Wireless Ad Hoc Networks

Course Information

Hung-Yun Hsieh

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Registration Information

- Course information
  - Title: Wireless Ad Hoc Networks (無線隨意網路)
  - Code number: 942 U0290 (第一類加選方式)
  - Time: Wednesday 9:10am ~ 12:10am
  - Place: Room 145, EE-II Building
- Instructor
  - Prof. Hung-Yun Hsieh <hyhsieh@cc.ee.ntu.edu.tw>
  - Office: Room 546, EE-II Building
  - Office hours: By appointment
  - Phone: 02-33663666

Course Scope

- Wireless ad hoc networks
  - A particular type of wireless networks that do not need any infrastructure support to operate
  - ☞ Wireless multi-hop networks based on peer-to-peer communication
  - ☞ *cf.* Wireless last-hop networks relying on direct communication with the base station (or access point)
  - Found instantiations in many areas
    - Wireless mesh network (WMN)
    - Wireless sensor network (WSN)
    - Mobile ad hoc network (MANET)
    - Vehicular ad hoc network (VANET)
    - Wireless personal/body area network (WPAN/WBAN)
    - ...

Course Objective

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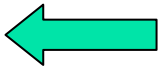
  - The goal is to introduce students to the mathematical models and network protocol designs in wireless multi-hop networks
  - ☞ A systematic exposition of network protocols and their cross-layer interactions
  - ☞ A broad perspective on the active research areas in wireless multi-hop networks
- Prerequisites
  - Introduction to computer networks, or
  - Computer communication networks

Syllabus

- Selected topics on wireless multi-hop networking
  - Wireless link model
  - Mobility model
  - Network simulation
  - Medium access control protocol 
  - Routing protocol
  - Transport protocol
  - Miscellaneous topics
  - …

Course Materials

- No textbooks
  - ☞ An active research area in wireless networking
  - Selected chapters from several books in wireless ad hoc networking
  - Selected articles from IEEE/ACM journals, magazines, and conference proceedings
- Course materials
  - Fundamental disciplines
    - Lecture
  - State-of-the-art technologies
    - Topic presentation

Not Just Theories

- Network simulation
  - A valuable pedagogy for courses in networking
  - An in-depth understanding of the concept, design, operation, and performance of networks and protocols
- NS-2 (NS-3)
  - The network simulator to use for research in networking
  - Supported by a large community (DARPA, NSF, LBL, ICIR, PARC, Berkeley, USC/ISI, CMU, Sun, …)
  - Open source that runs on Windows and Linux/MacOS

  ☞ Use of NS-2/NS-3 is an integral part of this course
    - Homework assignments and term projects
    - Background in NS-2/NS-3 is not a must

Grading

- Midterm exam (30%)
  - Essays, multiple choices, and/or gap fills
  - In class, closed notes
- Topic presentation (10%)
  - 1 group presentation, or
  - 2 paper reviews
- Homework assignments (40%)
  - 4 hands-on exercises
- Term project (20%)
  - Proposal, presentation, and final report

Course Administration

- Teamwork
  - Two to three students in a group
  - Homework assignments and topic presentation: per group
  - ☞ Term project: it is possible for collaboration of at most 2 groups
- Submission
  - Homework
  - Presentation slides
  - Project proposal, presentation slides, and final report
  - ☞ All submissions must be in English

Course Web Page

- Course portal
  http://cc.ee.ntu.edu.tw/~hyhsieh/teaching/adhoc10f
- Announcement
  - Exam and grades
- Syllabus and course materials
  - Lecture slides
  - Reading and supplementary papers
- Homework assignments and submissions

☞ No cheating

- Plagiarism and hacking

☞ Style of lecture and participation