

COURSE ELT3340: INTERNET PROCESSES**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 apply their knowledge of wide area network (WAN) technologies to an Internet environment. Course content focuses on the significance and utility of Internet Protocol (IP) addressing schemes in Internet communication and on the function of WAN protocols and services in providing Internet access. Students develop knowledge of internetworking career paths and related educational opportunities.**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 reinforcing and applying previously developed knowledge and skills in an Internet environment, and on explaining how and why particular technologies are employed. 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
<p><i>The student will:</i></p> <ul style="list-style-type: none"> describe and analyze the historical roots, basic architecture and functions of the Internet in global communication 	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> a test, presentation or project designed to address the: <ul style="list-style-type: none"> – origin and evolution of the Internet – basic architecture of the Internet – nature and function of services provided by the Internet – contributions of emerging technologies in global Internet communication 	15

COURSE ELT3340: INTERNET PROCESSES (continued)

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> • develop a rationale for, and demonstrate the use of, IP addressing schemes, subnets and subnet masks in Internet communication • explain and compare the function of selected WAN protocols and services, and their utility in providing access to the Internet • identify and assess methods for connecting a local network infrastructure with the Internet • identify and describe internetworking career paths and employment opportunities, as well as related education and certification requirements 	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> • a presentation or project designed to demonstrate: <ul style="list-style-type: none"> – the nature of IP addressing, subnets and subnet masks, and their use with IP networks – ability to identify classes of IP addresses, to subnet addresses, to identify subnet masks, and to optimize host/subnet schemes – problems and solutions associated with traditional IP addressing • a presentation or project that explains and compares, within the context of an Internet environment, common WAN protocols and services with respect to: <ul style="list-style-type: none"> – function – architecture – configuration – benefits – possible design issues • a project designed to: <ul style="list-style-type: none"> – identify and assess methods for connecting a network to the Internet – plan and implement an appropriate strategy for Internet connectivity, given needs within a local network for access to the Internet • a project or report identifying technical and professional internetworking career paths and employment opportunities, and related education and certification requirements. The student should also organize a portfolio and résumé suitable to present qualifications for a selected entry-level networking position 	<p>30</p> <p>25</p> <p>15</p> <p>10</p>

COURSE ELT3340: INTERNET PROCESSES (continued)

Concept	Specific Outcomes	Notes
Nature and Origin of the Internet (continued)	<p><i>The student should:</i></p> <ul style="list-style-type: none"> • identify and explain contributions of emerging technologies in global Internet communication; e.g.: <ul style="list-style-type: none"> – Internet over Satellite (IoS) – Internet telephony. 	<p>Research advantages offered by IP for unifying data and voice networks. Discuss benefits and applications of Voice over IP (VoIP) products.</p>
IP Addressing Schemes	<ul style="list-style-type: none"> • explain the function of Internet Protocol (IP) addressing, subnets and subnet masks in Internet communication • describe methods for assigning an IP address • identify classes of IP addresses and the purpose of reserved address space • subnet a Class A, B or C address into a given number of subnetworks • determine the subnet mask for a subnetted network • optimize a host/subnet scheme • compare connectionless and connection-oriented networking processes • identify problems and solutions associated with traditional IP addressing • identify advantages of Internet Protocol version 6 (IPv6) over Internet Protocol version 4 (IPv4). 	<p>Compare IP multicasting, unicasting and broadcasting.</p> <p>Perform the Boolean AND function to obtain a network number.</p> <p>Compare public and private addresses.</p>
WAN Protocols and Services	<ul style="list-style-type: none"> • explain the significance of the Transmission Control Protocol/Internet Protocol (TCP/IP) suite within an Internet environment 	<p>Provide opportunities for students to apply previously developed knowledge of WAN protocols to an Internet environment. Relate each protocol to:</p> <ul style="list-style-type: none"> • its function within the context of the Internet • relevant layers of the OSI model.

COURSE ELT3340: INTERNET PROCESSES (continued)

Concept	Specific Outcomes	Notes
<p>WAN Protocols and Services (continued)</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> • describe common WAN protocols and services, including Dynamic Host Configuration Protocol (DHCP), Address Resolution Protocol (ARP), Domain Name Service (DNS), Integrated Services Digital Network (ISDN), and Point-to-Point Protocol (PPP), with respect to: <ul style="list-style-type: none"> – function – architecture – configuration – benefits – possible design issues. 	<p>Identify services from the TCP/IP suite that are used in:</p> <ul style="list-style-type: none"> • file transfer • electronic mail • the World Wide Web.
<p>Internet Access</p>	<ul style="list-style-type: none"> • identify criteria involved in network planning • identify and assess options for connecting a network to the Internet; i.e.: <ul style="list-style-type: none"> – accessing the Internet backbone – choosing an Internet service provider (ISP) – selecting a WAN connection strategy – procuring a domain name – obtaining the required number of IP addresses – addressing security issues • describe methods for securing IP traffic between a local network and a service provider; e.g.: <ul style="list-style-type: none"> – firewalls – Internet Protocol Security (IPSec) – proxy servers • explain applications of Network Address Translation (NAT) in sharing an Internet connection • plan and implement a strategy for Internet connectivity, given needs within a local network for access to the Internet. 	<p>Discuss factors to consider when selecting an ISP; e.g.:</p> <ul style="list-style-type: none"> • the ISP's service • redundant connections • proximity to an NAP. <p>Identify pros and cons associated with WAN technologies in connecting to the Internet; e.g.:</p> <ul style="list-style-type: none"> • T-lines • Frame Relay • Digital Subscriber Line.

COURSE ELT3340: INTERNET PROCESSES (continued)

Concept	Specific Outcomes	Notes
Career Paths	<p><i>The student should:</i></p> <ul style="list-style-type: none"> • identify technical and professional internetworking career paths and employment opportunities • place internetworking job titles in a progression sequence • write a detailed internetworking position description • describe related post-secondary and/or industry education/certification requirements and opportunities • organize a portfolio and résumé suitable to present qualifications for a selected entry-level networking position. 	<p>Plan for individual/group research and presentations that address:</p> <ul style="list-style-type: none"> • job description • employment market • education/training • salary range. <p>Research and describe available industry networking certification tracks.</p> <p>Arrange/facilitate:</p> <ul style="list-style-type: none"> • information interviews • work study/experience • job shadowing.