Rethinking the Undergraduate Networking Curriculum

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Problem

What to teach in introductory course?

- Topics (EE vs. CS)
- Level of detail
- Hands on (programming, simulation) vs. lecture-only
- Top down vs. bottom up, problem oriented

How to teach it?

- E.g., multi-course sequences
- e.g., follow-up courses

What are reasonable follow-up courses?
Overview

• The way it should (?) be
• The way it is
Undergraduate Networking courses

- Undergraduate CTE (Computers and Telecommunications Engineering) Major
- Submatriculation in TCOM program (MS/BSE)
- Courses available to UGrads
Courses

- TCOM799 Special topics (Graph Algorithms, Approximations ...)
- TCOM670 TCOM Seminar
- TCOM520 Telecom Transmission Systems
- TCOM570 Digital Communications
- TCOM551 Network Security
- TCOM511 Wireless Systems
- TCOM510 Wireless Networks
- TCOM504 TCOM Lab
- TCOM503 Waves, Fibers, & Antennas for TCOM
- TCOM512 Application & Transport Level Protocols
- TCOM502 Broadband Networking
- TCOM501 Networking -- Theory & Fundamentals
- TCOM500 Networking -- Technology, Protocols, and Practice
- TCOM400 Networking -- Technology, Protocols, and Practice
- TCOM370 Principles of Data Communication
Who are our students?

Students who (think they) want to go on and do:
• Grad work/research in networking, w/ emphasis on:
  – (CS?) protocol design and network algorithms or …
  – (EE?) physical layer and/or queuing theory or …
• Implement network protocols.
• Design network interfaces.
• Write programs that use existing protocols.
• Design, administer/manage networks.
• (B-school) "understand the technology" well enough to:
  – Knowledgeably invest in a networking startup.
  – Be a manager in a networking startup.

Don’t want to “do” anything, but Internet is important, so liberal arts education should teach:
• History, deep issues, fundamental questions, social policy.

Who are our students?
What does this mean to us?

- Each community/course.
  - "naturally", but can match reasonable prerequisites to

- Cannot expect students to all have prerequisites.
  - Lecturers vs. full-time faculty
  - Course listing, cross listing, funding, hiring

- Matching the course to constituency may allow us
  - To match the teaching slot to the appropriate dept.

- May be better able to address the needs of each
  - Community individually rather than in a single class
  - Different likelihood of taking follow-up courses.

- Each community needs different topics
Action Items?

- Focus on each group separately
- Per Institution
  - Clear statement of what students will take away
  - Identity reasonable prerequisites
    - Design appropriate course or multi-course sequence
  - Identify groups of students and level of demand
    - Can we justify distinct course?
    - Combine? Eliminate? -- just don’t make unfulfillable promises

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