Introduction to ITS 413 - Internet Technologies and Applications

Dr Steve Gordon

ICT, SIIT

Welcome

- To an advanced course on technologies and applications that are used in the Internet
- A 4th year course for ICT stream
- Course website available from http://ict.siit.tu.ac.th/

Who Am I?

- Steve Gordon
- Assistant Professor in ICT (started in October 2006)
- 2001-2006: Researcher/Lecturer in Australia
  - Telecommunications, Internet, Wireless Networks, …
- Contact details:
  - Email: steve@siit.tu.ac.th
  - Office: 2304-7, Bangkadi (IT&MT Building)
  - Phone: ext 2014
  - Consultation: email or phone for appointment; see website for availability

Prerequisites

- I assume you have passed:
  - ITS 327 Computer Network Architectures and Protocols; or
  - ITS 393 Networking and Collaborative Computing
- And you know:
  - What are computer networks and distributed systems?
  - What are communication protocols?
  - What is the Internet and what are the basic principles of operation, e.g. routing?
  - What are the principles and details of layered communications, e.g. OSI 7 layer stack?
  - What devices are used in networks, e.g. computers, switches, routers, cables?
  - How do basic protocols and algorithms work, e.g. MAC, routing, physical transmission?

What will you learn in ITS 413?

- Details of Internet protocols
  - IPv6 and related protocols
  - TCP services and algorithms
- How Internet applications work
  - Voice and video
  - Instant messaging and P2P
- Basic Internet security
  - NAT/firewalls, VPNs, IPsec
- Selected network technologies
  - LANs, ADSL, WANs; wireless Networks
- Some advanced topics
  - Mobile Internet, …

Why is ITS 413 Useful?

- It will help you get a job!
  - Designing and writing applications that use the Internet
  - Setting up and managing computer networks
  - Designing and using network software and hardware

- You will have deeper understanding of:
  - Details of network protocols' operations
  - Protocol and algorithm design principles
  - Factors affecting performance and security of networks
  - Directions and challenges for future Internet technologies

Course Structure

- Lectures
  - 3 hours per week
- Self study
  - At least 6 hours per week
  - Browsing lecture notes BEFORE and AFTER class, reading the textbook and other materials, studying for quizzes and exams, preparing assignments, consultations, group discussions, …
- Assessment

Assessment

- Quizzes
  - 10 minute quizzes at the beginning of selected lectures
  - Cover the topics since the last quiz
  - Test your understanding of lectures, reading materials and homework problems
  - Closed book
  - 7 quizzes; 5 best marks will count
  - 15% total (3% each)
- Assignment
  - Set of problems for you to complete over a number of weeks
  - Test your in-depth understanding of concepts and protocols
  - Open book
  - 20%

Assessment

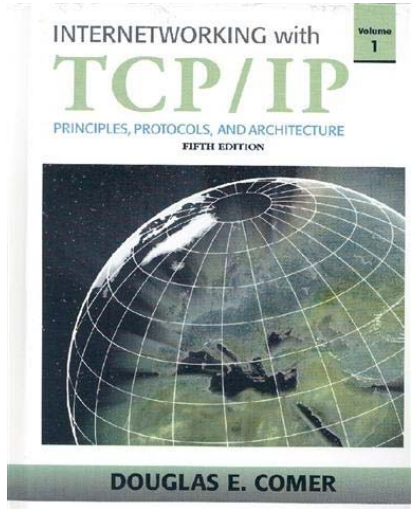
- Mid-term Exam
  - Test your knowledge and understanding of all material to date
  - Use as practice for final exam
  - Closed book
  - 20%
- Final Exam
  - Closed book
  - 45%
- For advice:
  - Closed book assessment is not a memory test (e.g. I won't test your knowledge of every header field in every protocol) – it's a test of understanding
  - We will discuss types of questions and topics before exam

Academic Misconduct

- What is it?
  - Plagiarism, cheating, copying, “lending”, …
- Examples
  - Copying assignment answers from friend (verbal or written)
  - Giving your assignment (or some answers) to a friend
  - Looking at neighbours answers during quiz/exam
  - Copying sentences/paragraphs/code from textbooks/Internet without acknowledgement
- Results
  - If detected, questions or entire assessment item may get 0 marks
- Discussion with friends is encouraged; telling your friends answers is not!

Learning Materials

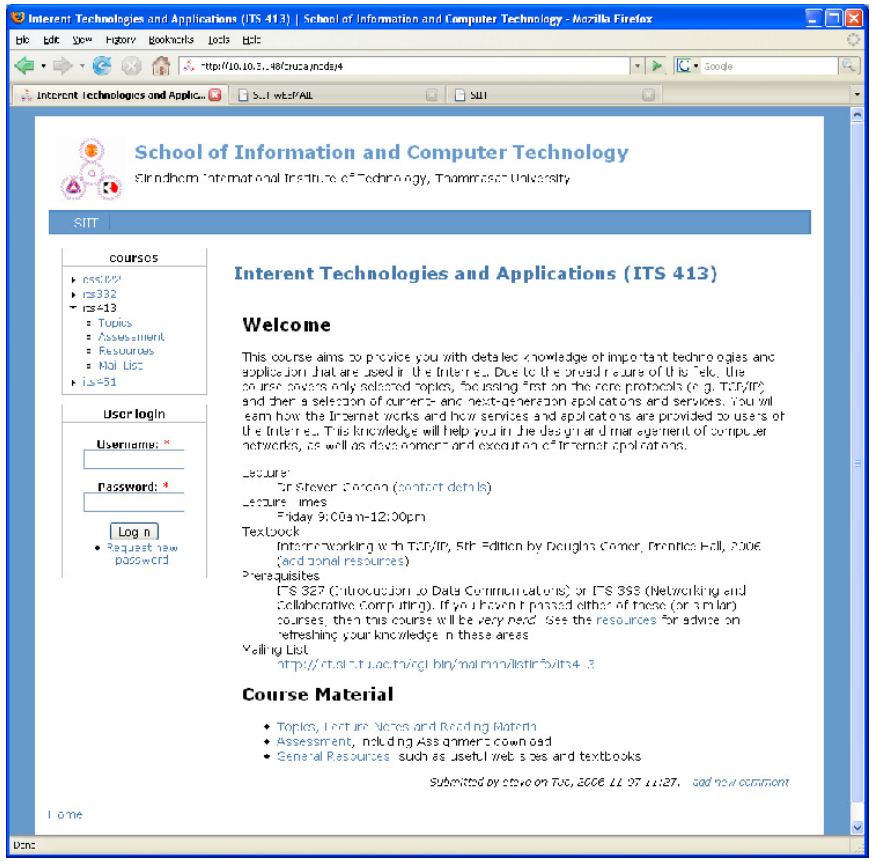
- Lectures
  - Attend, listen and ask questions!
  - Will include examples and demonstrations
- Lecture notes
  - PDF of Powerpoint slides
  - Available on website and from document services
  - Aim to have available 1 day before lecture
  - Make your own notes
- Recommended Textbook
  - Internetworking with TCP/IP by Douglas Comer
  - 5th Edition
- Other Useful Textbooks
  - 3rd and 4th edition of Comer textbook
  - Network textbooks by Stallings, Tanenbaum, Comer, Kurose, …
  - These other textbooks should only be used as supplementary readings



Learning Materials

- Recommended Readings
  - For selected topics I will list papers/chapters/websites/standards that should be read
  - These will be publicly available on the Internet or available through the Library (electronic or hardcopy)
- Homework Problems
  - Problems from the textbook and other sources will be given
  - Answers will not be assessed, but discussed in lectures
- Course Website
  - All materials will be available from the website
  - Announcements, selected solutions will be on the website
- Mailing List (access via course website)
  - You must subscribe (as will be used for announcements)

Course Web Site



Course Topics

- Network Technologies (1 lecture)
  - Ethernet, Residential Access, PDH, SDH, MPLS, PoS, Future
- Wireless Networks (2 lectures)
  - GSM/3G, Wireless LAN, Bluetooth, WiMax, …
- IPv6 (1 lecture)
  - Basics, Auto configuration, …
- TCP in Detail (2 lectures)
  - Services, Connections, Flow & Congestion Control, Performance
- Internet Design and Analysis
  - Protocol design, Simulations, Experiments
- Internet Multicast (1 lecture)
  - Models and protocols

Course Topics

- Quality of Service (1 lecture)
  - IntServ, RSVP, DiffServ
- Multimedia Applications (1 lecture)
  - Voice, Video
- Internet Security (1 lecture)
  - Concepts, IPsec, Firewalls
- Mobile Internet (1 lecture)
  - Mobile IP, WAP, MMS
- Peer to Peer Applications (1 lecture)
  - Instant Messaging, File Sharing, …
- Other Topics (1 lecture)
  - ?

Course Topics

What Do You Want?