McMaster University

UNIVERSITY PLANNING COMMITTEE
Wednesday, December 9, 2020 at 10:30 AM
Zoom

AGENDA

Page

OPEN SESSION

BRIGHTER WORLD | McMaster University

Office of the Vice President
University Advancement
Gilmour Hall, Room 205
1280 Main Street West
Hamilton, ON L8S 4L8
(905) 525-9140 x 24568

TO:	University Planning Committee
FROM:	Mary Williams, Vice President, University Advancement
SUBJECT:	**Naming Policy – Proposed Updates**
DATE:	December 1, 2020

We are pleased to share the following proposed updates to the McMaster's Naming Policy & Procedures with both clean and track changes versions as per the Secretariat. The updated policy has been reviewed by PVP and has their support.

McMaster's Naming Policy exists to provide structure and an approvals process for naming recognition. University Advancement manages the naming processes by developing naming recognition values, consults with faculties and units regarding naming opportunities and maintains an inventory of naming recognition on campus.

This will be the first policy update since 2010 and updates are minor in nature, including wording edits for clarification purposes. The existing policy has been serving McMaster well, so the proposed changes are small refinements. Internal university consultations have taken place and the Secretariat has been deeply involved in the review process. Externally, naming policies from several universities across Canada have been reviewed in preparation for this policy update.

Highlights of the changes include:

• Addition of 'life of space' naming limits, and clarity of scope for time limited namings.

• Addition of recognition of library archives and cultural collections to scope.

• Removal of fellowships from scope as these are not typically named. If this option presents itself in the future, the policy allows for us to present other suitable naming opportunities for naming consideration and approval.

• Replacement of 'donor' with 'funder' throughout the policy.

Following UPC approval, the proposed updated policy will be reviewed for approval by the Advancement Committee of the Board on December 11, and the Board of Governors on December 17.

We welcome the opportunity to discuss this proposed update with you or answer any questions.

BRIGHTER WORLD

McMaster University

Policies, Procedures and Guidelines

Complete Policy Title

Naming Policy & Procedures

Policy Number (if applicable):

Approved by

Board of Governors

Date of Most Recent Approval

TBD

Date of Original Approval(s)

December 16, 2010

Supersedes/Amends Policy dated

December 16, 2010

Campus Names Policy – 1993

Campus Names Procedure - 2004

Responsible Executive

Vice-President (University Advancement)

Policy Specific Enquiries

Vice-President (University Advancement)

General Policy Enquiries

Policy (University Secretariat)

DISCLAIMER: *If there is a Discrepancy between this electronic policy and the written copy held by the policy owner, the written copy prevails.*

PREAMBLE

1. The naming of physical space and academic entities is a well-established custom at McMaster University. Naming provides meaningful opportunities for the recognition of outstanding contributions by those who serve as inspiration for future generations of students, graduates and members of the University community.

2. This Policy governs naming opportunities at the University. The Board of Governors may recognize exceptional contributions, be they financial support or in the form of honorable service, as follows:

   a) to recognize distinguished members of the University community;

   b) to recognize major funders of the university, including individuals, corporations, and foundations; or

   c) to recognize individuals who bear a special relationship to the University, Hamilton, or surrounding community.

SCOPE

3. This policy applies to all units and individuals at the University who seek recognition for a funder's generosity and/or exceptional service by a member of the McMaster community. This Policy guides the granting of named recognition at the University for:

   a) buildings (new and existing) or substantial parts of buildings (wings, floors, segments);

   b) streets, walkways and outside spaces;

   c) rooms and spaces within existing and new buildings;

   d) gifts in kind such as library collections, art, and other appropriate items;

   e) academic entities: Faculties, departments, and schools;

   f) academic programs, lectureships, speaker series, programs of research, service or recreation; or

   g) other suitable naming opportunities as determined by the University.

4. Minimum funding requirements for naming recognition will be established by the President and Vice-Presidents and be reviewed on an ongoing basis.

5. Naming of a chair or professorship in honour of an individual, corporation or foundation will be subject to the requirements and process as outlined in the McMaster University Policy Guidelines for Establishing Named Chairs and Professorships.

GENERAL NAMING POLICY

6. Naming terms will normally be outlined in documentation such as a gift agreement. Naming may be offered for a limited time or for the useful life of the space/building or may be offered in perpetuity.

7. Ultimate authority to approve or revoke any naming request at the University rests with the Board of Governors.

8. The Board of Governors reserves the right to revoke a naming decision if it constitutes a significant and/or continuing impairment to the University's reputation or if the agreed-upon financial contributions are significantly reduced. In these instances, the approval procedure of this Policy will apply.

9. From time to time a named space may need to be altered due to a change in purpose, etc. The University will make all reasonable efforts to consult with the honoree, funder, or appropriate family members in advance of changes to naming recognition

10. Naming of academic units shall not impede the University from altering its academic and research priorities and shall conform to all University policies and guidelines governing the establishment of such entities.

11. Recommendations for the naming of a new building, or major segment of it, should flow from:

    a) a sense of very broad support in the University community for the naming in recognition of the person's leadership contribution to the growth and reputation of the University; or

    b) an individual's (or corporation's) significant financial or in-kind contribution towards the capital or continuing operating cost of the facility within the context of the University's development strategy. The University will consider a funder's overall contributions in naming discussions/decisions. Normally "significant" will be interpreted as meaning 30%, or more of costs. Namings as a result of future gifts (bequests, etc.) will not normally be granted until such time as the gift is realized.

12. Naming recognition to honour a member of the University community or outstanding external scholars who have a close relationship with the University shall not be conferred until at least two years following the individual's retirement or death, except under the most unusual circumstances (such as the awarding of a Nobel Prize or similar world-wide recognition).

APPROVAL PROCEDURE

13. Naming recommendations may originate from any member of the University community.

14. Individuals contemplating a naming opportunity to recognize outstanding service and/or financial support are to consult first with the office of University Advancement for information and advice.

15. The Vice-President of University Advancement shall submit naming requests in writing to the President and Vice-Presidents for review.

16. The President, once satisfied that the naming recognition conforms to this Policy and that the recommendation deserves support, will forward their recommendation to the University Planning Committee for approval.

17. The University Planning Committee will then forward approved names to the Board of Governors for final University approval.

18. If the University Planning Committee does not approve the recommendation it will be sent back to the office of University Advancement who will inform the party who made the submission.

19. Namings of an academic nature may require additional approval from the Senate.

PLAQUES AND NAMING SIGNAGE

20. Plaques and signage recognizing funders and named spaces shall be of a generally uniform design and consistent with the University's branding guidelines. The office of University Advancement should be consulted on all named space recognition signage.

21. External corporate logos and/or wordmarks will not be permitted on University recognition signage.

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When permanent named recognition has been offered, it will be honoured in perpetuity, subject to 3.2 above. ¶
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REPORT TO THE UNIVERSITY PLANNING COMMITTEE
from the
UNDERGRADUATE COUNCIL

a.   **Establishment of New Certificate of Completion Program**

   i.   **MMRI Industrial Training Program (Certificate of Completion in Advanced Manufacturing)**

At its October 27, 2020 meeting, the Undergraduate Council reviewed and approved a proposal to establish the Certificate of Completion in Advanced Manufacturing. Details of the proposed Certificate of Completion program are contained within the circulated material.

It is now recommended,

that the University Planning Committee approve the establishment of the Certificate of Completion in Advanced Manufacturing, as set out in the attached.

University Planning Committee: FOR APPROVAL
November 18, 2020

BRIGHTER WORLD

Proposal

MMRI Industry Training Program

Certificate in Advanced Manufacturing
- *Processes*
- *Materials*
- *Industry 4.0*

Objectives:
- *provide hands-on advanced training for active learners*
- *expose learners to advanced materials and manufacturing capability and expertise at McMaster*
- *empower laid off and underutilized workers to be better problem solvers and thereby reconnect with job opportunities*
- *allow employers to access the skills their staff need to solve problems and realize performance opportunities on the shop floor.*

McMaster Manufacturing Research Institute (MMRI)

September 24, 2020

Table of Contents

Rationale for the Program

To meet the ever-increasing global demand for high-value manufactured products, manufacturers are striving to maintain their competitive edge in the global market by optimizing processes, applying automation, and creating innovative products and services. New technologies can benefit companies, but companies also require skilled workers with advanced knowledge, problem-solving and decision-making skills. These demands put workers with low technical and problem-solving skills at risk of being laid off if production volumes drop. They also make it difficult for people with limited experience to re-enter the job market and for people recently laid-off to keep up with changes in the industry.

This unique training program is designed around meeting the needs and requirements of industry as identified by our wide range of our industry partners. The focus is on building on a worker's existing skillset, not replacing it, and empowering them with innovative, up-to-date and in-demand skills and knowledge. The program will be set up to deliver core concepts quickly in small units which are focused on providing the necessary background to solve a problem or realize a production performance opportunity.

Experiential problem-based learning of this nature is the most powerful way for people in the manufacturing sector to acquire the necessary skills and experiences that will build their background to connect with new job opportunities and develop a life long career in manufacturing. By linking learning with problems and production improvement opportunities employers also benefit from the results of the learner's project work in their operations.

Given the pandemic all content will be delivered online including demos and case studies. Learners will also interact with the program team online to complete their projects. Once restrictions are lifted, we will be working to develop a blended mode of learning allowing learners to come to the MMRI and interact with our equipment, instruments and experts.

1

Learning Outcomes

The MMRI Industrial Training Program current plans to offer 20+ short one day courses (micro-credentials) in three core streams directly related to advanced manufacturing, as listed below:

1. Advanced Manufacturing Processes
2. Advanced Manufacturing Materials
3. Advanced Manufacturing Industry 4.0

All courses will be designed based on the current needs and requirements as identified by industry and the skill-gaps among the workers we have identified through our years of collaboration with industry.

This educational program will address the challenges faced by our manufacturing industry partners and provides the attendees with the problem-solving skills needed to tackle the challenges they face. Projects will be defined based on existing problems and challenges faced by the manufacturing industry, and courses will be designed to provide critically needed skills and knowledge to solve problems and realize opportunities on the manufacturing floor.

This certificate program will be designed to provide the background knowledge needed to empower workers. The focus is on giving them the tools they need to solve real world production problems, realize opportunities for improvement on the factory floor and in addition support product innovation by facilitating manufacturing.

To earn a certificate in one stream, participants must complete four required courses, four elective courses, and complete an industry-relevant project of their choice. The project can build on opportunities an active learner has or connect with manufacturing problems and production improvement opportunities from their current employer.

Each course will be completed in 1 day and the project will have instructional input as well so there will be over 50 hours of instructor contact time per certificate.

The intended learning outcomes of each of the courses are listed in Table 1.

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Table 1. MMRI Industry Training Program

Courses	Streams			Learning Outcomes
R: Required E: Elective	Advanced Manufacturing Processes	Advanced Manufacturing Materials	Advanced Manufacturing Industry 4.0	
Metal Cutting (I) (Introduction)	R (Exemption Available)	E	E	1. Cover basic safety training and acquire the hands-on and technical skills needed to machine a part on a manual machine. Learn about setting up a part and tooling and selecting cutting parameters. 2. Machine test parts on a manual machine. 3. Be able to machine a common part, measure it and record the cycle time.
Metal Cutting (II) (Intermediate)	R (Exemption Available)	E	E	1. Acquire the hands-on and technical skills needed to machine a part on a CNC machine. Learn about fixturing, setting offsets, and selecting tooling and cutting parameters. 2. Generate a G-Code program for a CNC machine. 3. Be able to machine a complex part and optimize the cycle time.
Metal Cutting (III) (Advanced)	R	E	E	1. Understand the basics of different machining operations, identify the main tool wear mechanisms and learn ways to control them, know the different coolant strategies, learn about different active chip control mechanisms and learn about the impact of machining process conditions on surface quality. 2. Perform a machining study and use optical microscopy to assess tool wear and perform surface quality analyses. 3. Be able to suggest cutting conditions resulting in minimum tool wear, surface integrity and cost for machining of a specific material and operation.

3

Cutting Tools/ Tool design	R	E	E	1. Review the main geometries of cutting tools, identify the different tool wear mechanisms and their root-causes, learn different classes of tool materials and tool coatings, know their typical applications and limitations. 2. Perform machining tests and use optical microscopy to assess tool wear and perform tool failure analysis. 3. Be able to suggest a proper tool geometry, material, and coating for a specific machining operation.
Dynamics of Machining	R	E	E	1. Learn the basics of mechanics of metal cutting and cutting forces in a machining operation, learn the fundamentals of mechanical vibrations & regenerative chatter, sensors, and data collection. 2. Run a machining test and measure cutting force and vibration. 3. Be able to tune a process based on its dynamic performance.
Coatings for Cutting Tools	R	E	E	1. Get exposure to the different properties of tool coatings, learn the criteria for selecting the best coatings for specific operations, learn about different coating deposition techniques, their basics, applications, and limitation, and learn about different coating characterization techniques. 2. Be able to use different characterization instrumentation and be able to understand and analyze results. 3. Be able to suggest a proper coating for an intended operation and be able to characterize it and quantify impact on performance.
Design for Reliability and Manufacturability	R	E	E	1. Learn the fundamentals of design requirements for reliability and manufacturability of products by covering test method validation, process capability and voice of X (VOX). 2. Use a statistical tool like Minitab to develop a testing framework. 3. Demonstrate the ability to measure a processes capability and validate the test method using a statistical tool like Minitab.

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Design for Advanced Manufacturing	R	E	E	1. Learn about design challenges in Advanced Manufacturing a. Limitations and opportunities b. Physical based optimization of the manufacturing processes using advanced modeling. 2. Use Computer-aided design (CAD) software to solve design problems. 3. Be able to apply a CAD software package to optimize a manufacturing process.
Material Testing and Characterization (I) (Micro / Nano-Mechanical Testing)	E	R	E	1. Study the background theory and application of micro/nano-mechanical testing techniques available for near/sub-surface material property assessments. 2. Get familiar with material testing and characterization equipment and procedures. 3. Learn how small-scale testing can be utilized to understand the behaviour of materials and predict/enhance product performances under real life conditions.
Material Testing and Characterization (II) (Scratch Testing)	E	R	E	1. Develop an understanding of scratch testing for assessing the adhesive strength of coating–substrate systems as well as quantifying scratch and mar resistance for research, quality control and product development. 2. Become familiar with the instruments, testing procedures and interpreting results. 3. Compare surface performance of critical surfaces to enhance the understanding of how these methods can be applied to improve surface performance and longevity.
Microscopy Failure Analysis	E	R	E	1. Learn basic failure analysis methodologies, failure modes and mechanisms. 2. Identify different failure modes using advanced microscopy. 3. Perform root-cause analysis using newly gained knowledge and visual evidence.

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High Resolution Surface Imaging Atomic Force Microscopy (AFM)	E	R	E	1. Get exposure to the science and application of different imaging technologies (both high and low resolution) available for material characterization. 2. Use the different microscopes available to identify common problems in materials and manufacturing. 3. Develop an understanding of choosing the right imaging tools and apply their capability correctly by studying meaningful problems.
Composite Materials and Testing Techniques	E	R	E	1. Introduction to composite material, basic mechanics, and failure modes. Mechanical testing of composites at low and high temperatures. 2. Perform fracture toughness testing to understand delamination behavior of composites. 3. Be able to understand the mechanics of composite materials and select the right testing method to characterize the material.
Finite Element Analysis (FEA) Modeling of Machining Processes (Introduction)	E	E	R	1. Understand the basics of FEA applied to machining process modelling. 2. Apply FEA based modelling of processes using a commercial software package to solve problems. 3. Be able to solve a production problem using FEA based process modeling.
Finite Element Analysis (FEA) Modeling of Machining Processes (Applications)	E	E	R	1. Understand the basics of machining operations and the use of FEA based models for modeling different metal-cutting processes. 2. Learn FEA based modelling techniques of metal cutting processes using a commercial software. 3. Be able to shed light on a machining problem using FEA.
Finite Element Analysis (FEA) Modeling for Machine Tooling Design	E	E	R	1. Understand the basics of FEA based modeling for machining processes. 2. Apply FEA based modelling of machining process tooling using a commercial software package. 3. Be able to solve a tooling problem using FEA.

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Finite Element Analysis (FEA) Modeling of Metal Forming Processes	E	E	R	1. Understand the basics of applying FEA for modeling metal forming processes. 2. Apply FEA based modelling of metal forming processes using a commercial software. 3. Be able to investigate a metal forming process using FEA.
Modeling of Additive Manufacturing Processes	E	E	R	1. Understand the basics of modeling of additive manufacturing processes. 2. Apply modelling of additive processes using commercially available software. 3. Be able to study a given problem using process modelling. Problems may be related to part quality or optimization of part design or process.
Lean Manufacturing (Basics)	E	E	R	1. Learn the basic background on lean manufacturing for reducing waste, identify the 7 types of waste in a project and suggest tools for eliminating them. 2. Apply tools for waste identification, basics of process mapping, 5S, plan–do–check–act (PDCA) methodology. 3. Be able to apply lean principles to improve an operation.
Lean Manufacturing (Toolbox)	E	E	R	1. Learn advanced concepts of lean manufacturing such as continuous flow, takt time, advanced process mapping, push-pull and bottleneck identification with continuous flow, 1-piece flow, cellular, manufacturing, standard work, mistake proofing, load leveling and kanban. 2. Review examples and practice applying concepts on processes. 3. Map a current state of a given process, identify issues and suggest a future state using the tools covered.

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Resources

Ontario Rapid Skills

Employment Ontario has provided funding to support the development of this training program. This funding has enabled the qualified instructors to develop high quality, relevant course content, organize demos and prepare case studies. It has also allowed us to organize potential projects based on our research and input from our industry partners.

NGen – Next Generation Manufacturing Canada

The Next Generation Manufacturing AmpUP program will support employers who want their employees to participate in the MMRI Industrial Training Program by covering ½ of the tuition costs for employee training.

Instructors

The MMRI has more than 20 years of experience in teaching, research and industrial activities. Highly qualified MMRI staff members and post doctoral fellows have developed the curriculum for the three certificate streams. These staff members are experienced in solving manufacturing problems with industry partners and know what manufacturers are looking for in employees. The courses will be delivered by MMRI staff, a faculty member in the department of Mechanical Engineering, and by outside experts.

Tuition Revenue

Tuition revenue will be modest at first, as support from Employment Ontario and NGen is helping with development costs, but once the program is fully operational, tuition fees will cover costs.

MMRI Facilities

The MMRI currently has a large facility with a wide range of industrial scale equipment and world-class instruments well suited for hands-on training. This program is being designed to increase utilization of the MMRI's facilities by providing us with more exposure in the community.

The MMRI will also be moving to the McMaster Innovation Park (MIP) expanding in space and acquiring more advanced manufacturing technology. The move to MIP will facilitate more collaboration with our industry partners. Architect renderings highlight the space and show the connection between the classroom and the lab areas.

8

MMRI
McMASTER UNIVERSITY

270 LONGWOOD ROAD SOUTH
HAMILTON, ON

SCALE:	LINTACK ARCHITECTS	EXTERIOR FACADE
DATE:	INCORPORATED	PROJ No.
JAN 2020		19.065	SK1

MMRI
McMASTER UNIVERSITY

270 LONGWOOD ROAD SOUTH
HAMILTON, ON

SCALE:	LINTACK ARCHITECTS	CONFERENCE ROOM
DATE:	INCORPORATED	PROJ No.
JAN 2020		19.065	SK5

Training space under development at MIP

9

Major Equipment

The MMRI has instrumented industry scale equipment capable of duplicating a wide range of industry processes while studying them using our advanced instrumentation and modeling capability.

Milling Centres

Makino MC56-5XA
Rapid Feed Rate: 15m/min
Special High Power: 40 HP Spindle
Max Spindle Speed – 15,000 RPM
Simultaneous 5-Axis Control
FANUC 16 Control
Movement Increment 0.0001mm
Maximum Travel X:510mm   Y:635mm Z:635mm
High Pressure Through Spindle Coolant and Air

Matsuura FX-5G
Rapid Feed Rate: 25m/min
Spindle Power: 27 HP
Max Spindle Speed – 27,000 RPM
High Precision, High Rigidity
FANUC 15iM Control, 20 Tool ATC
Maximum Travel X:1020mm Y:560mm Z:400mm
Probe Measuring and Positioning System

Matsuura LX-1
Rapid Feed Rate: 90m/min
1.5G Rapid Feed Acceleration
Max Spindle Speed – 60,000 RPM
Linear Motors on All Three Axis
Ultra High Precision
FANUC 15iM Control
Maximum Travel X: 500mm   Y:500mm Z:300mm

Okuma Cadet-Mate
Max. Rapid Feed Rate: 20m/min
Spindle Power: 15 HP
Max Spindle Speed 8,000 RPM
Maximum Travel X:1016mm Y:508mm Z:523

Turning Centres

Boehringer VDF 180CM
Spindle Power: 50 HP
Max Spindle Speed – 4,500 RPM
10m/min Axes Feed Rate
12 Station VDI 40 Turret

Nakamura SC450
40 HP Wide Output Spindle
Spindle Speed-2,500 RPM
12m/min Rapid Axis Feed Rate
Slant Bed Design, 12" Diameter Chuck
Laserline 2.0 KW Diode Laser System
FANUC

Okuma Crown-S, BB
OSP Control System
Max. Spindle Power: 24 HP
Spindle Speed – 3,500 RPM
20m/min Rapid Feed Rate
10" Diameter Chuck

Water Jet System

Flow AF-6080
Cutting Table: 6' x 8', Z-axis adjustability: 24"
Allen Bradley Series 9 Control System
Contouring Speed: 400 ipm

Micro Machining

Freeform 7000
Rotary C-Axis, Rotary B-Axis
High Speed Turbine Grinder
SP-90 Diamond Turning Spindle
LVDT Tool Set Station, Optical Tool Set Station
Tool Air/Lube System
Air Temperature Control System
Expected: July 2003

Grinding

Walter Helitronic Power Series Tool Grinder
Double Ended Grinding Spindle
Oil Coolant Systems
15m/min Axes Feed Rate
HMC 500 Control With Pentium Processor
Automatic Tool Probing System

BLOHM Planomat 408 CNC Surface Grinder
GE Fanuc 18i control
Contour/creep-feed grinding capability
15 kW spindle
Grinding speeds up to 165 m/s
30 m/min. maximum table feed rate
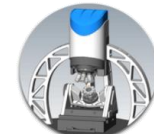
Metrology Equipment

Zeiss Prismo 900 with VAST measuring head.
Solution Software Library
Probing Technology (VAST)
900/1200/700 XYZ
Full Scanning Capabilities
1000pt a sec. and 3" a sec.
Caliber up to 2 Microns

Alicona InfiniteFocus

Real 3D Part Metrology for small objects
Vertical resolution up to 10nm
Edge radius up to 1μm
Roughness up to 0.03 μm Ra

EDM System

AGIETRON *Impact 2* Ram-type EDM System
Windows-based Agievision 2 control
4 servo controlled axis
Freely definable 2- & 3-dimensional
orbital/vector movements
72 A power generator

10

Instruments

The MMRI has an extensive suite or material property assessment equipment capable of assessing a wide range of materials.

Nano Test Platform
- ✓ Two Loading Heads: Micro (0.1-20N) and Nano (10 mN -500 mN)
- ✓ Nano-/micro -indentation
- ✓ Nano-/micro- scratch
- ✓ Nano-impact
- ✓ High temperature capability
- ✓ Property Mapping

Anton-Paar NHT3 Nano-Indentation Platform
- ✓ Fast measurements with ISO 14577 standard
- ✓ Sinusoidal loading (sinus mode)
- ✓ Multi-cycle loading
- ✓ User defined profile
- ✓ Target specific indentation
- ✓ User Friendly
- ✓ Compatible for measurements in liquids

High Load-High Temperature Tribometer
- ✓ Heavy-load
- ✓ High-temperature (up to 1000 °C)
- ✓ Custom developed to mimic the tool-chip interface in machining.
- ✓ The tool is simulated by a ball-tipped carbide pin, coated or uncoated, which interacts with a sample of work material.
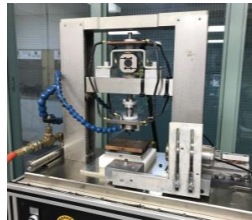
AFM – TOSCA 400:

- ✓ Automatic laser alignment
- ✓ Large scan area in all directions combined with the highest accuracy
- ✓ The easiest engagement procedure on the AFM market
- ✓ Compatible with all cantilevers
- ✓ State-of-the-art sample navigation
- ✓ Workflow-oriented control and analysis software which meets the demands of industry
- ✓ Applications by Industrial Segments:
- Chemicals
- Paint & coatings
- Rubber & plastics
- Electronics
- Metal
- Non-metal
- Petroleum
- Textile
- Life science
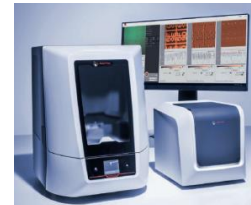
Anton-Paar Revetest Scratch Tester
- ✓ Mico-/Macro- scratch and Wear test
- ✓ Conventional hardness measurements
- ✓ Toughness Measurements
- ✓ Critical load to failure, frictional force, co-efficient of friction and penetration depth determination
- ✓ Panoramic imaging directly synchronized with scratch

Standard Tribometer (TRB³ PIN-ON-DISK):
- ✓ The industry standard for friction, wear and lubrication measurement.
- ✓ Environmental condition monitoring in real-time with integrated temperature and humidity sensors
- ✓ Ultimate testing parameters control and cutting-edge data analysis with Tribometer software
- ✓ Fast and easy contact mechanics simulation by Modelization software
- ✓ Some Applications:
- Thin films (protective or decorative hard coatings)
- Metals (bulk, advanced alloys, metallic composites)
- Polymers (bulk polymers, polymeric coatings)
- Lubrication system (fluid or solid lubricants)
- Automotive (coatings, bulk materials, engine oils)
- Optical coatings (antireflective coatings)
- Biomaterials (hard implants, soft implants, stents)
- Pharmaceutical (medicaments)
- Various (thermal spray coatings, ceramic tiles, etc.)

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Alignment with McMaster's Certificates Policy

The following comments address points 45-56 of McMaster's Certificates-Diplomas policy:

CERTIFICATE OF COMPLETION
45. We are proposing that the term certificate of completion be assigned when a learner completes 8 one day courses and the completion of a real-world project. The academic calibre courses include in class lecture content, on machine demos and case studies involving industry relevant data which are being developed by faculty, post docs and core staff at the MMRI. The lecture content will be designed to provide the necessary background. Demos and case studies will be used to familiarize individuals with the technology. The project will be used to provide focus to the learning and encourage learners to pull content from the program to solve problems. The content leverages undergrad and grad material previously developed by core instructors and draws on international experts at our technology partners.
46. Based on the course load and project work the program will have over 30 hours of contact time (approx. 50 hrs) with instructors and an evaluation of the learners understanding will be completed at the end of each course. Project reports will also be graded.
47. As part of the program learners will complete quizzes, perform an assignment, and complete a project to demonstrate understanding of core concepts.
48. This program is targeting unemployed and underutilized people and as such is part of a lifelong learning initiative.

Admission Requirements
49. It is expected that learners will have a diploma, degree or considerable experience in advance materials and manufacturing before starting the program. This will be assessed in a preselection interview.

Credit Toward Another Credential
50. There are no plans currently to align this with a degree program, but the program will be designed so this can be done in the future if there is interest. We are working to be compatible with the micro credential initiative underway in the faculty of engineering.
51. A Certificate of Attendance may be issued if an individual takes only one course. Then it would be a Certificate of Attendance for one course. If they are not actively working towards a Certificate of Completion, then they may also opt to not participate in the assessment.

Approval Criteria
52. Appropriate announcements will be made to Undergrade council so that they are aware of this program and its objectives.
53. Fees are being charged and thus we are following the process for approval of academic certificates and diplomas.
54. The program is designed to address the needs of unemployed and underutilized workers and as such holds considerable benefit to the community and is consistent with the objectives McMaster has for community engagement.

Guidelines and Limitations
55. Clarity and the protection of the McMaster certificate brand are being considered. The planned title of the program is the MMRI Industry Training Program. We are working with the Public Relations groups on campus to ensure branding is consistent with McMaster's guidelines.
56. The course description will include the non-credit status of the course. Details related to learner evaluation will also be provided. At this stage 70% is the target grade to pass a course and have it contribute to a "Certificate of Completion".

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Appendix – Statement of Academic Merit, Faculty of Engineering

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McMaster University | ENGINEERING

September 24, 2020

Certificates Committee
McMaster University

RE: Faculty of Engineering's statement of support for the MMRI Industry Training Program

To whom it may concern,

I am writing to outline the Faculty of Engineering's support for the McMaster Manufacturing Research Institute (MMRI) Industry Training Program.

By way of background, a funding opportunity came up with Employment Ontario to develop a training program to help unemployed and underutilized employees gain valuable experience and advance their career in the manufacturing sector. The MMRI applied for and was successful in this competition. Since receiving the award they have been developing a detailed curriculum and putting in place the resources needed to deliver a rich learning experience.

The course content is being developed by the faculty and researchers at the MMRI, many of whom have PhDs in materials and manufacturing and have worked in the manufacturing research sector for many years. We have reviewed the intended learning outcomes associated with each course as part of our internal review process. We are also ensuring that the MMRI has the necessary resources to deliver a high-quality program that meets the standards of engineering for industry training programs and the objectives set out in McMaster's Certificates and Diplomas Policy.

Please contact me if you have any questions or concerns regarding this program.

Best regards,

Ishwar K. Puri
Dean of Engineering and Professor

BRIGHTER WORLD

DATE: November 17, 2020

TO: University Student Fees Committee

FROM: Stephen C. Veldhuis, Prof. and Director (MMRI)

RE: The MMRI Industry Training Program

Brief Description of the Request

Please describe the fee request and explain why it is being brought to the University Student Fees Committee. And please fill in the table below and leave it in as part of the description of the request, if applicable.

Request category	New Program Tuition and Supplementary Fees
If new program, is it intended to be MCU funded?	**No**
Description of Program and Plan. Please also suggest description strings to be used in Mosaic Program: ACAD_PROG (5 chars length) DESCR (max 30 chars length) Plan: ACAD_PLAN (max 10 char length) DECSR (max 30 chars length)	To meet the ever-increasing global demand for high-value manufactured products, manufacturers are striving to maintain their competitive edge in the global market by optimizing processes, applying automation, and creating innovative products and services. New technologies can benefit companies, but companies also require skilled workers with advanced knowledge, problem-solving and decision-making skills. These demands put workers with low technical and problem-solving skills at risk of being laid off if production volumes drop. They also make it difficult for people with limited experience to re-enter the job market and for people recently laid-off to keep up with changes in the industry. This unique training program is designed around meeting the needs and requirements of industry as identified by our wide range of our industry partners. The focus is on building on a worker's existing skillset, not replacing it, and empowering them with innovative, up-to-date and in-demand skills and knowledge. The program will be set up

	to deliver core concepts quickly in small units which are focused on providing the necessary background to solve a problem or realize a production performance opportunity. Experiential problem-based learning of this nature is the most powerful way for people in the manufacturing sector to acquire the necessary skills and experiences that will build their background to connect with new job opportunities and develop a lifelong career in manufacturing. By linking learning with problems and production improvement opportunities employers also benefit from the results of the learner's project work in their operations.	
Indicate the proposed fee amount(s) by Fee Type: (Under Fee Type, please specify if the fees specified are program, course, term, unit, or annual fees) **Domestic Tuition:**	**Fee Amount ($)**	**Fee Type**
	$500 / course $4,500 / certificate (involving 8 course + 1 project course)	Cash but some government support programs are available.
International Tuition:	$500 / course $4,500 / certificate (involving 8 course + 1 project course)	
Supplementary Fees:	Choose an item.	Choose an item.
How fees will be charged? (Proposed program or annual fees that are charged or payable by term should preferably be divisible by 3.)	**Individuals will be invoiced before each course and will have the option to pay by credit card. In cases where agencies like NGen are involved they will be billed separately at the end of each month.**	

Additional Notes, if applicable:

Brief Description of the Program or Issue

Please provide a brief description of the relevant program or issue associated with the request to USFC. For programs, please include at the minimum the program name, department/faculty, and certification received upon degree completion.

Program Name: MMRI Industry Training Program
Dept. / Faculty: Faculty of Engineering
Certificate Received: McMaster Certificate of Completion in Advanced Manufacturing

Rationale for Fees or Issue

Please provide the rationale for the proposed fees/request.

Fees are being charged to cover the cost of instructors associated with content delivery.

If new program tuition and/or supplementary fees, rationale should include fees charged by similar programs within McMaster or at other institutions or any other relevant information.

$500 per 1 day course is typical within industry for this type of course content.

If existing program tuition and/or supplementary fees, explain why the proposed change is necessary. Explain the process/procedure for approval of the supplementary fees and the outcome. Describe the method of fee collection.

Proposed Timelines

Deadline for University Student Fees Committee Decision:	**September, 2021**
Rationale for requiring University Student Fees Committee decision by the above date:	**To meet timing associated with the program.**
Please indicate effective start date (month/year) for new program/fees:	**September, 2021**
Need Board approval for fees by:	**September, 2021**

- **The MMRI Industry Program has been operating with Faculty of Engineering Dean's permission since March 2020 to test the concept. We are requesting formal approval to start effective September 2021.**

Additional Information

Please provide any other additional information. You may provide attachments. For new programs, please attach the completed Program Costing Template.

Please see the accompanying Program information document.

Since this is not a new degree program a detailed Program Costing Template was deemed to not be appropriate, in its place a Program Budget is provided.

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If this request relates to a **new fee** you are advised to connect with Student Accounts and Cashiers prior to submitting this proposal to USFC in order to discuss on how to code this new fee into the Mosaic system.

I/We have contacted with Student Accounts and Cashiers: YES ☐   NO ☒

Note: We will be invoicing the learners or their company's directly.

Program Budget

First Year

Revenue		Notes
Rapid Skills	300,000	
NGen AmpUp Support	9,000	NGen industry members get support from NGen
First year Fees	42,000	Count on 20 learners completing a certificate and 30 other learners just taking 1 course. Use a reduced fee amount of $200 for the first year.
Revenue Subtotal	351,000	
Expenses		
Partnership Development	35,000	
Program Development	109,500	
Program Delivery	122,500	Revenue used to support Post Docs, Staff and cover machine maintenance costs.
Materials and supplies	10,000	
Special Tuition support	44,000	
Program Coordination (Part Time Administrator)	30,000	
Expenses Subtotal	351,000	
Balance	-	If any extra revenue is generated it will go into new course development to build the program.

Year 2 - Planned

Revenue		Notes
Fees	97,000	Count on 40 learners completing a certificate and 50 other learners just taking 1 course. Continuing using a reduced fee amount of $200 for certificates but full amount of $500 for people taking only 1 course.
Revenue Subtotal	97,000	
Expenses		
Partnership Development	5,000	
Program Development	6,000	
Program Delivery	51,000	Revenue used to support Post Docs, Staff and cover machine maintenance costs.
Materials and supplies	5,000	
Program Coordination (Part Time Administrator)	30,000	
Expenses Subtotal	97,000	
Balance	-	If any extra revenue is generated it will go into new course development to build the program.