COURSE OUTLINE: NASA206 - NETWORK DESIGN

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Approved: Corey Meunier, Dean, Technology, Trades, and Apprenticeship

Course Code: Title	NASA206: ENTERPRISE NETWORK DESIGN
Program Number: Name	2196: NETWRK ARCH & SEC AN
Department:	COMPUTER STUDIES
Academic Year:	2023-2024
Course Description:	This course will examine the business-needs based design of enterprise networks. Analysis will focus on selecting technologies to securely implement backbone, distribution and access layers utilizing the most appropriate protocols. Models are used to answer management, security, resiliency, and flexibility concerns in office, mobile, virtual, cloud and data centre environments.
Total Credits:	2
Hours/Week:	3
Total Hours:	42
Prerequisites:	There are no pre-requisites for this course.
Corequisites:	There are no co-requisites for this course.
Vocational Learning Outcomes (VLO's) addressed in this course: Please refer to program web page for a complete listing of program outcomes where applicable.	**2196 - NETWRK ARCH & SEC AN** VLO 3 — Develop a security architecture plan to incorporate both perimeter and endpoint security controls and devices to provide layers of security. VLO 4 — Design multi-site enterprise operating system infrastructures using a security architecture framework.
Essential Employability Skills (EES) addressed in this course:	EES 1 — Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience. EES 2 — Respond to written, spoken, or visual messages in a manner that ensures effective communication. EES 4 — Apply a systematic approach to solve problems. EES 5 — Use a variety of thinking skills to anticipate and solve problems. EES 6 — Locate, select, organize, and document information using appropriate technology and information systems. EES 7 — Analyze, evaluate, and apply relevant information from a variety of sources. EES 8 — Show respect for the diverse opinions, values, belief systems, and contributions of others. EES 9 — Interact with others in groups or teams that contribute to effective working relationships and the achievement of goals. EES 10 — Manage the use of time and other resources to complete projects. EES 11 — Take responsibility for ones own actions, decisions, and consequences.

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Course Evaluation:	Passing Grade: 50%, D
	A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.
Other Course Evaluation & Assessment Requirements:	A+ = 90-100% A = 80-89% B = 70-79% C = 60-69% D = 50-59% F < 50%
	Students are expected to be present to write all tests in class, unless otherwise specified. If a student is unable to write a test due to illness or a legitimate emergency, that student must contact the professor prior to class and provide reasoning. Should the student fail to contact the professor, the student shall receive a grade of zero on the test.
	If a student is not present 10 minutes after the test begins, the student will be considered absent and will not be given the privilege of writing the test. Students exhibiting academic dishonesty during a test will receive an automatic zero. Please refer to the College Academic Dishonesty Policy for further information.
	In order to qualify to write a missed test, the student shall have: a.) attended at least 75% of the classes to-date. b.) provide the professor an acceptable explanation for his/her absence. c.) be granted permission by the professor.
	NOTE: The missed test that has met the above criteria will be an end-of-semester test. Labs / assignments are due on the due-date indicated by the professor. Notice by the professor will be written on the labs / assignments and verbally announced in the class. Labs and assignments that are deemed late will have the following penalty: 1 day late - 10% reduction, 2 days late, 20% reduction, 3 days late, 30% reduction. After 3 days, no late assignments and labs will be accepted. It is the responsibility of the student who has missed a class to contact the professor immediately to obtain the lab / assignment. Students are responsible for doing their own work. Labs / assignments that are handed in and are deemed identical or near identical in content may constitute academic dishonesty and result in a zero grade.
	Students are expected to be present to write in-classroom quizzes. There are no make-up options for missed in-class quizzes.
	Students have the right to learn in an environment that is distraction-free, therefore, everyone is expected to arrive on-time in class. Should lectures become distracted due to students walking in late, the professor may deny entry until the 1st break period, which is 50 minutes into the class or until that component of the lecture is complete.
	The total overall average of test scores combined must be 50% or higher in order to qualify to pass this course. In addition, combined tests, Labs / Assignments total grade must be 50% or higher.

Course Outcomes and Learning Objectives:	Course Outcome 1	Learning Objectives for Course Outcome 1
	1. Analyze Business Goals, Constraints, Technical Goals and Tradeoffs.	1.1 demonstrate an understanding of design methodology and life cycles 1.2 analyze business goals and constraints

	1.3 identify scope of design projects and customer network applications 1.4 describe and explain Network Scalability and Availability 1.5 describe and explain Network Performance, Security and Manageability 1.6 decide and explain network design tradeoffs 1.7 create and apply technical goals checklist
Course Outcome 2	**Learning Objectives for Course Outcome 2**
2. Characterizing the Existing Internetwork and Network Traffic	2.1 characterize a network infrastructure: 2.1.1 develop a network map, including addressing, naming, wiring, etc. 2.1.2 checking Architectural and Environmental Constraints 2.2 checking the health of the existing internetwork: 2.2.1 develop a baseline of network performance 2.2.2 analyze network availability, utilization, accuracy, efficiency 2.2.3 checking status of major routers, switches and firewalls 2.3 utilize a network health checklist 2.4 characterize network traffic flow, load and behaviour 2.5 describe and characterize quality of service requirements (QoS) 2.6 utilize a network traffic checklist
Course Outcome 3	**Learning Objectives for Course Outcome 3**
3. Logical Network Design	3.1 describe and apply the network hierarchical design model 3.2 describe modular network designs 3.3 describe and apply various key design topologies: 3.3.1 redundant 3.3.2 campus network 3.3.3 enterprise edge 3.3.4 security 3.4 describe guidelines for assigning IP addresses 3.5 describe guidelines for naming models 3.6 describe and apply the decision making process of network design 3.7 identify, decide and implement switching and routing protocols 3.8 analyze, develop and maintain security policies 3.9 describe and implement security mechanisms 3.10 understand and describe modular security design
Course Outcome 4	**Learning Objectives for Course Outcome 4**
4. Physical Network Design	4.1 describe and understand selecting technologies and devices for campus networks. 4.1.1 describe and implement LAN technologies 4.2 describe criteria for selecting campus network devices 4.3 describe criteria for selecting enterprise network devices: 4.3.1 remote access technologies 4.3.2 selecting remote access devices 4.3.3 WAN technologies 4.4 design and implement a campus and enterprise network

		design
	Course Outcome 5	**Learning Objectives for Course Outcome 5**
	5. Cloud Architecture	5.1 define and describe fundamentals of cloud architecture 5.1.1 analyze workload distribution 5.1.2 review resource pooling 5.1.3 analyze dynamic scalability 5.1.4 elastic resource capacity 5.1.5 service load balancing 5.1.6 review cloud bursting 5.1.7 elastic disk provisioning 5.1.8 redundant storage
	Course Outcome 6	**Learning Objectives for Course Outcome 6**
	6. IoT Architecture	6.1 define and describe IoT Architecture: 6.1.1 ITU-T IoT Reference Model 6.1.2 IoT World Forum Reference Model 6.2 define and describe IoT implementation: 6.2.1 IoTivity 6.2.2 Cisco IoT System 6.2.3 ioBridge
	Course Outcome 7	**Learning Objectives for Course Outcome 7**
	7. Software Defined Networking (SDN) / Network Functions Virtualization (NFV)	7.1 define and describe SDN and NFV 7.2 describe NFV design practices 7.3 describe SDN design practices: 7.3.1 placement of SDN elements 7.3.2 SDN controller functions 7.3.3 use of multiple SDN controllers
	Course Outcome 8	**Learning Objectives for Course Outcome 8**
	8. Testing, Optimizing and Documenting	8.1 describe the process of building and testing a prototype network 8.2 understand and apply writing and implementing a network test plan 8.3 define and describe tools for testing network designs 8.4 describe optimizing bandwidth usage 8.5 define and describe reducing serialization delay 8.6 define Cisco IOS features for optimizing network performance 8.7 describe and implement a customer request for proposal 8.8 describe and apply contents of a network design document

Evaluation Process and Grading System:

Evaluation Type	Evaluation Weight
Labs and Assignments	40%
Test #1	30%
Test #2	30%

Date: August 21, 2023

| **Addendum:** | Please refer to the course outline addendum on the Learning Management System for further information. |