

## ***IT 441 Network Services Administration (a new course)***

### **Course Description**

This course builds upon the material learned in IT341 Introduction to System Administration. It shows how one may better administer networked computer systems by automating many of the administration regimes and by effectively managing those who help. Topics include scripting, heterogeneous networks, remote management, the legal issues of network administration, an introduction to network security, and the design and implementation of policy. Students are also introduced to issues in managing others.

### **Course Goals**

The goal of this course is to teach students how computer network system administration may be made easier by

- Automating some of the required processes,
- Understanding the basics of network security, and
- Managing others who are working with you to get the work done.

This course builds on the basics of Linux system administration covered in IT341 Introduction to System Administration.

### **How the Course Serves Students**

IT441 is a required course in the System Administration track of the new BS in Information Technology (IT) degree, offered jointly by the Department of Computer Science (CSM) and the MSIS Department (CM). The System Administration track is offered by the Computer Science Department. The track's purpose is to prepare the student for a career in computer system administration and/or information technology in general.

### **Syllabus**

- Automating the System Administration Process
  1. Advanced Shell Scripting.
  2. Perl Programming
  3. Building and monitoring a logging infrastructure.
  4. Network monitoring.
- Running heterogeneous networks.
- Services
  1. Local server standards
  2. Internet Postmaster: duties and responsibilities.

3. Supporting SAMBA (making your UNIX file system look like a Windows file system).
  4. Running a network information system
  5. Running a local DNS.
  6. Running NFS.
  7. Running a print server.
- Security
    1. Levels of security and threat analysis
    2. Password systems
    3. An introduction to firewalls
    4. Detecting intruders
    5. Redundancy of hardware and data
  - Management
    8. Reality, perception and visibility.
    9. Staying happy.
    10. Responsibilities of technical and people managers.
    11. Hiring and firing system administrators.
    12. Dealing with vendors.
    13. Budgeting for the System Administrator
    14. System security: a management perspective.

## Projects

Much of the material in this course will be transmitted by way of hands-on projects, where students, working in small teams, set up small networks of computers running Linux. There will be six to eight projects, such as the following (these are only examples):

- Setting up a Linux network with clients and a server supporting NFS, NIS, DNS.
- Setting up remote access management
- Set up a sniffer for monitoring network usage
- Writing a Perl script to watch for repeated illegal login entries.
- Automating the user registration process.
- A Perl script for looking for orphaned homes (Home directories without users, or the inverse)
- A Perl script for validating group file integrity.
- A Perl script for checking the integrity of the alias database.
- A (OSU-like) Perl script for automating backup and/or restore.
- A Perl script for checking the consistency of Ethernet addresses.
- A Perl script for recording disk usage in a way that it may be easily queried.
- Configuring a firewall, attempting to crack a firewall.
- Installing open-source software such as SVN (a source control application).
- Setting up Samba and adding Windows boxes to the network

## Grading

Projects and Engineering Notebook	50%
Midterm Exam	20%
Final Exam	30%

## Textbooks and Readings

There are very good textbooks that address both the policy issues of system administration, as well as the implementation details. Many are oriented towards specific systems such as Unix, Linux, Windows and (for people with taste) Macs. For this course, we will use the following:

(From IT341)

1. Thomas A. Limoncelli, Christine Hogan and Strata R. Chalup. *The Practice of System and Network Administration, 2<sup>nd</sup> Edition*. Addison Wesley, 2007. ISBN 978-0321492661. (This discusses the generic policy questions in system administration, and rarely talks about a particular operating system.)
2. Evi Nemeth, Garth Snyder, Scott Seebass and Trent R Hein. *Unix System Administration Handbook (Third Edition)*. Prentice Hall, 2001. ISBN 0-13-020601-6. (Unix specific.)
3. Matt Welsh and Matthias Daheimer. *Running Linux (5<sup>th</sup> edition)*. O'Reilly, 2005. (Linux specific.)

(New for this course)

4. Randal Schwartz and Tom Phoenix. *Learning Perl (4<sup>th</sup> Edition)*. O'Reilly Media, Inc, 2005.
5. Nick Christenson and Brad Knowles. *Internet Postmaster: Duties and Responsibilities*. SAGE, USENIX Association, 2006.

Additional readings will be assigned from the SAGE web site at <http://www.sage.org/>. SAGE is the System Administrators Guild, a special technical group of the USENIX Association. They maintain a fabulous web site (which Rick Martin pointed us to) with all sorts of resources including a series of monographs on core sysadmin subjects.

## Accommodations

Section 504 of the Americans with Disabilities Act of 1990 offers guidelines for curriculum modifications and adaptations for students with documented disabilities. If applicable, students may obtain adaptation recommendations from the Ross Center for Disability Services, Campus Center 2nd Floor, 2100 Street,

Room 2010, 617-287-7430. The student must present these recommendations and discuss them with each professor within a reasonable period, preferably by the end of Drop/Add period.

### **Academic Honesty**

All students are expected to follow the [University's Code of Student Conduct](#). If you are caught cheating, we will follow the guidelines for punishment outlined in the code.

When you turn in work that you have discussed with someone, or which contains ideas that you found in a book, *you must indicate that fact*. We expect you to talk to each other and to read materials other than those assigned. We also expect to see in your work evidence that you have done so. Learning to acknowledge intellectual debts is part of learning. You should be reading, talking to each other, and telling the world that you have done so. When group work is called for the group solution should note whenever a part of the project was done by only a part of the group.

Some kinds of sharing, however, are unacceptable. You may not use the computer to copy someone's work and submit it as your own -- even if you acknowledge that theft! You may not have your friends do your work for you. Versions of some of the assignments in this course may have been given in previous years. You may not use answers to those assignments.