompson: thompn@rpi.edu, x8501, Stephen Tytko: tytkos@rpi.edu, x2575
- **TA**: TBD (check WebCT announcements)
Networking Courses @RPI

CANOS

CCN

Network Programming (CS)

Network Security (CS)

Internet Protocols

Mobile & Wireless Networking

Network Modeling

Experimental Networking (Lab Course)

Network Operations (CS)

“Topics Courses”

“Core Networking Sequence”

Design, Analysis, Operations Tools for Networking Research

“Core Networking Sequence”

Network Programming (CS)

Network Security (CS)

Internet Protocols

Mobile & Wireless Networking

Network Modeling

Experimental Networking (Lab Course)

Network Operations (CS)
Course Description: Goals

- Fundamental protocol concepts in the context of concrete/real protocols (including protocols that did not survive)
  - As if YOU designed the protocols grappling through the tradeoffs…
  - Where do these ideas really come from?
  - Identify common themes, building blocks…
    - Look beyond alphabet soups, idiosyncratic differences and stove-pipes!
  - Broad foundation of advanced material of lasting value: you can draw upon them in future (even in related fields)!
- Insights into design and implementation: lab exercises
- Preparation for possible research/advanced development in networking (reading of papers, fundamental perspective, case-study)
- In-class work (informal quizzes) & discussion (be prepared!)
Syllabus

- **Core problems**: heterogeneity, scale, coordination of distributed components, handling failures, sharing resources, managing congestion
- **Building Blocks**: workload units (call vs packet), multiplexing, indirection, virtualization, identifiers/name-space structures/scopes, signaling/state management, randomization, distributed coordination and control, redundancy
- **Core protocols**: Transport (TCP, UDP), IP, Routing, Addressing/Naming.
- **Advanced topics**: Multicasting, Peer-to-Peer, Next-generation IP, Better-than-best-effort Internet (QoS), High-Speed Routers, IP Telephony, Security … (may not cover all)
Course Description Highlights

- Lectures
- Informal quizzes: Every week (every 2 classes)
- Be prepared: I will randomly call on students to explain ideas.
- Remote students: download latest class material from WebCT or class web page for each class
- WebCT bulletin board: Post your questions! TA will monitor regularly.
- WebCT: Grades, papers, RFCs, Internet drafts…

- **Grading:**
  - Informal Quizzes & Paper Summaries: {15 pts}
  - 2 Labs: Hands-on TCP and IP {20 pts}
  - 1 Research Case Study: {15 pts}
  - 3 exams: 15 pts, 15 pts, 20 pts: {50 pts}

- Quiz dates: **Feb 15th, Mar 22nd, May 3rd.**
- [2 days later for delayed schedule]
Prerequisites

- **Required (no exceptions):**
  - ESCE-4670 Computer Communication Networks or equivalent
  - VERY GOOD C programming knowledge

- **Desirable:**
  - Operating Systems
  - Computer Architecture (ECSE-4730 or equivalent)

- If you **do not have the required prerequisites**, you **must drop the course** and take it later (next year).
Prerequisites

- Protocol Layers: ISO/OSI reference model
- Physical Layer: Coding, Manchester
- Transmission Media: UTP, Cat 5
- Data Communication: Asynchronous vs synchronous, Baud, bit, and Hz, Half-Duplex vs Full-duplex, Modulation/Demodulation
- Packet Transmissions: Framing, Bit stuffing, byte stuffing
- Flow Control: On-Off, Window
- Error Detection: Parity, Checksum, Cyclic Redundancy Check
Prerequisites (Continued)

- Error Recovery: Start and Stop, Go back $n$, Selective Reject
- LANs: Aloha, CSMA/CD, Ethernet, IEEE 802.3, Token Ring/IEEE 802.5, FDDI
- Addressing: Unicast/multicast, Local/Global
- LAN wiring: 10Base5, 10Base2, 10Base-T, 100Base-TX,
- E-LANs: Hubs, Bridges, Routers, Switches
- Routing: Distance Vector vs Link State, Spanning tree, source routing
- Transport layer: multiplexing, reliability, congestion control, introduction to TCP and UDP
- Basics of probability and queuing theory
Still trying to get into the course?

- Do you have the pre-requisites?
- Please submit course add form to course secretary: Melissa, JEC 6049 by tomorrow noon.
- Depending upon the number of people who drop the class, space available, TA resources available, we will add more students.
  - Decisions to be emailed to you.
  - Make sure you mention your email address.
Answers to FAQ's

- Considerable paper readings in the class + research case study (writing skills)
- Labs require advanced C programming skills
- Informal quizzes given every week

- All homeworks/labs etc due at the **beginning** of the class indicated on the course calendar
  - Up to one late submission: no penalty
  - Beyond that **10% penalty**: only if submitted before solutions are posted.

- All quizzes are open-book and extremely time limited.
  - Quizzes consist of design qns, numerical, multiple-choice (true-false), and short answer questions.