2013

FANS 01305 - Network and Security Architecture - CVS Application

Fanshawe College

ONTARIO COLLEGES OF APPLIED ARTS AND TECHNOLOGY

CREDENTIALS VALIDATION SERVICE

APPLICATION FOR PROGRAM VALIDATION

This proposal will be sent to MTCU for Approval for Funding __X__Yes _____ No

1. College: Fanshawe College
2. College contact person responsible for this proposal: Name: David Belford Title: Dean, Faculty of Business Telephone: 519-452-4430 (ext:3371) Electronic mail: dbelford@fanshawec.ca
3. Proposed Program Title: Network and Security Architecture
4. Proposed Credential: (please indicate below) Local Board Approved Certificate ☐ Ontario College Certificate ☐ Ontario College Diploma ☐ Ontario College Advanced Diploma ☐ Ontario College Graduate Certificate X
5. Proposed Program Outcomes: Please complete and attach the two Program Maps (Appendix A - Form 1 and Form 2)
6. Proposed Program Description: Please complete and attach the Program Description Form (Appendix B)
7. Proposed Program Curriculum: Please complete and attach the Program Curriculum Form (Appendix C)
8. Proposed Program Certification/Accreditation: Please complete and attach the Regulatory Status Form (Appendix D)
9. Date of Submission: November 20, 2013
10. Date of CVS Response: December 9, 2013

11. Validation Decision:

☐ Proposal Validated (APS Number: **FANS 01305**)

_____

Signed on behalf of CVS: Tim Klassen

Send the completed form and required appendices to: klassen@ocqas.org . For detailed information on how to complete the Application for Program Validation, please refer to the Application Instructions document. For any additional information contact: The Ontario College Quality Assurance Service, 20 Bay Street, Suite 1600, Toronto, ON M5J 2N8; or by telephone at (647) 258-7682.

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APPENDIX A - PROGRAM MAPS
(Vocational Program Outcomes & Essential Employability Skills Outcomes)

Vocational Program Learning Outcomes:

Form 1 (attached) is provided to assist you in mapping your proposed program vocational learning outcomes against existing vocational outcomes found in either Provincial Program Standards or in Provincial Program Descriptions. When completing this form, please be sure to include the MTCU code (where applicable) for the program category being referenced.

Where there is a relevant Provincial Program Standard, the approved Vocational Learning Outcomes must appear in the first column, followed by your proposed program vocational learning outcomes.

Where there are no Provincial Program Standards, the first column will contain program outcomes from the Provincial Program Description. Again, your proposed program vocational learning outcomes will be added in the middle column.

NOTE: *Both these types of documents can be obtained from staff at the CVS or at the Colleges Unit, MTCU. Electronic copies of the Program Descriptions can be found at http://caat.edu.gov.on.ca/HTMLpages/Programs while electronic copies of the Provincial Program Standards can be found at http://www.edu.gov.on.ca/eng/general/progstan/index*

If there are no such programs in the province, this information will be provided in the left column. The proposed vocational program outcomes must be written in the middle column.

The last column will contain a list of the relevant curriculum proposed in your program to address the outcome in a manner that ensures the graduate will have reliably demonstrated the required skill or ability. Course numbers or course codes, corresponding to those provided in your list of courses (Appendix C), are sufficient in this column.

Essential Employability Skills Outcomes:

A mapping of the Essential Employability Skills (EES) will be done on Form 2 (attached).

The instructions / requirements for this map are the same as for the Vocational Program Map. The first three columns contain the approved skill categories, the defining skills, and the EES learning outcomes. The last column will contain the proposed curriculum (as listed in Appendix C) that will ensure the meeting of these outcomes.

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APPENDIX A - PROGRAM MAPS

Form 1 - Vocational Program Outcomes

PROVINCIAL PROGRAM STANDARD VOCATIONAL LEARNING OUTCOMES / PROVINCIAL PROGRAM DESCRIPTION OUTCOMES	**PROPOSED PROGRAM VOCATIONAL LEARNING OUTCOMES**	**PROPOSED PROGRAM CURRICULUM (COURSE NAME & NUMBER) ADDRESSING THE OUTCOME** (From Appendix C)
	1. Design an enterprise network by applying knowledge of networking and routing protocols.	INFOXXXX Enterprise Network Design INFOXXXX Network Protocols INFOXXXX Securing Routers and Switches INFOXXXX Firewalls INFOXXXX Windows Active Directory INFO6010 CISSP Prep INFOXXXX Wireless Networks INFOXXXX Virtual Private Networks INFOXXXX Intrusion Prevention Systems INFOXXXX Wireless Networks INFOXXXX IT Service Management
	2. Perform network monitoring, analysis and troubleshooting to determine efficient and secure operations.	INFOXXXX Enterprise Network Design INFOXXXX Network Protocols INFOXXXX Securing Routers and Switches INFOXXXX Firewalls INFOXXXX Intrusion Prevention Systems INFOXXXX Web Security
	3. Develop a security architecture plan to	INFOXXXX Enterprise Network Design

	incorporate both perimeter and endpoint security controls and devices to provide layers of security.	INFOXXXX Network Protocols INFOXXXX Firewalls INFOXXXX Wireless Networks INFOXXXX Securing Routers and Switches INFO6010 CISSP Prep INFOXXXX Virtual Private Networks INFOXXXX Intrusion Prevention Systems
	4. Design multi-site enterprise operating system infrastructures using a security architecture framework.	INFOXXXX Enterprise Network Design INFOXXXX IT Service Management INFOXXXX Windows Active Directory INFOXXXX Virtualization
	5. Design a centrally managed wireless network topology that can accommodate remote sites incorporating current security standards.	INFOXXXX Enterprise Network Design INFOXXXX Wireless INFOXXXX IT Service Management
	6. Design and implement a virtualization and cloud computing focused infrastructure specifically addressing security risks associated with incorporating virtualization into an organizations infrastructure.	INFOXXXX Enterprise Network Design INFOXXXX Windows Active Directory INFOXXXX Virtualization
	7. Deploy servers to host web applications, focusing on securing the server and web applications from identified security risks.	INFOXXXX Web Security INFOXXXX Network Protocols
	8. Identify and plan IT services that support business goals and objectives, and explain specific activities directly related to the delivery and support of the services.	INFOXXXX Enterprise Network Design INFOXXXX Virtualization INFOXXXX IT Service Management INFO6010 CISSP Prep

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APPENDIX A - PROGRAM MAPS

Form 2 - Essential Employability Skills Outcomes

SKILL CATEGORIES	**DEFINING SKILLS** **Skill areas to be demonstrated by the graduates**	**ESSENTIAL EMPLOYABILITY SKILLS OUTCOMES** **The graduate has reliably demonstrated the ability to:**	**PROPOSED CURRICULUM (COURSE NAME & NUMBER) ADDRESSING THE OUTCOMES** (From Appendix C)
COMMUNICATION	Reading Writing Speaking Listening Presenting Visual Literacy	communicate clearly, concisely, and correctly in the written, spoken, and visual form that fulfils the purpose and meets the needs of the audience	INFOXXXX IT Service Management INFO6010 CISSP Prep
		respond to written, spoken, or visual messages in a manner that ensures effective communication	INFOXXXX IT Service Management INFO6010 CISSP Prep
NUMERACY	Understanding and applying mathematical concepts and reasoning Analysing and using numerical data Conceptualizing	execute mathematical operations accurately	INFOXXXX Enterprise Network Design INFOXXXX Network Protocols INFOXXXX Intrusion Prevention Systems
CRITICAL THINKING & PROBLEM	Analysing Synthesizing Evaluating	apply a systematic approach to solve problems	INFOXXXX Enterprise Network Design INFOXXXX Network Protocols

SKILL CATEGORIES	DEFINING SKILLS Skill areas to be demonstrated by the graduates	ESSENTIAL EMPLOYABILITY SKILLS OUTCOMES The graduate has reliably demonstrated the ability to:	PROPOSED CURRICULUM (COURSE NAME & NUMBER) ADDRESSING THE OUTCOMES (From Appendix C)
SOLVING	Decision-making Creative and innovative thinking		INFOXXXX Securing Routers and Switches INFOXXXX Firewalls INFOXXXX Windows Active Directory INFOXXXX Wireless Networks INFOXXXX Virtual Private Networks INFOXXXX Intrusion Prevention Systems INFOXXXX Wireless Networks INFOXXXX IT Service Management INFO6010 CISSP INFOXXXX Web Security
		use a variety of thinking skills to anticipate and solve problems	INFOXXXX Enterprise Network Design INFOXXXX Network Protocols INFOXXXX Securing Routers and Switches INFOXXXX Firewalls INFOXXXX Windows Active Directory INFOXXXX Wireless Networks INFOXXXX Virtual Private Networks INFOXXXX Intrusion Prevention Systems INFOXXXX Wireless Networks INFOXXXX IT Service Management

SKILL CATEGORIES	DEFINING SKILLS Skill areas to be demonstrated by the graduates	ESSENTIAL EMPLOYABILITY SKILLS OUTCOMES The graduate has reliably demonstrated the ability to:	PROPOSED CURRICULUM (COURSE NAME & NUMBER) ADDRESSING THE OUTCOMES (From Appendix C)
			INFO6010 CISSP INFOXXXX Web Security
INFORMATION MANAGEMENT	Gathering and managing information Selecting and using appropriate tools and technology for a task or a project Computer literacy Internet skills	locate, select, organize, and document information using appropriate technology and information systems	INFOXXXX Enterprise Network Design INFOXXXX Network Protocols INFOXXXX Securing Routers and Switches INFOXXXX Firewalls INFOXXXX Windows Active Directory INFOXXXX Wireless Networks INFOXXXX Virtual Private Networks INFOXXXX Intrusion Prevention Systems INFOXXXX Wireless Networks INFOXXXX IT Service Management INFOXXXX Web Security
		analyse, evaluate, and apply relevant information from a variety of sources	INFOXXXX Network Protocols INFOXXXX IT Service Management INFO6010 CISSP
INTERPERSONAL	Team work Relationship management Conflict resolution Leadership Networking	show respect for the diverse opinions, values, belief systems, and contributions of others	INFOXXXX IT Service Management INFO6010 CISSP
		interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals	INFOXXXX Enterprise Network Design INFO6010 CISSP INFOXXXX IT Service Management INFOXXXX Web Security

SKILL CATEGORIES	**DEFINING SKILLS Skill areas to be demonstrated by the graduates**	**ESSENTIAL EMPLOYABILITY SKILLS OUTCOMES The graduate has reliably demonstrated the ability to:**	**PROPOSED CURRICULUM (COURSE NAME & NUMBER) ADDRESSING THE OUTCOMES** (From Appendix C)
PERSONAL	Managing self Managing change and being flexible and adaptable	manage the use of time and other resources to complete projects	INFOXXXX Enterprise Network Design INFOXXXX IT Service Management INFO6010 CISSP
	Engaging in reflective practices Demonstrating personal responsibility	take responsibility for one's own actions, decisions, and consequences	INFOXXXX Enterprise Network Design INFOXXXX IT Service Management INFO6010 CISSP

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APPENDIX B - PROGRAM DESCRIPTION

PROGRAM DESCRIPTION: (including occupational areas where it is anticipated graduates will find employment)

This program is designed to provide students with the knowledge and skills to analyze and design the operation of an Enterprise network. Security, and the varying components that are integral to multiple layered defense strategies, will be explored. Effective and secure delivery and support of IT services, that meet a broad spectrum of business needs, will be a core learning component of this program. The NASA program incorporates curriculum that prepares the student to obtain certification from Cisco Systems as a Cisco Certified Network Professional (CCNP) security specialist.

VOCATIONAL PROGRAM LEARNING OUTCOMES: (vocational program learning outcomes must be consistent with the requirements of the Credentials Framework for the proposed credential)

***The graduate has reliably demonstrated the ability to*:**

1. Design an enterprise network by applying knowledge of networking and routing protocols.
2. Perform network monitoring, analysis and troubleshooting to determine efficient and secure operations.
3. Develop a security architecture plan to incorporate both perimeter and endpoint security controls and devices to provide layers of security.
4. Design multi-site enterprise operating system infrastructures using a security architecture framework.
5. Design a centrally managed wireless network topology that can accommodate remote sites incorporating current security standards.
6. Design and implement a virtualization and cloud computing focused infrastructure specifically addressing security risks associated with incorporating virtualization into an organizations infrastructure.
7. Deploy servers to host web applications, focusing on securing the server and web from identified security risks.
8. Identify and plan IT services that support business goals and objectives, and explain specific activities directly related to the delivery and support of the services.

ADMISSION REQUIREMENTS:

Advanced diploma in Computer Systems Technology from an Ontario College of Applied Arts and Technology (CAAT) or equivalent diploma, OR University degree in network or computer engineering OR graduate certificate in information security OR an acceptable combination of related work experience and post-secondary education (as determined by the College).

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APPENDIX C - PROGRAM CURRICULUM

Semester	Course Code*	Course Title (and brief course description)
1	INFOXXXX	**Enterprise Network Design** This course will examine the design of an enterprise network implementing a core backbone with distribution and access layers. Analysis of the routing and switching protocols in the operation of the network will be studied. The design architecture will incorporate security devices from the network perimeter to host endpoint computers. Students will also design an IP addressing scheme for the network.
1	INFOXXXX	**Securing Routers & Switches** This course will study the procedures required to secure Cisco routers and switches. The curriculum will prepare the student to write the Cisco Secure exam which is part of the Cisco CCNP – Security certification
1	INFOXXXX	**Firewalls** This course will examine the use of firewall technologies to provide perimeter security to a network. The course will concentrate on the implementation and configuration of Cisco ASA firewalls. The curriculum will prepare the student to write the Cisco firewall exam which is part of the Cisco CCNP – Security certification.
1	INFOXXXX	**Windows Active Directory** Students will design and install a multi-site Windows Active Directory infrastructure. The design will focus on effective use of Group Policy for configuration management and security settings. In addition, students will learn to effectively plan and deploy a server infrastructure including Active Directory Certificate Services, network infrastructure services and network access services.
1	INFOXXXX	**Network Protocols** This course will analyze the protocols used on an enterprise network. Protocols will be implemented on a working network and the operation of the protocols for troubleshooting issues and the efficient operation of the network will be studied. Logging will be

		implemented on servers and network devices and the log information will to examine to determine the state of network operation.
1	**INFO6010**	**CISSP Prep** This course will prepare the student for the ICS^2 Certified Information Systems Security Professional (CISSP) or the Systems Security Certified Practitioner (SSCP) exam. The course will cover the 10 security domains outlined by the ICS^2.
2	**INFOXXXX**	**Virtual Private Networks** This course will study VPN technologies and the implementation and configuration of Cisco equipment to create virtual private networks. The curriculum will prepare the student to write the Cisco VPN exam which is part of the Cisco CCNP – Security certification
2	**INFOXXXX**	**Intrusion Prevention Systems** This course will explore the principles of Intrusion Prevention Systems. The implementation and configuration of Cisco IPS to secure the network will be studied. The curriculum will prepare the student to write the Cisco IPS exam which is part of the Cisco CCNP – Security certification.
2	**INFOXXXX**	**Wireless Networks** Wireless technology based on the IEEE802.11 protocols will be examined and the security issues with wireless networks will be studied. The student will deploy and implement wireless access points using current security standards for central authentication. Topics covered will include 802.1X, Extensible Authentication Protocols, Radius Server integration for Authentication, Authorization and Accounting, with the focus of building secure wireless networks from the ground up.
2	**INFOXXXX**	**Virtualization** This course will cover the various technologies and business models related to virtualization and cloud computing. Students will deploy and manage a virtual infrastructure, taking into account the security considerations that arise when incorporating virtualization technologies into an enterprise infrastructure. Specific security topics covered will include active directory integration, network security policies, firewall configuration and effective use of privileges, roles and permissions.
2	**INFOXXXX**	**Web Security** This course will examine the issues associated with deploying and securing web servers. The security of both Windows and Linux

		based web servers will be addressed. This course will also focus on securing web applications against the wide variety, and every changing attack vectors, present on the Internet.
2	**INFOXXXX**	**IT Service Management** This course will have the student identify and plan IT services that support business goals and objectives. Specific activities directly related to the delivery and support of IT services will be explored and examined.

APPENDIX D
Context for Information Collection

The role of regulatory colleges and voluntary membership associations in controlling employment in an occupation, trade or profession, conferring professional designations or in developing standards of practice is not always clear-cut. It is important for students that information about programs of instruction accurately describes entry-to-practice requirements in a field of study.

Regulated Professions and Trades

For some professions and trades, there is legislation requiring workers in the profession or trade to be licensed or certified by a regulatory body in order to practice the profession or trade in Ontario. The authority of these regulatory bodies comes from an Ontario statute e.g. *Professional Engineers Act*. Government generally limits the granting of legislative regulatory authority to private bodies in occupations and professions where it has identified that there is a public interest in having oversight over the standards of the profession or trade.

Some regulatory authorities have a legislated right to determine educational level and to accredit programs of study and will restrict certification or licensing to graduates of these programs.

The purpose of accredited status is to maintain the quality of programs, to promote continuing improvement of instruction and to ensure that students receive an education consistent with standards for entry into practice or advanced practice in their respective field or discipline.

Regulatory Authority without Accreditation

Most regulatory authorities do not have legislative authority to accredit or approve educational programs but they do determine requirements to practise as a member of the profession and control use of the professional designation. They may also develop standards of practice and competence.

The organization will identify the criteria for registration/membership which may include a requirement for the successful completion of certain identified educational programs. The list of programs might be those offered by named institutions or programs accredited by other third party accrediting bodies, for example the College of Occupational Therapists of Ontario recognizes programs accredited by the Canadian Association of Occupational Therapists.

All decisions regarding students' eligibility for licensing or certification, in a regulated profession or trade, fall within the jurisdiction of the certification or registration authority.

Voluntary Associations

In the majority of occupations, professions and trades there is no statutory body regulating entry-to-practice requirements but voluntary membership associations may determine rules for their own members. Voluntary certification is used by these member associations to represent

an individual’s professional competence and affirms a knowledge and experience base for practitioners in a particular field. One or more private association may represent a profession

and they generally function as advocates for their members and may also develop voluntary standards of practice.

A voluntary professional association /organization has no legislative authority to require that a student complete an accredited or recognized program as a condition of employment. Voluntary membership associations may, however, accredit or recognize programs that are required for membership in their organization, e.g. CIPS (Canadian Information Professional Association).

Some voluntary associations do not recognize or accredit specific educational programs and membership may be determined by examination, proof of employment, character reference, etc. for example the Canadian International Freight Forwarders Association.

APPENDIX D - Regulatory Status Form

MANDATORY REGULATORY REQUIREMENTS

Where licensing or certification is required by legislation for entry to practice in the profession or trade, the Ministry of Training, Colleges and Universities requires that colleges ensure that their programs will meet the requirements of the regulatory body in order to be approved for funding.

☐ There is a legislative requirement that program graduates must be certified or licensed by a regulatory authority to practice or work in the occupation.

Name of regulatory authority_____

☐ (A) The program has been accredited or approved by the regulatory authority or its identified third party.

OR

☐ (B) The college is working toward accreditation with the regulatory authority

.

Status of application and expected date of achievement_____

☐ (C) If the regulatory authority does not accredit educational programs directly or by an identified third party, it has formally acknowledged (e.g. in its published or legislated registration requirements) that the program graduates will be eligible to write any required certifying or registration exam or that the program is otherwise recognized for the purposes of certifying or registering a graduate

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★ **Please submit an acknowledgement and/or evidence from the regulatory authority to support (a) or (b) or (c) above.**

VOLUNTARY REQUIREMENTS

Colleges may choose to have a program accredited or recognized by a voluntary membership organization or association. Graduate eligibility for association recognition or adherence to standards imposed by the body is ***not a requirement*** for program funding approval by the Ministry of Training, Colleges and Universities.

Recognition of the program by a voluntary professional body:

☐ Is being sought: Name of professional body:____CISCO_____

This accurately captures the relationship with Cisco. We are planning to offer the 4 courses that are part of the Cisco CCNP Security certification. Students should be prepared to write that certification if they successfully complete the courses, but it is up to the student to choose to write the certification exams. The School of IT currently has partnerships with Cisco through the Networking Academy. This program will build on that relationship, but the CCNP-Security is not currently part of the Academy program. However, Cisco has offered to display this new program on their Cisco Networking Academy site which will be seen by students in over 10,000 academies and 165 countries, which should increase the speed to market and increase market coverage. A Cisco representative participated in the External Focus Group and hosted the session for us.

☐ The college is working toward recognition.

Status of application and expected date of achievement _____

☐ Recognition has been received.
Type of recognition e.g. accreditation, graduates eligible to write membership exams, etc._____

★ **Please submit an acknowledgement and/or evidence from the voluntary association that recognition has been received.**

X Recognition is not being sought *(please note there may be titling implications for programs that are not compliant in an area where other existing programs are*).