

	2008-2011 Program Review Phase 4 – Final Report & Action Plan	Program Quality Fall, 2011
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Program(s)	Computer Systems Technician--Network Systems (445/447) Computer Systems Technician--Software Support (558/548) Computer Systems Technology--Network Engineering and Security Analyst (555) Computer Systems Technology--Software Development (559)
Ministry of Training, Colleges, Universities (MTCU) Vocational Standards and Credential	MTCU 50505 Ontario College Diploma MTCU 60505 Ontario College Advanced Diploma
Dean	Tony Thoma
Associate Dean	Tom Low (as of August 15, 2011)
Program Review Membership	Program Faculty: B. Curtis, James Long Curriculum Design Specialists: Lisa Pegg and Catharine Ozols Institutional Research: Carmelinda DelConte
Program of Studies	2010/2011 10-A
Final Analysis Session	Not Applicable
Date of Interim Status Report	2014/2015 Academic Year
Date of Next Program Review	2016/2017 Academic Year
Date Submitted to VPA Office	October 19, 2012

This report represents the findings of Program Review for the Computer Science and Information Technology program cluster in the School of Engineering Technology. The review was performed during the period May 2008-December 2011.

This report has been prepared, reviewed, and accepted by the parties to the review, including program faculty, Curriculum Design, Institutional Research, Dean/Associate Dean in the school of Engineering Technology, and the Vice President Academic. The signatures of the representative parties demonstrate their acceptance of the content of this report and a commitment to prepare an interim status report in Fall 2014.

For the Program (Dean or Associate Dean):

 Signature Date
 For the Vice President Academic:

 Signature Date

Summary: Highlights

This is the first formal review of the CSAIT program cluster under the established program review policy (Dec. 2008), however, benchmark curriculum mapping matrices for the cluster were created in 2005-2006 with the Learning Excellence Project. The goal of the program review is to update the curriculum mapping matrices to reflect compliance to vocational standards, essential employability skills and external standards (where applicable) and analysis of various metrics from an environmental scan to develop actions to maintain and/or enhance , student success, graduate employability, and program quality.

Evidence from program review for the CSAIT program cluster indicates that:

Phase 1-Curriculum: Program of Studies for the CSAIT program cluster has gone through significant revisions over several years. As well, the program cluster went through several program title iterations through the program modification process. POS changes and program title changes resulted in incomplete course outlines in the CORE database (a requirement of the Mohawk College Course Outline Policy) and difficulties with ensuring compliance to the Ministry of Training, Colleges and Universities (MTCU) Framework for programs of instruction in regard to curriculum mapping. *A key recommendation is to develop a stable framework for curriculum development and course renewal through an annual review process while ensuring the needs of changes to the technology industry are addressed through curriculum renewal.*

Phase 2-Environmental Scan: The CSAIT program cluster has the third highest registrants to the programs in comparison to comparator colleges (OCAS 2010), however, there is some indication that some of the programs have problems meeting enrolment targets (PPI). Analysis of Key Performance Indicators (KPI) indicates student satisfaction scores lower than the overall Mohawk College scores for several metrics and in comparison to other programs under the Associate Dean. *A key recommendation is to develop strategies and actions plans for quality improvements as a result of the KPI analysis.*

Phase 3-Program Quality and Strategic Initiatives: Deferred to 5-Year Action Plan. Some components of Phase 3 of Program Review are no longer evaluated and will not be a requirement actions and recommendations as a result of program.

Summary: Overall Findings by Program Review Component

Phase	Component	Met	Partially Met	Not Met	Evidence
Curriculum	Course Outlines		X		-Course Outline Review -Programs partially meet requirements outlined in course outline and program review policy.
	Curriculum Mapping Matrix		X		-Programs partially meet requirements outlined in program review and program quality policy in keeping with MTCU framework for programs of instruction.
	MTCU Framework for Programs of Instruction		X		-Somewhat compliant with course outline policy, program review policy and MTCU mapping requirements for all programs
	Program Advisory Committee		X		Membership list is attached as Appendix I and minutes from the quarterly meetings are recorded and available on GroupSpace; have yet to review this report.
Environmental Scan	Program Performance Indicators		X		-Overall PPI scores lower than Mohawk College overall score. Some metrics not recorded for 2 of the programs.
	Key Performance Indicators		X		-Program has Student Satisfaction scores almost 18% points lower than Mohawk College programs (2010/11 KPI scores)
	Applicant/ Enrolment	X			-Applicant/Enrolment data stable over several years with minor variations.
	Student Success				-deferred to 5-Year Action Plan
Program Quality and Strategic Priorities	Quality--Curriculum Content				-deferred to 5-Year Action Plan
	Quality--Flexible Delivery				-deferred to 5-Year Action Plan

	Quality--Flexible Operationally				-deferred to 5-Year Action Plan
	Quality--Experiential Learning				-deferred to 5-Year Action Plan
	Innovation--Applied Research				-deferred to 5-Year Action Plan
	Innovation--Entre/ Intrapreneurship				-deferred to 5-Year Action Plan
	Sustainability--Curriculum				-deferred to 5-Year Action Plan
	Sustainability--Practices				-deferred to 5-Year Action Plan
	PLAR				-deferred to 5-Year Action Plan
	Learning Plans				-deferred to 5-Year Action Plan
	eLearn				-deferred to 5-Year Action Plan

Summary: Commendations, Affirmations and Recommendations

Commendations

There are a number of areas that the CSAIT program cluster demonstrates best practices and leadership in regard to program quality. They include:

- Faculty providing intensive support and linkage of theory and practice to students in order to meet professional and personal goals
- Strong input from the Program Advisory Committee regarding Co-op placements and post-college employment preparation

Affirmations

Affirmations are declarations, which may/may not have evidence as a result of program review, that the program faculty identify are areas required to support program quality improvements. The areas identified include:

- Support provided for professional development of faculty in terms of courses to update skills and knowledge, pursuance of advanced degrees, attendance at conferences
- Upgrading of teaching environment with renovations and currency of equipment and course material used in programs.
- Hiring of new full time faculty to replace vacancies in deficient areas of expertise
- Support for new full and part-time faculty, financially and professionally

Recommendations

Analysis of various data sources from program review identified several areas that will assist in ensuring compliance to program quality policies in keeping with MTCU Framework for programs of instruction with the goal of maintaining curriculum currency, student success strategies, student satisfaction, credit transfer, and articulations. They are:

1. Curriculum Currency and Renewal
 - Develop and maintain current course outlines in the CORE database
 - Develop and maintain a current Curriculum Mapping Matrix for all programs
 - Develop an Annual Program Review Plan that utilizes curriculum renewal process to maintain current course outlines and Curriculum Mapping Matrix
 - Use available sources (Curriculum Mapping Matrix, Key Performance Indicators, Strategic Enrolment Planning data) to monitor program quality on an annual basis.
2. Program Performance and Key Performance Indicators
 - Develop an Annual Program Review plan that monitors student satisfaction and program quality
 - Implement strategies to improve metrics
3. Program Quality and Strategic Priorities
 - Deferred to 5-Year Plan

Resources

Following is a list of all possible data sources accessed and evaluated at the time of review. Depending on the requirements of program review, not all data sources are used.

Program Review Phases	Source	File Name	Date Completed/ Accessed	Used (Y/N)
Phase 1: Curriculum	Course Outline Review	CSAIT Course Outline Review 2011.xls	Spring 2011	Y
	Curriculum Mapping Matrix (CMM)	Not Available at time of review		N
	Competitive Curriculum Analysis (CCA)	CSAIT Competitive Curriculum Analysis.xls	Final January 2012	Y
	Program of Studies (POS)	08 A 555 POS.pdf 09 A 555 POS.pdf 10 A 555 POS.pdf 11 A 555 POS.pdf 10 A 455 POS.pdf* 11 A 455 POS.pdf*	September 2011	Y
	Vocational Standards (VS)	50505 Vocational Standards.pdf 60505 Vocational Standards.pdf	February 2006	Y
	Focus Group Notes	CSAIT skills inventory.docx CSAIT skills inventory-- Advisory.docx	March 2009	Y
	PAC Minutes	Upon approval, posted in GroupSpace and available.	From August 2011 hence	Y
	Credentials Framework (Diploma)	CSAIT Credentials Framework.docx	September 2011	Y
	POS Trend	CSAIT POS	September 2011	Y

	Analysis	Analysis.docx		
	Program System Matrix	Deferred to 5 year plan		N
	Pathways Graphic	Graphic under development by faculty but presented as text in program descriptions	December 2011 hence	N
Phase 2: Environmental Scan	Program Performance Indicators	CSAIT Program Performance Indicators.docx	2009-2010 Fiscal Year	Y
	Key Performance Indicators	CSAIT KPI.pdf	2010-2011	Y
	Surveys	Not used for this review		N
	Competitive Program Profile	CSAIT Competitive Program Profile.xls	2010-2011	Y
	Student Success and Retention	Data not available at time of review		N
	Labour Market Demand	CSAIT Competitive Program Profile.xls	2010-2011	Y
	Program Job Search	Not used for this review		N
	Applicant vs. Registrant analysis	CSAIT Competitive Program Profile.xls	2010-2011	Y
	Student Entrance survey	Data Not Available at time of review		N
	Employment Profile	CSAIT Competitive Program Profile.xls	2010-2011	Y
	Employment Outlook	CSAIT Competitive Program Profile.xls	2010-2011	Y
	OSAP	CSAIT	2010-2011	Y

	Default Rates	Competitive Program Profile.xls		
	Assessment for Success	Data not available at time of review		N
	Other			
Phase 3: Quality Processes	Program Quality	Deferred to 5 year action plan		N
	Re-Thinking Assessment	Deferred to 5 year action plan		N
	Program Level Assessment Mapping	Not required for this review		N
	Other			
Supporting Policies	Course Outline Policy		Accessed Winter 2012 via: http://www.mohawkcollege.ca/about/policies/CorpSect5.html	Y
	Program Review Policy		See Course Outline Policy	Y
	Program Quality Policy		See Course Outline Policy	Y
	Program Advisory Committee		See Course Outline Policy	Y
	Prior Learning and Recognition			N
	General Education			N
	Program of Studies			N
	Academic Scheduling			N
Supporting MTCU Framework documents	Framework for Programs of Instruction		Accessed Winter 2012 via: http://www.accc.ca/ftp/es-ce/MTCUCollegeFramework.pdf	Y
	Essential		See Framework for Programs of Instruction	Y

	Employability Skills			
	General Education		See Framework for Programs of Instruction	Y
	Credentials Framework		See Framework for Programs of Instruction	Y

Curriculum: Summary

Overview

Phase 1 of program review is designed to develop and analyze a Curriculum Mapping Matrix which links course learning outcomes to program learning outcomes, essential employability skills and external standards (where applicable). Curriculum mapping is a ministry requirement and provides evidence of curriculum compliance to the program learning outcomes. Through focus groups, external stakeholders such as employers, graduates of the program and current students are also involved in this phase of program review.

Highlights

- At the time of review, the Computer Science and Information Technology program cluster had significant program of studies (POS) revisions several times over several academic years. The instability of the POS impacted development of course outlines in CORE (see POS comparison) and mapping the program to vocational standards, essential employability skills and external standards (where applicable).
- Course outline development is required in order to prepare comprehensive curriculum mapping matrices for most programs in this program cluster.

Curriculum: Mapping Analysis and MTCU Requirements

Overview

A Curriculum Mapping Matrix (CMM) is developed based on links between course learning outcomes and program learning outcomes, essential employability skills and external standards (where applicable). The CMM provides program areas with data in order to make decisions about curriculum, scaffolding/laddering and breadth, depth and complexity of student experience with the curriculum.

Course Learning Outcome Links to Program Learning Outcomes

- Unable to assess for the CSAIT program cluster

POS Analysis

A POS comparison is used to analyze and assess changes to the POS trended over a series of academic years.

Program Name	Program Number	POS 08				POS 09				POS 10				POS 11				% Outlines in CORE and CLINKED
		# Courses	# New Courses	> 25%	# Hours	# Courses	# New Courses	> 25%	# Hours	# Courses	# New Courses	> 25%	# Hours	# Courses	# New Courses	> 25%	# Hours	
Computer Systems Technician--Network Systems	455/447	22	9	40.9	1160	22	6	27.3	1160	25	6	24.0	1242	23	6	26.1	1186	73.91304
Computer Systems Technology--Network Engineering and Security Analyst	555	32	9	28.1	1720	32	13	40.6	1776	36	11	30.6	1914	35	11	31.4	1858	82.85714
Computer Systems Technician--Software Support	558	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Computer Systems Technology--Software Development	559		TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	39	15	38.5	2124	38.46154

Compliance: Framework for Programs of Instruction

All programs are assessed based on the major components outlined in the MTCU Framework for Programs of Instruction. Following is an overview of the assessment for the CSAIT program cluster.

Legend:		MTCU Framework for Programs of Instruction: Components (11-A POS and CMM)				
Green--meets MTCU requirements						
Yellow--partially meets MTCU requirements						
Red--does not meet MTCU Requirements						
Program Title	Program #	Credential	Scope: Depth, Breadth and Complexity	Essential Employability Skills	General Education	Typical Duration
Computer Systems Technician-- Network Systems	455/447	Diploma	Partial CMM 17/33 course outlines in CORE	Last mapped 2006 (Learning Excellence Project)	2 OPEL XXX; 1 Active Cit	1186=slightly lower than to MTCU requirement for a diploma (1200-1400)
Computer Systems Technology-- Network Engineering and Security Analyst	555	Advanced Diploma	Partial CMM 29/35 course outlines in CORE	Last mapped 2006 (Learning Excellence Project)	2 OPEL XXX; 1 Active Cit	1858=within MTCU requirement for an OCAD. (see notes in POS tab).
Computer Systems Technician-- Software Support	548 558	Diploma	Partial CMM: 8 of program specific outlines in CORE	Last mapped 2006 (Learning Excellence Project)	2 OPEL XXX; 1 Active Cit	1242=within MTCU requirement for OCD
Computer Systems Technology-- Software Development	559	Advanced Diploma	Incomplete CMM 15/39 course outlines in CORE	Last mapped 2006 (Learning Excellence Project)	2 OPEL XXX; 1 Active Cit	2124=above MTCU requirement for OCAD. (See notes in POS tab)

Curriculum: Focus Group

Several focus groups with employers, graduates and current students will be incorporated into the 5-Year Action Plan. Data captured from this program review component will be used to inform curriculum enhancements to complete the mapping process and to inform strategies to improve student satisfaction and program quality.

In 2009, the CSAIT program area completed a Skills Inventory. Analysis of the inventory indicate that employers require the following skills of graduates:

Skill Set Inventory

Jobs Specific to a 2 Year Graduate

- Technical Writer – Business Communication, Documentation Tools
- Software Quality Assurance – Testing, Document, Debugging, Compliance Awareness
- Project Planning Support – Microsoft Project, Systems Analysis, Diagramming Techniques
- Business Systems Support – Compliance Awareness, Diagramming Techniques, Organizational Behaviour, ERP, Basic Business & Accounting, Microsoft Office Scripting, Ethics, Intellectual Property Laws
- Database Support – SQL, Normalization, Access, MySQL, SQL Server
- Programmer – Procedural, C, PHP, VB.NET, COBOL, HCI
- Technology Manager – Networking, Basic Business & Accounting, E-Commerce, Change Management, PC Hardware, Telephony
- Web Master – HTML, CSS, DreamWeaver, JavaScript, Media, HCI, Basic Linux Shell
- Technical Support Specialist – Customer Service, ITIL
- User Trainer – Microsoft Office, Training Skills, Communications, Documentation Skills, Media
- Software Integrator – Problem Solving, Scripting, Platform Awareness, Importing/Exporting Data

This Diploma could lead to the following careers:

- Game Developer – C++, OpenGL, DirectX, Physics, Story Boarding, Level Design, Media, Modeling
- Desktop Application Programmer - .NET, Java, GTK, QT, C++, HCI, C#, Alternate Input Devices, ActiveX
- Mobile Application Developer - .NET, Java, RIM
- Mainframe Application Developer – COBOL, JCL, Assembler, z/OS, SPDF, WebSphere
- Web Application Developer – Linux, Web Services, XML, E-Commerce, Security
- Programmer/Analyst – Version Control, Design, Project Management, Debugging, Requirements Gathering, Testing, Business Communications
- Database Administrator – Oracle, Advanced SQL (Stored Procedures & Triggers), Normalization, Data Dictionary, Security
- Software Architect – See Systems Analyst
- Systems Analyst – Compliance Awareness, Diagramming Techniques, Organizational Behaviour, ERP, Basic Business & Accounting, Ethics, Intellectual Property Laws, Version Control, Design, Project Management, Requirements Gathering, Testing, Business Communications
- Systems Integration – Alternate Input Devices, API programming
- IT Manager – Organizational Skills, Time Management, Resource Management, Needs Assessment, Acquisition
- Project Manager – Planning & Estimating, Monitoring, PMI Preparation, Effective Presentation Skills, Microsoft Project

The skill set identified and ranked by the Advisory include:

Skill	Points
Communications	25
Project Management	15
Team Skills	11
Technology Skills	10
Development Methodology	8
.NET	7

Business Analysis	6
Secure Applications	5
Software Implementation	5
Troubleshooting	5
Adaptability	4
Design Methodology	4
People Skills	4
Service Oriented Architecture	4
Data Modeling	3
Multiple platform experience	2
Estimation Skills	1
Microsoft Office	1

Curriculum: Pathways and Partnerships

Graphics illustrating the curriculum pathways both intake, progression by semester, and career pathways upon graduation, including advancing to university degree programs, are under development by our faculty for inclusion in the final version of this report.

We have partnerships with industry that contribute to our curriculum in CSAIT. Mohawk College is a Cisco Academy and receive their support for inclusion of their material (both hardware and course material) into our Networking streams. The College has also entered into a Service Agreement with Apple to become a warranty service centre for their products. Our students are able to take the Apple service course for free under this agreement. Once they write the test for certification, they will be able to service Apple products for the College at first and for outside customers.

Environmental Scan: Summary

Overview

Phase 2 of program review analyzes several data sources such as Key Performance Indicators, Program Performance Indicator, Competitive Curriculum Analysis, and data direct from the Ontario College Application System to complete an "environmental scan" of the program in comparison to other colleges with the same program, Mohawk College overall and other programs under the Associate Dean.

Highlights

- Almost all colleges in the system have some form of computer program which means that there is a diversity of program offerings and program characteristics.
- It appears as though the Mohawk College computer program offerings have the most differentiation between programs (i.e. clearly identified program descriptors and unique program codes) in comparison to other colleges.
- KPI analysis (2010) combined with enrolment analysis indicates that the programs meet enrolment targets, however, current students in the programs are generally not satisfied with the program.
- Centennial College appears to have unsuccessfully offered a fast-track model of delivery for the technician and technology programs.

Background

- Due to the complexity of the curriculum analysis for this program cluster, a partial Environmental Scan was completed using a variety of alternative sources.

Competitive Overview

The following chart provides an overview of the CAAT system using the APS-MTCU table published by MTCU.

College	APS	APS Title	MTCU Title - English	WT	FU
ALGO	1178	Computer Systems Technician	Computer Systems Technician	1.20	2.30
ALGO	1189	Computer Systems Technician	Computer Systems Technician	1.20	2.30
BORE	1093	Computer Systems Technician	Computer Systems Technician	1.20	2.30
CANA	1133	Computer Systems Technician - Networking	Computer Systems Technician	1.20	2.30
CANA	1143	Computer Systems Technician	Computer Systems Technician	1.20	2.30
CENT	1188	Computer Systems Technician - Networking	Computer Systems Technician	1.20	2.30
DURH	1025	Computer Systems Technician	Computer Systems Technician	1.20	2.30
DURH	1128	Computer Systems Technician - Database Developer	Computer Systems Technician	1.20	2.30
FANS	1187	Computer Systems Technician	Computer Systems Technician	1.20	2.30
GEOR	1144	Computer Systems Technician - Networking	Computer Systems	1.20	2.30

			Technician		
GRAN	1026	Computer Systems Technician - Networking	Computer Systems Technician	1.20	2.30
GRBR	1190	Computer Systems Technician	Computer Systems Technician	1.20	2.30
HUMB	1135	Systems Analyst	Computer Systems Technician	1.20	2.30
LACI	1052	Computer Systems Technician	Computer Systems Technician	1.20	2.30
LAMB	1080	Computer Systems Technician	Computer Systems Technician	1.20	2.30
MOHA	1126	Computer Systems Technician - Network Systems	Computer Systems Technician	1.20	2.30
MOHA	1136	Computer Systems Technician - Software Support	Computer Systems Technician	1.20	2.30
NIAG	1212	Computer Systems Technician	Computer Systems Technician	1.20	2.30
SHER	1154	Computer Systems Technician	Computer Systems Technician	1.20	2.30
SLAW	1087	Computer Software Technician	Computer Systems Technician	1.20	2.30
STCL	1128	Computer Systems Technician - Networking	Computer Systems Technician	1.20	2.30
ALGO	1386	Computer Systems Technology - Networking	Computer Systems Technology	1.20	3.10
ALGO	1408	Computer Systems Technology - Security	Computer Systems Technology	1.20	3.10
CAMB	1223	Computer Systems Technology	Computer Systems Technology	1.20	3.10
CANA	1149	Computer Systems Technology - Networking	Computer Systems Technology	1.20	3.10
CENT	1057	Computer Systems Technology - Networking	Computer Systems Technology	1.20	3.10
DURH	1027	Computer Systems Technology	Computer Systems Technology	1.20	3.10
FANS	1219	Computer Systems Technology	Computer Systems Technology	1.20	3.10
GRBR	1222	Computer Systems Technology	Computer Systems Technology	1.20	3.10
LACI	1137	Technologie de l'information – réseaux informatiques	Computer Systems Technology	1.20	3.10
LACI	1172	Technologie de l'information – sécurité informatique	Computer Systems Technology	1.20	3.10

MOHA	1137	Computer Science Technology - Software Engineering	Computer Systems Technology	1.20	3.10
MOHA	1199	Computer Systems Technology - Network Engineering And Security Analyst	Computer Systems Technology	1.20	3.10
SENE	1204	Computer Systems Technology	Computer Systems Technology	1.20	3.10
SHER	1017	Computer Systems Technology - Software Development And Network Engineering	Computer Systems Technology	1.20	3.10
SHER	1109	Computer Systems Technolog - Systems Analyst	Computer Systems Technology	1.20	3.10
STCL	1129	Computer Systems Technology2- Networking	Computer Systems Technology	1.20	3.10

Source: 2011-09-28 APS-MTCU Table

Strategic Priorities

The focus of program review for the Computer Science and Information Technology cluster of programs was on curriculum development and mapping, and an environmental scan.

Phase 3 of program review is deferred to the 5-Year Action Plan.

5 Year Program Quality Enhancement Action Plan

Objectives	Action Strategies	Timelines	Responsibility	Status
Short Term (within the next 18 months)				
Develop a complete curriculum mapping matrix	Complete course outlines and mapping process			
	Analyze complete curriculum mapping matrix and update report			
	Present results to Program Advisory Committee			
Communicate with various stakeholders	Implement and utilize data from focus groups to support curriculum and program quality enhancements			
Develop strategies to improve student satisfaction and program quality metrics	Utilize KPI and student success data from Institutional Research to improve student satisfaction and program quality metrics			
Annual Program Review	Develop annual program review process to monitor curriculum and program quality enhancements			
Long Term (within the next 36-60 months)				
Monitor short-term and long-term program quality enhancements and adjust as required	Utilize Annual Program Review process to monitor program quality enhancements.	To be determined pending outcome of medium term objectives Spring 2014 (tentative)		
	Submit interim program quality report to Program quality area			
	Plan and prepare for Comprehensive Program Review	Spring 2016		

MOHAWK COLLEGE ADVISORY COMMITTEE**COMMITTEE:** Computer Science**PROGRAM ASSOCIATE DEAN:** Tom Low – (905) 575-2146**RECORDING SECRETARY:** Gini Giacomelli, (905) 575-2145**DATED:** October 2012

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