CAMOSUN COLLEGE
Trades and Technology
Electronics and Computer Engineering

ELEX 139B
PC Server Fundamentals
Fall 2018

COURSE OUTLINE

The calendar description is available on the web @   Online.camosun.ca

Please note: This outline will not be kept indefinitely. It is recommended students keep this outline for their records, especially to assist in transfer credit to post-secondary institutions.

Instructor Information

(a)	**Instructor**	Ian Cameron		
(b)	**Office hours**	TBA		
(c)	**Location**	TEC 211		
(d)	**Phone**	250 370 4439	**Alternative:**	
(e)	**E-mail**	cameron@camosun.bc.ca		

The focus of this course is advanced topics on Windows Server and an introduction to Linux. The students are introduced to Server management and administration. The students will create a working Client - Server based network. Students will be required to develop and implement a working file system, create user accounts and groups to implement a working domain structure and configure various server roles and services. The students will use both the UNIX command line interface and graphical user interfaces (GUI) to configure programs, files and directories, set file attributes and permissions, and configure drives and partitions.

Emphasis will be on configuration of the Client – Server environment based on the Microsoft 70-741 Networking with Windows Server 2016 exam. In addition, the LPI Linux material will be covered.

The student will be responsible for keeping up with the required reading and lab exercises.

Upon successful completion of this course a student will be able to:
- install and configure network operating systems;
- identify and describe the different server roles;
- describe the operation of server-based networks;
- perform server maintenance;
- configure and manage virtual servers and workstations;
- describe and practice disaster recovery methods for servers;
- perform operations on UNIX file systems, file storage, drives and partitions;
- modify UNIX file attributes and permissions;
- configure access control lists;
- explain basic shell scripts; and
- choose appropriate archive solutions.

Required Materials

(a) Text: Online - TestOut Server Pro 2016: Networking course pack. The information can be accessed through the TestOut (www.testout.com) once the course is purchased.

(b) NDG Linux Essentials hosted through the Cisco Net Academy

(c) Access to ELEX 139 Camosun D2L online course materials as required

<u>**Course Content**</u>

<u>**Week 1**</u>	<u>**Reading and Assignment**</u>

0.0 Introduction – Server Pro 2016:Networking Introduction
    0.1 Server Overview
    0.2 Virtual Machines
    0.3 Lab Configuration

<u>**Week 2**</u>   Chapter 1 – TestOut

1.0 DNS
    1.1 DNS Overview and Installation
    1.2 DNS Name Resolution
    1.3 Primary and Secondary DNS Zones
    1.4 Zone Properties and Auxiliary DNS Zones
    1.5 DNS Records
    1.6 DNS Record Management
    1.7 Single-Label Name Resolution
    1.8 DNS Server Properties
    1.9 DNS Protection
    1.10 DNS Policies
    1.11 DNS Monitoring and Troubleshooting

<u>**Week 3**</u>

2.0 TCP/IP   Chapter 2 – TestOut
    2.1 IPv4 Addresses
    2.2 IPv6 Addresses
    2.3 IPv4-to-IPv6 Transitional Technologies

                                               Chapter 3 – TestOut

3.0 DHCP
    3.1 Install DHCP
    3.2 DHCP Scopes
    3.3 DHCP Options
    3.4 Advanced Scopes
    3.5 Centralized DHCP and PXE
    3.6 DHCP Policies
    3.7 Advanced DHCP Management
    3.8 Maintain the DHCP Database

3.9 Troubleshoot DHCP

4.0 IP Address Management (IPAM)   Chapter 4 – TestOut
    4.1 IPAM Installation
    4.2 IPAM DNS and DHCP
    4.3 Advanced IPAM Administration and Auditing

5.0 Routing and Remote Access (RRAS)   Chapter 5 – TestOut
    5.1 Routing
    5.2 Install VPN
    5.3 VPNs
    5.4 Connection Profiles

6.0 DirectAccess (DA)   Chapter 6 – TestOut
    6.1 DirectAccess Installation
    6.2 DirectAccess Troubleshooting

Week 5

7.0 Network Policy Server (NPS)   Chapter 7 – TestOut
    7.1 Install Network Policy Server (NPS)
    7.2 NPS Templates
    7.3 NPS Network Policies
    7.4 NPS Connection Request Policies
    7.5 RADIUS Accounting
    7.6 Manage NPS Policies

Week 6

8.0 Distributed File System (DFS) and BranchCache   Chapter 8 – TestOut
    8.1 Distributed File System (DFS) Namespaces
    8.2 Configure DFS Replication
    8.3 Optimize DFS Replication
    8.4 Manage the DFS Replication Database
    8.5 BranchCache Installation and Configuration

9.0 High Performance Network Solutions   Chapter 9 – TestOut
    9.1 NIC Teaming and Switch Embedded Teaming (SET)
    9.2 QoS with Data Center Bridging (DCB)
    9.3 Virtual Machine Queue (VMQ) and Receive Side Scaling (RSS)
    9.4 SMB Direct and SMB Multichannel
    9.5 Single-Root IO Virtualization (SR-IOV)

Week 7

10.0 Implement Software-Defined Networking (SDN)   Chapter 10 – TestOut
    10.1 Implement SDN
    10.2 Implement Hyper-V Network Virtualization (HNV)
    10.3 Implement Software Load Balancer (SLB)

10.4 Implement Windows Server Gateways
10.5 Implement Data Center Firewall Policies

Week 8

1.0 Introduction - Linux OS – Module 1   Module 1/2/3 - Cisco

1.1 Introduction
1.2 Linux Evolution and Popular Operating Systems
1.3 Choosing an Operating System

2.0 Open Source Applications and Licenses – Module 2
2.1 Introduction
2.2 Major Open Source Applications
2.3 Understanding Open Source Software and Licensing

3.0 Using Linux – Module 3
3.1 Introduction
3.2 Graphical vs. Non-Graphical Mode
3.3 Command Line
3.4 Virtualization and Cloud Computing
3.5 Using Linux for Work
3.6 Keeping Your Linux Computer Safe
3.7 Protecting Yourself

Week 9   Modules 4/5 - Cisco

4.0 Command Line Skills – Module 4
4.1 Introduction
4.2 Command Line Interface (CLI)
4.3 Accessing a Terminal
4.4 Command history
4.5 Introducing BASH shell variables
4.6 PATH variable
4.7 export Command
4.8 which Command
4.9 type Command
4.10 Aliases
4.11 Globbing
4.12 Quoting
4.13 Control Statements

5.0 Getting Help – Module 5
5.1 Introduction
5.2 man Pages
5.3 info Command
5.4 Additional Sources of Help
5.5 Finding Commands and Documentation

Week 10   Modules 6/7 – Cisco

6.0 Working with Files and Directories – Module 6
    6.1 Introduction
    6.2 Understanding Files and Directories
    6.3 Listing Files in a Directory
    6.4 Copying Files
    6.5 Moving Files
    6.6 Moving Files While Renaming
    6.7 Creating Files
    6.8 Removing Files
    6.9 Removing Directories
    6.10 Making Directories

7.0 Archiving and Compression – Module 7
    7.1 Introduction
    7.2 Compressing files
    7.3 Archiving Files
    7.4 ZIP files

Week 11   Modules 8/9 - Cisco

8.0 Pipes, Redirection, and REGEX – Module 8
    8.1 Introduction
    8.2 Command Line Pipes
    8.3 I/O Redirection
    8.4 Searching for Files Using the Find Command
    8.5 Viewing Files Using the less Command
    8.6 Revisiting the head and tail Commands
    8.7 Sorting Files or Input
    8.8 Viewing File Statistics With the wc Command
    8.9 Using the cut Command to Filter File Contents
    8.10 Using the grep Command to Filter File Contents
    8.11 Basic Regular Expressions
    8.12 Extended Regular Expressions
    8.13 xargs Command

9.0 Basic Scripting – Module 9
    9.1 Introduction
    9.2 Shell Scripts in a Nutshell
    9.3 Editing Shell Scripts
    9.4 Scripting Basics

Week 12   *Complete Module 10 on your own.*

11.0 Managing Packages and Processes – Module 11   Modules 11/12 - Cisco
    15.1 Introduction
    11.2 Package Management
    11.3 Linux Kernel
    11.4 Process Hierarchy
    11.5 ps (Process) Command
    11.6 top Command

Week 13   Modules 13/14 - Cisco

Week 14   Modules 15/16 - Cisco

21.0 Review

Lab Schedule

Week 1 – Introduction / Hyper-V / Active Directory
- Create Virtual Machines
- Windows Server Installation

Week 2 – DNS
- DNS Forwarding and Zones
- Records and DNS Tools

Week 3 – Addressing and DHCP
- Network Configuration
- DHCP Role

Week 4 – IPAM and Remote Access
- Routing and Remote Access
- Virtual Private Networks

Week 5 – Mid Term
- Mid Term Exam (2 hours)
- Second Server Configuration

Week 6 – NPS
- Network Policy Server
- RADIUS

Week 7 – NIC Teaming
- Configure NIC Teaming

Week 8 – Final Exam for Server / Using Linux
- Server Final (2 hours)
- Introduction to Linux

Week 9 – Command Line / Help
- Linux Command Line Basics
- Getting Help

Week 10 – Files and Directories / Archiving / Compression
- Working with Files and Directories
- Archiving and Compression

Week 11 – Mid Term / Pipes / Redirection / Scripting
- Mid Term Exam (2hours)
- Pipes, Redirection and REGEX
- Basic Scripting

Week 12 – Packages and Processes / Network Configuration
- Managing Packages and Processes
- Network Configuration

Week 13 – System and User Security / User Accounts
- System and User Security
- User Accounts

Week 14 – Ownership and Permissions / Securing Permissions / File Locations / Cleanup
- Ownership and Permissions
- Securing Permissions, Links, and File Locations
- Cleanup

Basis of Student Assessment (Weighting)

Evaluation for this course will be a combined total of theory and laboratory marks as given below:

Marking Criteria
    Theory
        D2L Assignments -------------------------- 10%
        Quizzes --------------------------------------10%
        Term Test 1 (Server) ---------------------- 10%
        Term Test 2 (Linux) ----------------------- 10%
        Final 1 (Server) ----------------------------- 20%
        Final 2 (Linux) ------------------------------- 20%
                Total Theory   ⟶   80 %
    Laboratory
        Online Labs ------------------------------ 10%
        In-class Labs Completion--------------- 10%
                Total Lab   ⟶   20 %
                Total Mark   ⟶   100 %

D2L Assignments are weekly assignments that must be completed and submitted to the correct dropbox by Sunday midnight each week. Missing, late, or incomplete assignments will be given a grade of zero.

Chapter quizzes will be based on the online TestOut material completed in class via D2L and on the Linux material through the Cisco LPI website.

There will be one term test for each topic – Server and Linux – spaced approximately half way through each topic – 5th and 12th weeks of the course and one final exam at the end of the server material and at the end of the course on the Linux material.

The lab mark will consist of:

Online Labs – there are many virtual lab activities (TestOut) that will need to be completed throughout the course. Virtual lab activities need to be completed by Sunday midnight of the corresponding week. Missing, late, or incomplete labs will be given a grade of zero.

Completion of Labs – In-class labs must be completed by the end of the week and submitted to the correct dropbox by Sunday midnight each week. Missing, Late, or incomplete labs will be given a grade of zero.

It is the student responsibility to read the online Curriculum (TestOut or Linux) for that week in advance in order to develop a clear understanding of the content covered in class and lab.

Please note the following:

1. A grade of 50% or better is required in all assessment items above to be able to pass the course.
2. No late materials will be accepted past midnight of the last day of the course.
3. No opportunity will be available to write missed quizzes.
4. Attendance and completion of all lab material is mandatory to pass the course.

Grading System

| X | Standard Grading System (GPA) |

| | Competency Based Grading System |

Recommended Materials or Services to Assist Students to Succeed Throughout the Course

LEARNING SUPPORT AND SERVICES FOR STUDENTS

There are a variety of services available for students to assist them throughout their learning. This information is available in the College Calendar, Student Services or the College web site at http://www.camosun.bc.ca

STUDENT CONDUCT POLICY

There is a Student Conduct Policy. It is the student's responsibility to become familiar with the content of this policy. The policy is available in each School Administration Office, Registration, and on the College web site in the Policy Section.
http://www.camosun.bc.ca/policies/policies.html

A. **GRADING SYSTEMS** *http://www.camosun.bc.ca/policies/policies.php*

The following grading system is used at Camosun College:

1. Standard Grading System (GPA)

Percentage	Grade	Description	Grade Point Equivalency
90-100	A+		9
85-89	A		8
80-84	A-		7
77-79	B+		6
73-76	B		5
70-72	B-		4
65-69	C+		3
60-64	C		2
50-59	D		1
0-49	F	Minimum level has not been achieved.	0