

Programs	115 Mechanical Techniques 413 (Non-Coop)/473 (Coop/CODA) Manufacturing Engineering Technician – Automation (Industrial Mechanical Millwright)
Ministry of Training, Colleges, Universities Program Descriptions	47000 – Manufacturing Techniques (Appendix 1) 57000 – Manufacturing Engineering Technician (Appendix 2) 55300 – Mechanical Technician (Appendix 3)
Credentials	115 - Ontario College Certificate (OCC) 413 – Ontario College Diploma (OCD) 473 - Co-op Diploma Apprenticeship (OCD) - CODA
Dean	Piero Cherubini
Associate Dean	Tony Fazzari/Doug Daniels
Program Review Membership	Sharon Estok, Former Associate Dean Tony Fazzari, Associate Dean Marla Robinson, Faculty Doug Daniels, Faculty Rick Dupp , Faculty Carmelinda Del Conte, Institutional Research Catharine Ozols, Curriculum Design Specialist Jaspreet Grewal, Course Outline / Program Review Support
Program of Studies	2012-2013 (12A)
Final Analysis Session	March 2013
Date of Interim Status Report	2014/2015 Academic Year
Date of Next Program Review	2017/2018 Academic Year
Date Submitted to VPA Office	May 2013

This report represents the findings of Program Review for the Manufacturing Engineering Technician program, including both coop (CODA) and non-coop streams in the School of Skilled Trades and Apprenticeship. The review was performed during the period April 2012- March 2013.

This report has been prepared, reviewed, and accepted by all parties to the review, including program faculty, Curriculum Design, Institutional Research, Dean/Associate Dean in the School of Skilled Trades and Apprenticeships, 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 Spring 2015.

For the Program (Dean or Associate Dean):

Signature

Date

For the Vice President Academic:

Signature

Date

Summary: Highlights

Background

The Manufacturing Engineering Technician (57000) program integrates all 3 levels of the in-school apprenticeship curriculum for the trade of Industrial Mechanic Millwright (IMM) (433A). The Cooperative Diploma Apprenticeship (CODA) program offers an optional 16 month internship. The Manufacturing Engineering Technician program (413) does not contain opportunities for formal experiential learning. The CODA program (473) offers substantial opportunity to further develop skills on-the-job site. The vocational standards for the Manufacturing Engineering Technician program were last updated by the Ministry of Training, Colleges and Universities (MTCU) in 1997. It is anticipated an update will occur in the near future. A review of other recently updated technology programs shows a new outcome related to sustainable practice has been updated. This has been flagged as a future need for this program. It is anticipated that when new or updated vocational standards are published by MTCU, the program will undergo a comprehensive internal program review. Prior to this occurring there are plans to strengthen the current program of studies to better align with comparator colleges for block transfer credit opportunities.

Program Description

Mohawk offers the only two-year Manufacturing Engineering Technician CODA program. Other colleges utilize the Mechanical Engineering Technician and Mechanical Technician program standards. Students in the Manufacturing Engineering Technician program will:

- Get a solid foundation in the core vocational and trade skills associated with the trade of Industrial Mechanic Millwright (IMM) (433A) as well as meet the requirement for an Ontario College Diploma
- Be registered as apprentices during their program of study and qualify for their Certificate of Apprenticeship upon successful completion of the CODA program.
- Participate in experiential learning opportunities for a maximum of sixteen months during the program.

Mohawk's Award Winning Program

The Manufacturing Engineering Technician integrated apprenticeship diploma program was a Yves Landry Award winner for innovation delivery solutions to bridge gaps in industry.

Evidence from program review for the Manufacturing Engineering Technician program indicates that:

Phase 1-Curriculum: courses in the Program of Studies contribute to the program learning outcomes (MTCU code 657000) as required by the Ministry of Training, Colleges and Universities (MTCU). The Manufacturing Engineering Technician program is compliant with the General Education requirements and minimum program timelines outlined in the MTCU Framework for Programs of Instruction (based on 11 A POS). *Recommendations:* 1) Utilize the Annual Program Review and Curriculum Committee processes to make changes to curriculum content and assessment to address scaffolding and laddering of curriculum; 2) Evaluate opportunities for student pathways and develop a plan to implement a pathways plan for the program; 3) Map the existing program of studies to the in-school Industrial Mechanic Millwright curriculum; 4) Launch a BYOD (Bring Your Own Device) initiative for Fall 2013 building upon lessons learned in the iPad project launched September 2012; 5) Assess efficacy and membership of the Program Advisory Committee.

Phase 2-Environmental Scan: Applications and registrations have increased over 3 trended years for all colleges with CODA programs integrated with the Industrial Mechanic Millwright (IMM) (433A) apprenticeship. KPI scores pertinent to teaching are generally higher for the Mohawk College Manufacturing Engineering Technician program in comparison to other colleges. Overall student satisfaction scores for the Mohawk College program are greater than Mohawk College scores, scores in the Associate Dean portfolio and in comparison to other colleges with similar integrated programs. *Recommendation:* 1) Utilize the Annual Program Review process to monitor enrolment and satisfaction trends. 2) Develop strategies to address issues as a result of the environmental scan.

Phase 3-Program Quality and Strategic Initiatives: The program meets *most* requirements of the Program Quality analysis (PLAR, learning plans etc.) Program mapping to strategic priorities is no longer a requirement of program review (as of Winter 2012).

Summary: Overall Findings by Program Review Component

Phase	Component	Met	Partially Met	Not Met	Evidence
Curriculum	Course Outlines	X			-Course Outline Review Outlines are all Clinked, data currently being updated into CORE.
	Curriculum Mapping Matrix	X			-Program meets most requirements outlined in program review and program quality policy in keeping with MTCU framework for programs of instruction. -Program will be updating outcomes and evaluation in some courses to increase breadth and depth of learning
	MTCU Framework for Programs of Instruction	X			-Meets general education and timelines components of MTCU framework for programs of instruction. 1) Critical & Innovative Thinking 2) OPEL XXXX; 3) Career Advancement
	Program Advisory Committee (PAC)	X			-Meets requirements of the PAC -Program focus group in 2012 -Notes summarized in Appendix 10
Environmental Scan	Key Performance Indicators	X			-KPI indicators, trended over several years, above Mohawk College and other programs under Associate Dean -Scored above other Provincial Program Averages
	Program Scorecard	X			-Conversion rates highest within Skilled Trades & Apprenticeship cluster -Low retention rate for 413 due to transfer into 473 (not a direct entry stream) at the completion of semester 1 -Graduation rate data for 413 also skewed per above -Student satisfaction for both streams (413/473) above college average -Manufacturing Techniques (115) students are all streamed into two year programs thus skewing performance characteristics as well -Graduation rates of 473 are above college

					average
	Applicant/ Enrolment	X			-Applicant/Enrolment returning to pre-recession levels matching 2009 enrolment numbers.
	Student Success				-Deferred to 5-Year Action Plan
Strategic Priorities					Program Mapping to Strategic Priorities is no longer a requirement of program review (as of Winter 2012)
Quality Priorities	PLAR		X		-PLAR has not been identified for courses in the POS yet exists for the majority of courses – information must be transferred to POS -Somewhat meets the requirements of the PLAR policy
	Learning Plans		X		-Majority of courses in the POS have a learning plan established for student progression -This is an ongoing project as part of the blended learning/iPad/BYOD projects
	eLearn	X			-An eLearn/blended-learning plan is in progress in order to meet college's goal for Dec 2013

Summary: Commendations, Affirmations and Recommendations

Commendations

There are a number of areas that the Manufacturing Engineering Technician program demonstrates best practices and leadership in regard to program quality. They are:

- Students and faculty integrating technology into all aspects of the classroom. The pilot iPad project launched in F2012 introduced students to new teaching methods to improve student success and create future ready graduates. As a result of the iPad initiative students were able to:
 - Work anywhere using elearn, online text books, industry apps and additional online resources truly bringing the classroom and shop with them on and off the campus
 - Reduce the cost of texts by 90% for the program of study
 - Take advantage of the time and project management applications to further develop management of time and other essential employability skills
 - Work collaboratively with each other electronically
 - Evolve into more active learners

- Gain valuable experience using new technology
- Synergy of teaching integrating traditional post-secondary delivery and apprenticeship provides facilitation of collaborative and contextual study opportunities.
- Students benefit from the unique relationship with the Hamilton Skilled Trades Advisory Committee (HSTAC) and the local Apprenticeship Office providing them with the opportunity to be registered as apprentices while they attend school.
- Students benefit from strong industry support, including a large network of successful Mohawk Grads:
 - As employers,
 - By employer involvement in HSTAC leading innovation in integrated delivery models,
 - As judges for the final design project,
 - For scholarships and bursaries, ,
 - Through donations of state of the art equipment for our labs to bring the workplace into the college

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:

- Elimination of the Fluid Power Automation, stream has resulted in significant course realignment. Ideally the existing program should be mapped to the apprenticeship standard again as it has been updated since the last curriculum review.
- No established pathway (lack consistency) to programs in engineering technology within the college.
- No established pathway (lack consistency) from other post-secondary institutions as evidenced by the ONCAT project report
- It should be noted that the Published Provincial Program Standard for 57000 Manufacturing Engineering Technician was last updated in 1997 and it is anticipated additional outcomes concerning sustainable practice will be in the next update.
- Graduation rate tracking may be out of synch with the one year internship essentially making the two year program three years in length.

Recommendations

Analysis of various data sources from program review identified the following areas that will assist in maintaining the quality and student satisfaction of the program. They are:

1. Curriculum Currency and Renewal

- Utilize the Annual Program Review and Curriculum Committee processes to make changes to curriculum content and assessment to address scaffolding and laddering of curriculum in order to ensure students meet graduate outcomes
 - a. Utilize the Curriculum Mapping Matrix to address curriculum gaps.
 - b. Follow the process for evaluating best practices in Assessment Design to ensure alignment of assessment to outcomes with a focus on recognizing student experience.
 - Utilize the program level assessment mapping process in the program in order to monitor the student experience.
 - Monitor student experience in regard to time constraints linked to assessment practices in the program.
 - Consider the philosophy of outcomes-based education for assessment design.
 - c. Facilitate strategic curriculum discussions with current students and recent graduates to assess curriculum and employment opportunities relevant to the new technology introduced with the iPad project.
 - d. Consider revisions to course names and descriptions to align with comparator colleges and the in-school apprenticeship curriculum for Industrial Mechanic Millwright (IMM) (433A)

 - Evaluate opportunities for student pathways and develop a plan to implement a pathways plan for the program.
 - a. Assess opportunities for various pathways between other college programs (eg. Mechanical Technician and Mechanical Engineering Technician).
 - Utilize the expertise of the Institutional Research department to provide data pertinent to this analysis.
 - Review the results of the ONCAT project to determine best alignment practices.

 - Assess efficacy and membership of the Program Advisory Committee.
2. Market Demand, Program Performance and Key Performance Indicators
- Utilize the Annual Program Review process to monitor enrolment, satisfaction trends, and student success.
 - Monitor competitors for applicant, enrollment and possible opportunities for new program development and pathways
 - Perform an environmental scan as part of the interim review to look for trend post recovery from the recession. Develop strategies to address issues as a result of the environmental scan.
 - Investigate additional graduate pathway opportunities both internal and external.
3. Program Quality and Strategic Priorities
- Build upon the success of the innovative iPad Project and implement a Bring Your Own Device (BYOD) pilot in Fall 2013
 - Increase accessibility to program resources by allowing students to utilize a greater ranger of portable devices such as: iPad, Android, PC based tables, notebooks and laptops.

Resources

Program Review Phases	Source	File Name	Date Completed/ Accessed	Used (Y/N)

Phase 1: Curriculum	Course Outline Review	Appendix 6 Course Outline Review.xls	May 2012 March 2013	Y
	Curriculum Mapping Matrix (CMM)	Appendix 8 Curriculum Mapping Matrix.xls	March 2013	Y
	Competitive Curriculum Analysis (CCA)	Competitive Curriculum Analysis.xls	March 2013	Y
	Program of Studies (POS)	Appendix 3 115 12-A.pdf Appendix 4 413 12-A.pdf Appendix 5 473 12-A.pdf	February 2013	Y
	Vocational Standards (VS)	Appendix 1 413 473 Manufacturing Engineering Technician Learning Outcomes.docx Appendix 2 115 Manufacturing Techniques Learning Outcomes.pdf	March 2011	Y
	Strategic Curriculum Discussion (SCD) PAC Minutes	Appendix 10 115 413 473 Manufacturing Engineering Technician Focus Group Notes	April 23, 2012	Y
	Credentials Framework (Diploma)	Appendix 7a Framework for Diploma Programs	March 2013	Y
	POS Trend Analysis		Not required for this review	N
	Program System Matrix	Appendix 9 Comparative Program	January 2013	Y

		Analysis		
	Pathways Graphic	Lone graduate pathway indicated in body of report	March 2013	Y
	Other (e.g. accreditation letters etc.)	Appendix 17 CODA Program Details	March 2006/8	
Phase 2: Environmental Scan	Program Scorecard		2011-12 Fiscal Results	N
	Key Performance Indicators	Appendix 11 Manufacturing Eng Technician CODA KPIs Appendix 12 Manufacturing Eng Technician Non-coop KPIs	January 2013	Y
	Surveys		Not Applicable	N
	Competitive Program Profile	Appendix 13 Competitive Program Overview	March 2013	Y
	Student Success and Retention	Appendix 14 Competitive Data Analysis	March 2013	y
	Labour Market Demand			N
	Program Job Search			N
	Applicant vs. Registrant analysis	Appendix 13 Competitive Program Overview	March 2013	Y
	Student Entrance survey	Student Engagement Survey	Fall 2011	N
	Employment Profile			N
	Employment Outlook			N

	OSAP Default Rates			N
	Assessment for Success		Not Available at time of review	N
	Other			N
Phase 3: Quality Processes	Program Quality			N
	Re-Thinking Assessment	Hardcopy results available in Program Quality office	May 2012	Y
	Program Level Assessment Mapping	Hardcopy results available in Program Quality office		N
	Other			N
Supporting Policies	Course Outline Policy		Accessed Winter 2013 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 2013 via: http://www.accc.ca/ftp/esce/MTCUCollegeFramework.pdf	Y

	Essential Employability Skills		See Framework for Programs of Instruction	Y
	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

- Almost all course outlines for the Manufacturing Engineering Technician programs (CODA and non-coop) are available in the course outline application (CORE) as per the Course Outline Policy.
- A comprehensive Curriculum Mapping Matrix (CMM) for the program provides evidence that the curriculum and content meets *most* expectations for development of graduate skills.
- The Manufacturing Engineering Technician programs meets the Ministry requirements outlined in the Framework for Programs of Instruction

Recommendations

- Utilize the Annual Program Review and Curriculum Committee processes to make changes to curriculum content and assessment to address scaffolding and laddering of curriculum in order to ensure students meet graduate outcomes of a management program
 - a. Utilize the Curriculum Mapping Matrix to address curriculum gaps, including depth and complexity of learning and assessment.
 - b. Follow the process for evaluating best practices in Assessment Design to ensure alignment of assessment to outcomes with a focus on recognizing student experience.
 - c. Map the existing program of studies to the Industrial Mechanic Millwright (IMM) in-school curriculum to identify to create better alignment and ultimately greater ONTransfer opportunities.

- Evaluate opportunities for student pathways and develop a plan to implement a pathways plan for the program
- Assess efficacy and membership of the HSTAC/Program Advisory Committee.

Curriculum: Mapping Analysis

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.

The following analysis for the Manufacturing Engineering Technician program is based on the analysis of a curriculum mapping matrix.

Course Learning Outcome Links to Program Learning Outcomes

Breadth of Learning Summary

- An analysis of the CMM for all courses in the POS indicates that students are *adequately* exposed to *most* vocational standards for the Advertising program.
 - There is moderate curriculum linked to VS02, VS04, VS09, VS10 and VS11. It should, however, be noted that there is evidence of significant links in all cases. This is the result of the apprenticeship style delivery where culminating outcomes are introduced and achieved in a single reportable subject as opposed to being developed over a series of semesters.

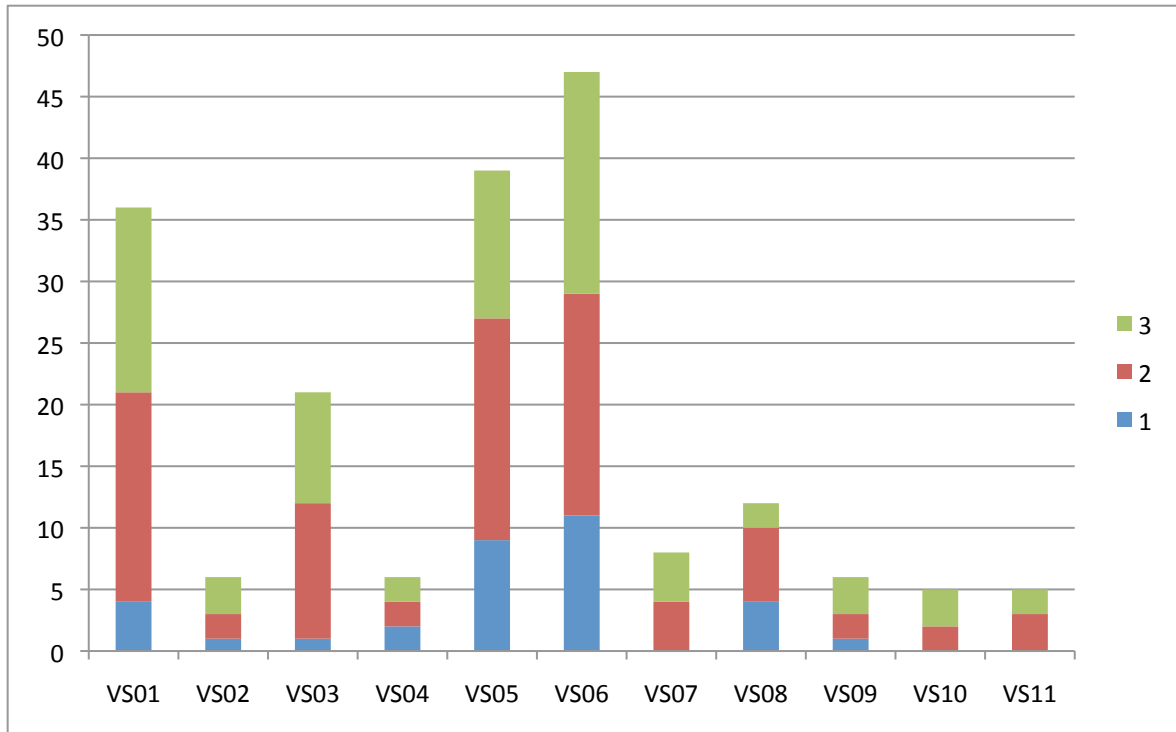
Vocational Standards

- 7/11 VS have an adequate number of Course links to Vocational Standards (ranging from approximately 8 to more than 20) from a broad range of courses in the program of studies
 - 4/8 VS require consideration for additional course level outcomes and/or evaluation strategies to ensure all content is in fact assessed.

External Standards

- The program also aligns to the Industrial Mechanic Millwright (IMM) (433A) in-school apprenticeship curriculum. This was completed as part of the original CODA submission and is recommended that this be completed again as part of the ongoing review process.

**Curriculum Mapping Matrix: Manufacturing Engineering Technician
12/13 VS CLINKS: Course Learning Outcomes linked to Vocational Standards**



Overall Depth & Complexity Summary

VS- Overall Highlights

- There are a total of 191 course links to VS
- Approximately 40% of total course links to VS are characterized as contributing to a significant (3) degree to graduates' ability to demonstrate the outlined skill or ability
- Approximately 15% of total course links to VS are characterized as contributing to a minor (1) degree and 45% of total course links to VS are characterised as contributing to a moderate (2) degree
- Overall levels of learning are *somewhat* scaffolded across semesters although the majority of trade skills tend to develop skill sets within a single course mirroring the apprenticeship delivery model.
 - Consider a review of curriculum, assessment and/or instructional design to create a delivery model more representative of the apprenticeship model to better align with transfer opportunities from institution to institution as well as in and out of apprenticeship training.
 - The integrated apprenticeship technician model mirrors the traditional apprenticeship delivery in many ways. As such, significant learning occurs in all semesters. The lower

number of links in semester 3 should in now where indicate an imbalance in the program of studies but rather the existence of very high level exit level outcomes for the courses.

- The fact that there are no contributions to a very significant degree is also reflective of the nature of apprenticeship style delivery where foundational concepts are addressed and the majority of the learning is honed on the jobsite.

Sem	% of CLO Links to VS by Semester			
	Minor Degree 1	Moderate Degree 2	Significant Degree 3	Very Significant Degree 4
1	14	41	15	0
2	13	9	22	0
3	0	6	6	0
4	6	29	30	0
Overall	33	85	73	0

ES - Highlights

- Not Applicable

Program Composition

- There are 7 Foundational courses, 9 Specialized, 1 Integrational, and 3 General Education courses (Critical and Innovative Thinking, Gen. Ed. Elective, Career Advancement)
- Total of 191 course links to VS in the program spread over 25 courses (student experience) in 4 academic semesters. An optional 16 month internships (4 x 4 months) is available to students registered in the CODA program.
 - There are a total of 25 courses in the POS with a common first-year with the Manufacturing Techniques program. Manufacturing Techniques (115) is the one year exit point for the Manufacturing Engineering Technician programs (413/473). To date, all students who enrol in Manufacturing Techniques (115) move over to the Manufacturing Engineering Technician program upon the successful completion of the first semester of studies
 - 38% of CLO are in Foundational courses, 56% in Specialized, and 6% in Integrational

# of CLO Links by Course Classification				

	Minor Degree 1	Moderate Degree 2	Significant Degree 3	Very Significant Degree 4	Overall
Found	14	40	18	0	72
Special	18	40	46	0	104
Integrate	1	3	7	0	11

Compliance: Framework for Programs of Instruction – Manufacturing Engineering Technician Diploma		✓
Scope: Depth, Breadth and Complexity	<ul style="list-style-type: none"> • Meets all specific Vocational Outcomes as defined by the provincial program standards • Students have many foundational and higher level learning opportunities to practice the following key skills: <ul style="list-style-type: none"> • VS06 <i>Apply knowledge of machinery, tools and other equipment to manufacture and assemble components.</i> • VS01 <i>Analyze and solve routine technical problems related to manufacturing environments through the application of engineering principles.</i> • VS05 <i>Apply knowledge of manufacturing materials, operations, and processes to support the production of components.</i> • VS03 <i>Interpret and prepare graphics and other technical documents to appropriate engineering standards</i> • There is an emphasis on problem solving, critical thinking and working in teams • No Course Learning Outcomes (CLO) are linked to VS at a very significant degree (e.g. 4). This mirrors the provincial apprenticeship model where 90% of skills development and application occurs on-the-job. This, by no means indicates, that these opportunities are not available within the current program of studies however CLO may need to be re-expressed to accurately reflect what is happening in the classroom. 	✓
Essential Employability Skills	<ul style="list-style-type: none"> • Basic fundamental personal management and teamwork skills • Capstone project requires development of personal, interpersonal, teamwork and project management skills • Depth of achievement consistent with EEs outcomes <p><i>NOTE: the Mohawk College Curriculum Overview, Research and Evaluation (CORE) database is unable to extract Essential</i></p>	✓

	<i>Employability Skills mapping due to a technological error in the programming. Program Faculty completed the mapping requirements for this MTCU requirement but due to the technological issues with CORE the data cannot be analyzed.</i>	
General Education	<ul style="list-style-type: none"> • Exposure to at least ONE discipline outside field of study • Access to 3-5 courses designed discretely from vocational standards 	✓
Typical Duration	<ul style="list-style-type: none"> • Approximately, four semesters or 1200 to 1400 equivalent instructional hours <ul style="list-style-type: none"> • POS as of Fall 2012 was 1307 which aligns with the framework 	✓

Curriculum: Strategic Curriculum Discussion (SCD)

Overview

Various stakeholders for the program are invited to attend a strategic discussion in regard to curriculum, essential skills for an entry-level position, emerging trends in the industry, graduate employment, and experiential learning opportunities. Meeting notes are logged in Appendix 10 – Hamilton Skilled Trades Apprenticeship Consortium and Employers of Mechanical Trades.

Highlights

- 95% of students get rave reviews from employers in terms of vocational and employability skill capability. The remaining 5% appear to lack motivation and direction
- Appear to be opportunities beyond the trade of Industrial Mechanic Millwright – specifically Machinists (including CNC) and Welders. It should be noted these are both streams in the new One year - Mechanical Techniques program
- Noted that an ongoing challenge exists to attract students to programs related to skills trades.
- The apprenticeship curriculum has not kept up with technology, the college program provides access and opportunities to integrate technology used on the plant floor
- Opportunities exist to complete core skills normally completed during orientation by the employer into the existing curriculum.
- Due to timing with academic schedules and student availability, specifically students on field placement, facilitating a focus group was not feasible at the time of review.

Recommendations

- Investigate opportunities for additional certification such as American Welding Institute (AWI) endorsement
- With the advent of the College of Trades, there is potential for significant change regarding apprenticeship training, both traditionally as well as through integrated CODA style programs.

Strengths, Challenges, Opportunities, Threats

Strengths

- Program provides excellent opportunities for experiential learning through the CODA program

- Students are registered as apprentices while attending school. CODA students may also complete a portion of the on-the-job training standard while on placement.
- Upon successful completion of the program, CODA students receive credit for all three in-school levels of the Industrial Mechanic Millwright (IMM) (433A) apprenticeship curriculum granting a Certificate of Apprenticeship (C of A).
- The iPad project provided students with ongoing opportunities to utilize technology available on the plant floor.

Challenges

- Although program enrolment has stabilized post-recession there are still challenges recruiting students to programs affiliated with manufacturing.

Opportunities

- Bring Your Own Device is the logical next step after the success of the iPad project. Continued opportunities exist to enrich the student experience with technology.
- Re-alignment with the apprenticeship curriculum to better reflect the traditional model of delivery in clustering of core subjects would lead to increased portability and opportunities for transfer credit.
- Align curriculum with program at other colleges to increase transferability (ONTrans)
- Incorporate basic business fundamentals beyond entrepreneurship to provide students with a greater understanding of how business operates.
- Introduce opportunities to develop skills in emerging technologies in areas such as power generation and Green power.
- Optimize OCAS listing so program is identifiable with other comparable programs.

Threats

None

Curriculum: Pathways and Partnerships

Overview

Pathways and partnerships analysis provide opportunities to explore and identify strengths and challenges associated with internal and external pathways and partnerships for the program.

Highlights

- The Manufacturing Engineering Technician program provides graduates of the CODA program with credit for all three levels in the in-school apprenticeship curriculum for the trade of Industrial Mechanic Millwright (IMM)

Challenges

- There are currently no internal articulated pathways to bridge to a Mechanical Engineering Technology Advanced College Diploma
- The Manufacturing Engineering Technician program does not have articulated external pathways for further education at this point. Opportunities do exist on a case by case basis with various institutions via the PLAR framework

- The current course design and program of study does not align with other comparable post secondary programs virtually eliminating the opportunity for block credit transfers

Recommendations

- Assess opportunities for various pathways between comparable college programs of study
- Consider better alignment with the apprenticeship curriculum in terms of course content to better align with reportable subjects for the Industrial Mechanic Millwright (IMM) (433A) trade.

Curriculum: Program System Map

Overview

A program system map provides data used to determine pathways between certain types of "families" of credentials. Families of credentials refer to program outcomes and MTCU codes that are relevant for specific industries and sectors.

Highlights

- Currently, comparable programs are offered under different Provincial Program Standards: Manufacturing Engineering Technician (57000), Mechanical Engineering Technician (51007) and Mechanical Technician (55300).
- Currently, there are 23 colleges that offer some type of Manufacturing/Mechanical 2-year program of study. The integrated apprenticeship programs are not limited to a single program standard. Of those 23 colleges, only 9 offer some type of integrated apprenticeship curriculum programs. However, not all 9 colleges offer CODA programs.
- The following colleges offer a comparable CODA program: Cambrian (Industrial Mechanical Millwright Technician), Lambton (Millwright Mechanical Technician) and Northern (Mechanical Technician).
- Two colleges offer non-CODA integrated programs: Fanshawe (Mechanical Engineering Technician-Industrial Maintenance) and St. Clair (Mechanical Engineering Technician-Industrial Mechanic)
- Conestoga offers a 1-year post-secondary program comprised of the first two levels of the trade.
- The range of program standards and delivery models makes block transfer credit opportunities next to impossible.

Recommendations

- Consider re-alignment of current POS to better accommodate block transfer credit opportunities. This would involve not only clustering of reportable subjects as well as completion of all of level one of the in-school apprenticeship curriculum. Currently students do not weld until the second year of the program of studies although welding is delivered in all three levels of the apprenticeship model.

Data Summary: Comparable Programs by Provincial Program Standard

Integrated Programs	Manufacturing Engineering Technician (57000)	Mechanical Engineering Technician (51007)	Mechanical Technician (55300)	Industrial Mechanical Millwright Technician (51007)	Mechanical Techniques (41007)
Cambrian (CODA)				1	
Conestoga					1
Fanshawe		1			
Lambton (CODA)			1		
Mohawk (CODA)	1				
Northern (CODA)			1		1
St. Clair		1	1		
# of Programs by Credential Level	1	2	3	1	2

Curriculum: Program Advisory Committee

Overview

Assessment of the efficacy and currency of the Program Advisory Committee (PAC) is required based on criteria established in the Program Advisory Committee Policy.

Highlights

- The Hamilton Skilled Trades Apprenticeship Consortium acts as the Program Advisory Committee for the Manufacturing Engineering Technician Program.
- HSTAC meets on a regular basis throughout the academic year
- HSTAC membership is generally comprised of employers (graduate and co-op), a representative of the local Apprenticeship Branch and industry representatives from a variety of sectors.
- HSTAC is regularly consulted outside of formal meetings. The expertise of the PAC is utilized in a variety of ways for a variety of reasons (e.g. Opportunities for field placement, curriculum renewal).

Recommendations

- Evaluate efficacy of HSTAC as the PAC as well as membership based on specific criteria outlined in the PAC policy and those locally developed by the program team.

Environmental Scan: Competitive Overview

Overview

The following section provides a brief overview of comparator integrated Industrial Mechanic Millwright (IMM) (433A) apprenticeship programs in the college system in regard to applicant, enrolment, program choice, funding units etc.

Highlights

- There are 8 Ontario College Diploma programs in the college system comparable to the Manufacturing Engineering Technician program.
- Many colleges offer a 1/2/3-year model from Ontario College Certificate to Ontario College Diploma to Advanced Ontario College Diploma
- The program profile for Mohawk College's integrated IMM program is somewhat different than competitor colleges with slightly more males and a higher proportion of non-direct students at time of enrolment. There is no difference in program choice.

MTCU	MTCU Title - English	WT	FU	TF	Definition of Funding Abbreviations
47000	Manufacturing Techniques	1.30	1.40	1.00	<i>WT = Program Weight for funding purposes. This is a measure of the special expenses that the program requires (such as specialized equipment or additional staff resources).</i>
57000	Manufacturing Engineering Technician	1.30	2.80	2.00	
41007	Mechanical Techniques	1.30	1.60	1.00	<i>FU = Program Funding Units for funding purposes. This is a measure of the duration of the program.</i>
55300	Mechanical Technician	1.40	2.40	2.00	<i>TF = Tuition Fee Factor (TFF) determines the maximum tuition fee the college can charge for a Ministry-approved program. Two factors determine the TFF- the number of semesters and the teaching hours of the program.</i>
51007	Mechanical Engineering Technician	1.30	2.30	2.00	

Funding factors for the Manufacturing Techniques and Manufacturing Engineering Techniques seem to be in the same range or better than comparable programs. It is likely, therefore, that there would be no economic advantage to a program modification from Manufacturing Engineering Technician to Mechanical Technician.

Environmental Scan: Applicant, Enrollment, Catchment

Overview

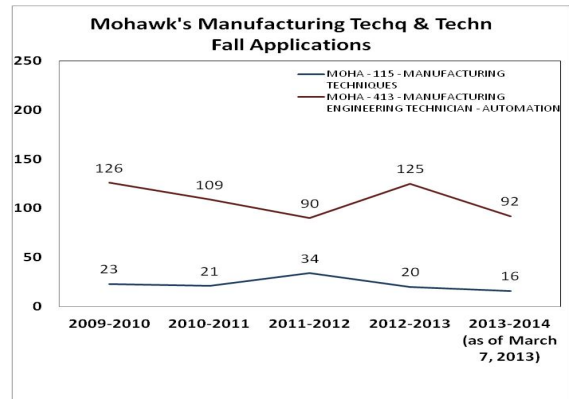
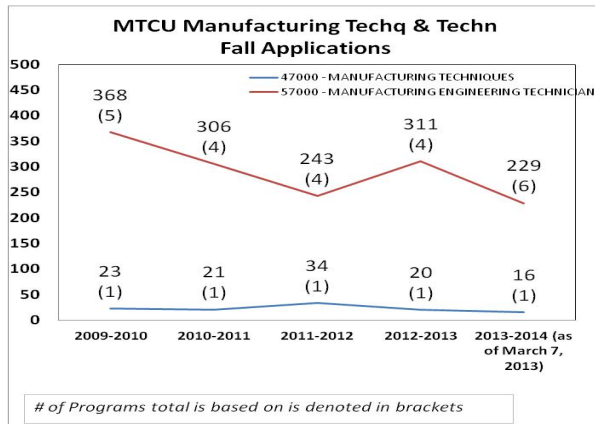
OCAS data, market demand data and labour market trends are used to analyze and compare the Mohawk College Advertising program to comparator programs in the college system.

Applications/Enrolment

Domestic applications for Manufacturing Engineering Technician programs across the system showed a slow decline from Fall 2009 to 2011, from a total of 368 to 243. Applications rose to a total of 311 in Fall 2012. Almost 60% of applicants choose Mohawk's program as their 1st or 2nd choice. As of March 27/13, applications to the program totalled 229.

Enrolments (domestic and international) ranged from a high of 147 in 2009 to 138 in 2012. Over the past four years, Mohawk's program has had a 40% share of Manufacturing Engineering Technician students across Ontario.

The program has strong applicant and enrolment numbers from the Niagara and Sheridan catchments. Although students from the Conestoga or Fanshawe catchments apply to the program, few enrol. Few Mohawk students go to other institutions to take this program.



Demographics

Those enrolled in the various programs across the province, including Mohawk are male; young (40% are 18-21) males, the majority of whom have been out of school for a period of time. About 10% of students enrolled in 2012/13 were international students.

Market Demand Profile

Program Profile (OCAS as of November 2012)

The program profile for Mohawk College's Manufacturing Engineering Technician program is slightly different than competitor colleges a higher proportion of non-direct students at time of enrolment and program choice.

Mohawk: Mfg Eng Techn Profile		MTCU Profile	
Applications Fall 2012	Enrolment Fall 2011	Applications Fall 2012	Enrolment Fall 2011

Applicant Type	63% are non-direct		63% are non-direct		56% are non-direct		56% are non-direct
Gender	97% Male		97% Male		97% Male		97% Male
Program Choice	46% as 1st choice followed by 11% as 2nd choice		n/a		19% as 1st choice followed by 19% as 2nd choice		n/a
Age Group			25% age 20-21 19% age 19				21% age 20-21 20% age 18

Applications (OCAS as of May 2013)

Applications have returned to pre-recession levels for this program. Confirmations are higher for 2012 than they were in 2011.

Catchment (OCAS as of Fall 2012)

There is no evidence of market drain for this program. Fanshawe program attracts local students as well as from the Conestoga catchment. Strong demand is demonstrated from both Niagara and Sheridan catchment – all enrol in Mohawk’s program.

Environmental Scan: Employment

Overview

Graduate Employment is analyzed using a variety of sources such as the Graduate Employment Report and a survey implemented 6 months after graduation. Graduate Employment for graduates of the Mohawk College Advertising program is based on:

Program	Grad Rate	Employed FT Related
Manufacturing Engineering Technician (CODA)	60%	92%
Manufacturing Engineering Technician (non-coop)	52%	50%

- 2010-2011 CODA Graduates: graduated in either August 2010, December 2010, or April 2011
- 2010-2011 Graduates: graduated in either August 2010, December 2010, or April 2011

Highlights

- Overall, there has been an increase in graduates employed in full-time, program related positions between 2008 and 2011.
- The CODA version of the Manufacturing Engineering Technician program ranks 9% above both the college and system wide averages for full-time related employment. This is a significant improvement over the previous year at 57%. This upward trend is expected to continue as the economy continues to rebound.
- The non-coop version of the program has a 50% employment rate significantly below the college and system average. This still represents an increase from the previous years results.
- Based on the 2010 Graduate Employment Report, graduates were employed in full-time, program related positions earning an average salary of approximately \$37,356 (non-coop) to 43,726 (CODA) . In comparison, 57% of all Mohawk College graduates were employed in full-time, program related positions with an average salary of approximately\$37,000. (<http://www.mohawkcollege.ca/about/research/gradReport.html>).

Recommendations

- Utilize the Annual Program Review process to monitor enrolment and satisfaction trends.
- Develop strategies to address issues as a result of the environmental scan.

Environmental Scan: Key Performance Indicators

Overview

Key Performance Indicators (KPIs) are an MTCU directive and the data is used to analyze the program based on student satisfaction, teaching and learning, facilities etc. KPIs also provide comparator data for other programs in the college, programs under the Associate Dean, all programs at Mohawk, and similar programs in the college system.

Overall, Student Satisfaction KPIs for both the CODA and non-coop option of this program have been strong over the past 4 years with a rolled average of 80%. Over the same three years, approximately 90% were satisfied with the knowledge and skills they learn for their future career (Q.14) and approximately 83% with their learning experiences in the program (Q.26). Student Satisfaction KPIs for this program are higher than the MTCU average for the program area and the overall average for Mohawk College. Strengths of the program were identified as:

- Q.3 'provides you with skills and abilities specific to your chosen career'
- Q.10 'develops your ability to solve problems'
- Q.22 'quality of other learning experiences'

2012 KPIs for both the CODA and Non-Coop Options increased from the previous year to:

2012 Student Satisfaction	CODA Option	Non-Coop Option
Q.14	93.9%	94.4%
Q.26	85.7%	94.4%
Q.44	89.8%	83.3%
Q.45	87.8%	88.9%

Areas where students noted some improvement could be made were in the areas of: developing writing skills, speaking, and computer skills; providing opportunities to further education after graduations; feedback about their progress; quality of other learning experiences, and course materials.

Resource: Appendices 11 & 12

Highlights

- Strengths of the Manufacturing Engineering Technician program are that the program provides graduates with appropriate skills (Q3), teachers' knowledge of subject and course content (Q10), develops ability to solve problems, and (Q22) quality of other learning experiences.
- Overall KPI student satisfaction scores (2012) for the Manufacturing Engineering Technician program (Q14, Q26, Q44 and Q45), are well above the overall respective Mohawk College scores.

Recommendations

- Continue to evolve the program to meet needs of industry.
- Lessons learned from the iPad pilot project will become the foundation for the BYOD program Fall 2013.

Environmental Scan: Competitive Curriculum Analysis

Overview

Competitive Curriculum data is used to analyze the program based on several variables such as admissions, model of delivery, tuition, program of studies, intake schedule, and experiential learning opportunities in comparison to other colleges with the same program. This data is used to determine if other colleges are adopting innovative practices within the program.

Source: Appendix 14 Competitive Analysis

Highlights

- The number of Cooperative Diploma Apprenticeship (CODA) programs integrating the in-school curriculum for the trade of Industrial Mechanic Millwright (IMM) (433A) apprenticeship has decreased. At this time there are only four schools offering this model of delivery.
- Admissions requirements into the Manufacturing Engineering Technician program in the college system are consistent, requiring applicants to have OSSD with grade 12 English C or U.
- Due to the variety of models and program standards utilized for this type of program it is difficult to achieve a Block Credit Transfer option at this point. Other colleges are not as restricted in terms of transfer credits as they tend to mirror the apprenticeship reportable subjects for both content and order of delivery.
- Comparison of the programs of study (POS) for various integrated apprenticeship diploma programs in the college system, indicates that course names and descriptions for the Mohawk program is somewhat outdated and out of alignment. In some cases, a single reportable subject is covered in three distinct courses. This is not the case at other institutions and is one of the barriers to Block Transfer Credit opportunities.

Recommendations

- Consider revisions to course names, descriptions and learning outcomes to align with comparator colleges and the in-school Industrial Mechanic Millwright (IMM) (433A) curriculum.
- Articulate a thorough PLAR model to align with other colleges as part of the ONTransfer framework.

Quality and Strategic Priorities: Summary

Overview

Phase 3 of program review is under revision in order to meet new strategic priorities, PQAPA requirements and the Academic Plan requirements. The Re-Thinking Assessment and Assessment Alignment is still required for Phase 3.

Highlights

- The program team followed a prescribed process to evaluate best practices in assessment design for most courses with a practical component.
- Most of the courses in the POS have identified a PLAR which somewhat meets the requirements of the PLAR policy, however, PLAR is not updated on the POS.
- The majority of courses in the POS have a learning plan which is a best practice for student success
- Faculty created a blended –learning environment for most of the courses in the program as an offshoot of the iPad Pilot project. Development continues to prepare for BYOD in Fall 2013.
- KPIs remain strong for both versions of the program.
- The CODA program integrates Essential Employability Skills at the technician level with the Apprenticeship curriculum to meet the needs of employers who are looking for entry-level with Future Ready skill sets.
- Strong Share of Market for Applicants and Registrants in Manufacturing Engineering Technician program

Recommendations

- Evaluate best practices in assessment and make appropriate adjustments as a result of the evaluation.
- Utilize the Curriculum Committee and the Annual Program Review processes to monitor results of the adjustments
- Maintain linkage to MTCU 57000 Manufacturing Engineering Technician program but realign curriculum and program of studies to create better opportunities for Block Transfer
- Map to in-school Industrial Mechanic Millwright (IMM) (433A) curriculum. Offer complete level 1 apprenticeship curriculum as part of 1st year of the Manufacturing Engineering Technician program. At this point, welding is not introduced until semester three in year two.
- Integrate sustainability into courses as appropriate to align with comparable Mechanical Technician/Engineering Technician programs.

- Update competitive charts and pathways to include Mechanical Engineering Technician and Mechanical Technician programs.
- Investigate niche programming to female high school students.
- Enhance Orientation to support students in the BYOD program to use learning technologies.
- Track iPad/BYOD project results to establish best practices as well as complete an environment scan on the use of emerging education technology in the Ontario college system and other areas of higher education and within industry.
- Introduce opportunities to develop skills in emerging technologies in areas such as power generation and Green power.
- Investigate program name change to more closely and transparently reflect Industrial Mechanic Millwright (IMM) focus and relationship to apprenticeship.
- Optimize OCAS listing so program shows up with comparable programs (e.g. keyword: Millwright)

Program Quality Action Plan

Objectives	Action Strategies	Timelines	Responsibility	Status
Short Term (within the next 18 months)				
Utilize the Annual Program Review and Curriculum Committee processes to make changes to curriculum content and assessment to address scaffolding and laddering of curriculum. .	a. Utilize the Curriculum Mapping Matrix to address curriculum gaps. b. Follow the process for evaluating best practices in Assessment Design to ensure alignment of assessment to outcomes with a focus on recognizing student experience. <ul style="list-style-type: none"> • Utilize the program level assessment mapping process for additional semesters in the program in order to monitor the student experience. • Include all IMM apprenticeship outcomes in first year of program • Investigate aligning curriculum with programs at other colleges to increase portability and transferability c. Facilitate Strategic Curriculum Discussions with current students and recent graduates to assess curriculum and employment opportunities relevant to the program standards for both the postsecondary and apprenticeship content. <ul style="list-style-type: none"> • Consider revisions to course names 	2013-2014	Program Team and Program Quality	Not Started

	and descriptions to align with comparator colleges and industry input.			
Evaluate opportunities for student pathways and develop a plan to implement a pathways plan for the program.	<ul style="list-style-type: none"> a. Assess opportunities for various pathways between other college programs <ul style="list-style-type: none"> o Utilize the ONTransfer data to review comparator colleges and programs. 	2013-2014	Program Team and Program Quality	ONTransfer review started
Investigate program name change to more closely and transparently reflect program focus and relationship to apprenticeship	<ul style="list-style-type: none"> a. Optimize OCAS listing so Mohawk's program shows up with similar programs when searching for Industrial Mechanic Millwright (IMM) b. Research Industrial Mechanical Millwright Techniques/Technician titles (as used by Cambrian and Apprenticeship standard) c. Identify pathways to further education for graduates of diploma and CODA programs 	By Oct 2013 for next year's listings	Program Team and Program Quality	Not Started
Establish best practices for in-class use of learning technologies	<ul style="list-style-type: none"> a. Track iPad project results to establish best practices in school and in the workplace b. Conduct an environmental scan on the use of emerging educational technology in the Ontario college system (e.g. Algonquin, Seneca programs) other areas of higher education, and within the industry 	2013-2014	Program Team and Program Quality	Not Started
Pursue niche marketing opportunities	<ul style="list-style-type: none"> a. Identify area high schools to target possible female applicants 	2013-2014	AD/Faculty	Not Started
Assess efficacy and membership of the Program Advisory Committee.		Spring 2013	Program Team	Not Started
Medium Term (within the next 18-36 months)				
Modify curriculum to introduce emerging technologies	<ul style="list-style-type: none"> o Review apprenticeship alignment to maximize efficiencies in delivery. o Develop strategies to address issues as a result of the environmental scan. o Introduce opportunities to develop skills in emerging technologies in areas such as power generation (e.g. wind turbines, solar tracking) 	2014/15 Academic Year	Program Team Faculty	Not Started

Monitor short-term and medium-term program quality enhancements and adjust as required	Utilize Annual Program Review process to monitor program quality enhancements.	TBD	AD	Not Started
Improve the graduation rates in the non-coop option of the program	Develop strategies, based on research, to improve graduation rates.	2014/15 Academic Year	Program Team and Program Quality	Not Started
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)		Not Started
	Submit interim program quality report to Program quality area	Fall 2015	AD	Not Started
	Plan and prepare for Comprehensive Program Review	Spring 2017	AD	Not Started