

Network and System Administration - CMPT 433  
Syllabus  
University of Saskatchewan  
2012-2013 Term 2

## DESCRIPTION AND LEARNING OBJECTIVES

-----

### CALENDAR DESCRIPTION:

This course concerns deployment and maintenance of modern computer systems in an operational environment. The course provides both conceptual knowledge and practical experience. Topics to be covered include architectures, heterogeneous systems, authentication and security, network services including firewalls, storage services, performance analysis and tuning, management and configuration of services and system resources, system initialization, drivers, cross-platform services, policies and procedures.

INSTRUCTOR: Dwight Makaroff - Thorvaldson 281.3 x8656. Available via appointment.

CLASS MEETING TIME: Tuesday/Thursday 2:30-4:00 p.m.

ROOM: Thorvaldson S386

TEACHING ASSISTANT: Khadija Rasul (khr667)

### LEARNING OBJECTIVES:

Upon successful completion of this course, students should be able to demonstrate competency at the following tasks:

1. Manage users, files, and software on a computer system installation consisting of clients and servers (MANAGEMENT)
2. Install and configure networking services for intranet and Internet domains (NETWORKING)
3. Administer network security policies in Linux and Windows environments (SECURITY)
4. Understand and apply techniques to interoperate computer systems comprised of Linux and Windows machines (INTEROPERABILITY)
5. Identify potential sources of poor computer performance and evaluate potential solutions (PERFORMANCE DEBUGGING)

6. Design small and medium sized business IT infrastructure organization (CAPACITY PLANNING).
7. Develop scripting mechanisms and automated scripts for performing complicated administration tasks (SYSTEM SCRIPTING)
8. Evaluate alternative policies and mechanisms for providing reliability features of computer system services and operations (BACKUPS)
9. Install and configure Linux and Windows virtual machines (VIRTUALIZATION)
10. Deploy systems to manage large amounts of data for a wide variety of users (DATA CENTRES)

#### RESOURCES

-----

#### REQUIRED TEXTBOOK:

The Practice of System and Network Administration (2nd Ed.), Thomas A. Limoncelli, Christina J. Hogan, and Strata R. Chalup, Addison-Wesley, 2007, ISBN 0-321-49266-8.

#### RECOMMENDED ADDITIONAL READINGS/RESOURCES:

UNIX and Linux System Administration Handbook (4th Ed.), Evi Nemeth, Garth Snyder, Trent R. Hein, Ben Whaley, Prentice Hall, 2011, ISBN-10: 0-13-148005-7.

Linux Administration A Beginners Guide (6th Ed.), Wale Soyinka, McGraw Hill, 2012, ISBN-10: 0-07-176758-4

Essential System Administration (3rd Ed.), A. Frisch, O'Reilly, 2002, ISBN-10: 0-596-00343-9

TCP/IP Network Administration (3rd Ed.), C. Hunt, O'Reilly, 2002, ISBN-10: 0-596-00297-1

Microsoft Windows Server Administration Essentials, Tom Carpenter, Sybex, 2011, ISBN-10: 1-11-801686-6

Introducing Windows Server 2012, RTM Edition, Mitch Tulloch with the Windows Server Team, Microsoft Press, ISBN-10: 0-7356-7535-3

## COURSE TOPICS/POLICIES/EVALUATION

### COURSE TOPICS:

The topics of discussions, assignments and lecture time shall include, but not necessarily be limited to the following: clusters vs supercomputers vs LANs, multi-tiered server architectures, heterogeneous systems, authentication and security, file servers, disk configuration, backups, network file systems, performance analysis and tuning, managing system resources, devices and drivers, configuring and building kernels, bootstrapping and system initialization, network administration, network services, cross-platform services, firewalls, proxies, routers and name servers, policies and procedures.

### POLICIES:

The course will be structured as informal lecture/discussion. Information will be discussed from the various textbooks and readings, with applications to deploying the concepts on systems consisting of resources in a virtual machine environment. Students will be expected to be prepared to discuss topics and complete exercises in classroom and lab environments.

The U of S Policy on Academic Honesty will apply for this course. The university policy will be the terms of reference for student academic conduct.

### EVALUATION:

The course evaluation will consist of assignments, a midterm exam (2 components: written and lab), a term project, and a final exam (again, 2 components: written and lab). All components are mandatory in order to achieve a passing grade for the course. All evaluation components must receive a passing grade to achieve a passing grade in the course.

### ASSIGNMENTS:

There will be approximately 5-7 assignments, consisting of a practical problem in system administration that students will be asked to solve, and either write up a report on the solution or demonstrate the solution to the Instructor or a Teaching Assistant outside of class time.

### MIDTERM EXAM:

There will be a mid-term exam, consisting of a written portion where students demonstrate understanding of the concepts behind system and

network administration, and a lab component where practical solutions will be required in a time-limited environment. The midterm will be held during class time in late February/early March.

TERM PROJECT:

Each student will propose a research project associated with one or more major topics of the course. This could involve literature reviews, industry evaluations, or technical prototype development and evaluation.

FINAL EXAM:

The final exam will have two components: a written exam and a lab exam, written during the exam period.

RELATIVE WEIGHT OF EVALUATION COMPONENTS:

-----

Assignments	25%
Midterm (written)	10%
Midterm (lab)	10%
Term Project	15%
FINAL EXAM (written)	20%
FINAL EXAM (lab)	20%
TOTAL	100%

ADMINISTRATION: The course will be administered with the Blackboard Course Tools. This will include Course Notes, Discussion Forums, Announcements, and Internal Email.

TENTATIVE OUTLINE OF TOPICS:

-----

Lesson Title	Date
Review and Role of System Administrators Limocelli 1-2, Nemeth 1, 2 and 4, Soyinka 5.	January 3, 2013
Organization of IT Systems, Documentation Limocelli 9, 30	January 8, 2013
Hardware and Software Configuration Basics Limocelli 3-6, 25, Nemeth 7, Soyinka 4	January 10, 2013
H/W, S/W, User Mgmt continued	January 15, 2013
File Systems and Disk Issues Nemeth 8, Soyinka 7, 10, Tanenbaum 10.6, 11.8, 12.6	January 17, 2013
Networking Intro Limocelli 7, Soyinka 11-12, Nemeth 14	January 22, 2013
Startup and Shutdown Nemeth 3, Soyinka 6	January 24, 2013

Startup and Shutdown - part 2	January 29, 2013
The Kernel	January 31, 2013
Nemeth 11, 13, Soyinka 8-9	
Observation, automation, logging and Backups	February 5, 2013
Limoncelli 10, 25, 26, Nemeth 10, 21, Soyinka 30	
Security Introduced	February 7, 2013
Limoncelli 11, Nemeth 22, Soyinka 13-15	
Security Continued	February 12, 2013
Ethics	February 14, 2013
Limoncelli 12	
Local and Network Services and Applications	February 26, 2013
Limoncelli 22, 23, and 24, Nemeth 19, 25, 26, 27, Soyinka 22-28	
Services and Applications continued	February 28, 2013
Nemeth 17-20, Soyinka 16-21	
Applications and Services, part 3	March 5, 2013
Midterm	March 7, 2013
Network Connections and Management	March 12, 2013
Limoncelli 27, Nemeth 15-16, Soyinka 12, 13, 15	
Network Stuff continued	March 14, 2013
Performance Analysis and Tuning	March 19, 2013
Limoncelli 22	
Cross-Platform Services	March 21, 2013
Nemeth 24, 30, Soyinka 23, 29	
Software Deployment and IT Support Management	March 26, 2013
Limoncelli 28, 30, 33, Nemeth 32	
User Support and Maintenance and Change	March 28, 2013
Limoncelli 13, 14, 15, 17, 18, 19, 20	
Maintenance and Change continued	April 2, 2013
Class Presentations 1	April 4, 2013
Class Presentations 2	April 9, 2013