

COURSE ELT3310: NETWORK OPERATING SYSTEMS**Level:** Advanced**Theme:** Computer Networking Systems**Prerequisite:** ELT2310: Network Structures, ELT2320: Network Media & Devices, ELT2330: OSI Model (Open System Interconnection), ELT2340: Network Protocols, ELT2350: Local Area Networks**Description:** Students examine the features, advantages and disadvantages of major network operating systems, and the criteria involved in selecting network operating systems that are appropriate in specific networking environments. They develop knowledge and skills required to install and configure different network and client operating systems, and develop a strategy for troubleshooting problems resulting from the installation of operating system software.**Parameters:** Designed to be delivered in conjunction with other advanced level courses in the Computer Networking Systems theme. Schools have the option of delivering courses within this theme in conjunction with one or more Project courses from the Career Transitions theme if they wish to extend learning and/or address other vendor-specific technologies.

Access to a computer work centre equipped with networking hardware, software, tools and consumable supplies, and to instruction from an individual with specialized knowledge and skills in computer networking.

Particular emphasis is placed on current versions of commonly used network operating systems (e.g., Microsoft Windows, Novell NetWare, Apple Macintosh, UNIX/Linux) and client operating systems (e.g., Microsoft Windows, Apple Macintosh, UNIX/Linux). Students model and assume personal responsibility for ethical behaviour in their use of networking technologies and in their access to electronic sources of information. They also demonstrate an understanding of industry-based policies regarding network use and security.

Curriculum and Assessment Standards

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<i>The student will:</i> <ul style="list-style-type: none"> identify the generic functions and administrative tasks common to all network operating systems 	<i>Assessment of student achievement should be based on:</i> <ul style="list-style-type: none"> a teacher-directed evaluation designed to test knowledge of: <ul style="list-style-type: none"> differences between peer-to-peer and server-based networks, and the role of a network operating system in server-based networks generic tasks and administrative functions common to all network operating systems 	5

COURSE ELT3310: NETWORK OPERATING SYSTEMS (continued)

Curriculum and Assessment Standards

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> • describe and compare specific capabilities and functions of current versions of network operating systems in common use 	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> • a presentation or project designed to describe and compare the capabilities and functions of current versions of network operating systems in common use; e.g.: <ul style="list-style-type: none"> – Microsoft Windows – Novell NetWare – Apple Macintosh – UNIX/Linux 	20
<ul style="list-style-type: none"> • identify and analyze criteria relevant to planning for, selecting and implementing a network operating system 	<ul style="list-style-type: none"> • a presentation or project designed to demonstrate ability to: <ul style="list-style-type: none"> – explain factors and considerations involved in network planning – identify criteria involved in selecting a network operating system – select network operating systems options that are appropriate in specific networking environments – analyze the needs of a small company and recommend an appropriate network operating system solution 	15
<ul style="list-style-type: none"> • demonstrate ability to install and configure two or more network operating systems and compatible network clients 	<ul style="list-style-type: none"> • a series of projects designed to demonstrate ability to: <ul style="list-style-type: none"> – install and configure two or more different network operating systems – install and configure a network client to interact with and access the resources of each network operating system that is installed 	30
<ul style="list-style-type: none"> • demonstrate ability to analyze and troubleshoot connectivity problems related to the installation of operating system software 	<ul style="list-style-type: none"> • demonstrated ability to analyze and troubleshoot connectivity problems resulting from the installation of network and/or client operating systems, within the context of the installation projects above, including: <ul style="list-style-type: none"> – outlining a general strategy for troubleshooting network problems – applying the troubleshooting strategy in specific scenarios 	25

COURSE ELT3310: NETWORK OPERATING SYSTEMS (continued)

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> demonstrate established laboratory procedures and safe work practices 	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> observed performance in following: <ul style="list-style-type: none"> established laboratory procedures safety regulations specific to the networking technologies being used <p><i>Assessment Tools</i> <i>Assessment Checklist: Network Operating Systems (ELT3310-1)</i> <i>Assessment Checklist: Laboratory Procedures and Safety Practices, ELTPSP</i></p> <p><i>Standard</i> <i>Performance rating of 3 on each criterion</i></p>	5
<ul style="list-style-type: none"> demonstrate basic competencies. 	<ul style="list-style-type: none"> observations of individual effort and interpersonal interaction during the learning process. <p><i>Assessment Tool</i> <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	Integrated throughout

Concept	Specific Outcomes	Notes
NOS Functions and Capabilities	<p><i>The student should:</i></p> <ul style="list-style-type: none"> compare and contrast peer-to-peer and server-based networks describe the role of a network operating system (NOS) in server-based networks; e.g.: <ul style="list-style-type: none"> connecting computers and peripheral devices, and servicing requests for resources managing access to data and shared resources monitoring performance and activities of the network identify generic tasks and administrative functions common to all network operating systems; e.g.: <ul style="list-style-type: none"> file services print services directory services security services messaging services routing services network administrative services 	<p>Compare the features and functions of commonly used network operating systems with respect to:</p> <ul style="list-style-type: none"> network services administrative functions native protocols compatible clients configuration. <p>Distinguish between the functions of a:</p> <ul style="list-style-type: none"> network operating system client operating system multipurpose operating system.

COURSE ELT3310: NETWORK OPERATING SYSTEMS (continued)

Concept	Specific Outcomes	Notes
<p>NOS Functions and Capabilities (continued)</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> – • describe and compare the capabilities and functions of network operating systems in common use; e.g., Microsoft Windows, Novell NetWare, Apple Macintosh and UNIX/Linux, with respect to: <ul style="list-style-type: none"> – evolution and major features – associated protocols and interoperability – client support – authentication and security – file, print and directory services – routing services. 	<p>Current versions of major operating systems encourage the use of TCP/IP.</p>
<p>Planning for NOS Implementation</p>	<ul style="list-style-type: none"> • identify criteria involved in network planning; e.g.: <ul style="list-style-type: none"> – need for and benefits of network planning – specific criteria and steps involved in network planning • explain criteria involved in selecting a network operating system; e.g.: <ul style="list-style-type: none"> – client needs/required services – user base and budget – client software and associated protocols – hardware requirements – client licensing • identify hardware devices and software tools used in network planning • identify key differences among common network operating systems • identify network operating systems that are appropriate in specific networking environments • analyze the needs of a small company and recommend an appropriate network operating system 	<p>Choosing a network operating system can be a complex task. Although all operating systems enable users to share resources on a network, some operating systems are more suited to the needs of specific networking environments than others.</p> <p>Discuss applications of network design software.</p> <p>Examine the pros and cons of each network operating system. Identify operating systems that are most appropriate in specific networking environments.</p>

COURSE ELT3310: NETWORK OPERATING SYSTEMS (continued)

Concept	Specific Outcomes	Notes
<p>NOS Installation and Configuration</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> • install and configure two or more different network operating systems: <ul style="list-style-type: none"> – partition and format drive – name server and network – install and configure protocol – select network services – establish and confirm licensing – set administrative passwords – install peripherals – share resources and set permissions • install and configure a network client to interact with and access the resources of each network operating system that is installed: <ul style="list-style-type: none"> – configure an appropriate client operating system – install and configure protocol – assign computer/host name and user name – select network services – set an acceptable/secure password • identify the function of and configure common network services; e.g.: <ul style="list-style-type: none"> – Dynamic Host Configuration Protocol (DHCP) – Bootstrap Protocol (BOOTP) – Domain Name Service (DNS) – Network Address Translation/Internet Connection Sharing (NAT/ICS) – Windows Internet Naming Service (WINS) – Simple Network Management Protocol (SNMP) • demonstrate processes for: <ul style="list-style-type: none"> – sharing and accessing a folder – assigning permissions – sharing a printer. 	<p>Networking computers requires that:</p> <ul style="list-style-type: none"> • the server is configured with a network operating system • each client computer is configured with a client operating system • both server and client computers are configured with an appropriate network protocol. <p>Client operating systems could include:</p> <ul style="list-style-type: none"> • Windows • UNIX/Linux • Macintosh. <p>Discuss the function of the redirector in client software.</p>

COURSE ELT3310: NETWORK OPERATING SYSTEMS (continued)

Concept	Specific Outcomes	Notes
<p>NOS Troubleshooting</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> • outline a general strategy for troubleshooting network problems; e.g.: <ul style="list-style-type: none"> – establish the symptoms – identify the affected area – establish what has changed – select the most probable cause – implement a solution – test the results – recognize the potential effects of the solution – document the solution • analyze and troubleshoot connectivity problems resulting from the installation of a network and/or client operating system; i.e.: <ul style="list-style-type: none"> – use appropriate diagnostic commands and utilities – interpret visual indicators – predict the impact of adding, removing and/or modifying network services • use protocol analysis software to analyze basic network utilization and frame statistics. 	<p>Identify tests that are used to determine if a link is operational.</p> <p>Demonstrate applications of:</p> <ul style="list-style-type: none"> • telnet • ping command • trace command • Internet Protocol (IP) route command.