

Senate Wednesday, January 13, 2021 at 3:30 PM Zoom

AGENDA

NOTE: Members who wish to have items moved from the Consent to the Regular Agenda should contact the University Secretariat before the Senate meeting. Members may also request to have items moved when the Agenda is presented for approval.

Page

A. OPEN SESSION

OPENING REMARKS

1. APPROVAL OF AGENDA – OPEN SESSION

CONSENT

2. MINUTES OF PREVIOUS MEETING – DECEMBER 9, 2020 (OPEN SESSION)

<u>REGULAR</u>

- 3. BUSINESS ARISING
- 4. ENQUIRIES
- 5. COMMUNICATIONS
 - COU Update (INFORMATION)
- 6. **REPORT FROM GRADUATE COUNCIL**
- 6 7 Graduate Council Report (INFORMATION)
 - For Information
 - **1.** Change to Calendar Copy
 - 2. Change to Comprehensive Examination
 - 3. Change to Program Requirements and Calendar Copy
 - 4. Change to Course Requirements
 - 5. Change to Program Requirements
 - 6. Change to Program Requirements
 - 7. Curriculum Updates

7. REPORT FROM THE UNIVERSITY PLANNING COMMITTEE

8 - 30 University Planning Committee Report (APPROVAL)

8. **REPORT FROM THE FACULTY OF HUMANITIES**

31 - 33 Faculty of Humanities Report (APPROVAL)

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9. OTHER BUSINESS



Academic Colleagues

December 8-9, 2020: Zoom Meeting

Evening Meeting, Tuesday, December 8, 2020, 6:00 - 8:00 pm

Conversation with Dr. Scott Henderson, Dean and Head of Trent University on the topic of misinformation and the role of universities.

Dr. Henderson joined the colleagues for a conversation on the role of universities in combating misinformation. He framed the conversation around three questions: (1) What role can universities play in combatting misinformation? (2) How and where can faculty become part of the public discourse by actively sharing information and ideas? and (3) How can academia stay relevant and timely while respecting the importance of peer review?

Dr. Henderson noted that the increasing volume and rapid spread of information create too much complexity and confusion weakening an individual's ability to discern good information from misinformation. These factors also create challenges for academics. University researchers validate their work through a lengthy and rigorous peer-review process. Often, individuals have already made up their minds about a topic by the time research is made public.

Colleagues noted that one of the most important ways in which universities can contribute to combating misinformation is to provide a high standard of education that enables students to critically evaluate information.

Colleagues stressed the importance of being transparent about what we know and what we don't yet know, stressing that scientific knowledge is still evolving.

Colleagues also discussed how to more broadly disseminate their research by participating in public discourse through Op-Eds and other media formats. Some universities actively encourage their faculty to engage with the public in this manner, and provide training.

Colleagues Meeting, December 9, 2020

1. Update on the launch of the Indigenous Faculty Survey Katarina Todic and Éilis Karry

The results of the Indigenous Faculty Survey will be published on December 14. This the first survey of its kind in Canada. Please see attached slides for more information.

2. COU update (Mike Snowdon)

Budget

The Ontario government tabled its 2020 budget on November 5. The province estimates that spending in 2020-21 will be \$22 billion higher than in 2019-20 and that the deficit for this year will be \$38 billion. It also projects deficits over the next two years of \$33 billion and \$28 billion, respectively. University and college base budgets remained essentially unchanged.

Council of Ontario Universities Meeting Material

Page 1 of 3

Capital and Infrastructure

The government's decision to allocate the same amount of capital and infrastructure funds to universities and colleges will result in less funding for universities than under the previous allocation model. Universities account for three-fourths of buildings and two-thirds of enrollment. COU continues to advocate for more capital and infrastructure funding for universities.

Micro-credentials

The province has committed \$60M over the next three years to the development of microcredentials. The government defines micro-credentials as programs that "recognize granular, specific skills and competencies, are tied to a labour market need, and typically require less time to complete than traditional credentials."

This funding will be used for, among other things, an online portal, to fund and incent the development of micro-credentials, launch a public awareness campaign, expand OSAP eligibility to include students in "ministry approved, quality-assured" micro-credential programs and to develop a virtual passport that issues and tracks a person's learning experience.

eCampusOntario will play a major role in supporting this initiative by developing a virtual passport that issues and tracks a person's learning experiences.

Research

A small amount of new money, about \$9M, was allocated to research, including \$2M for Ontario Health Data Platform, which will explore opportunities to integrate datasets and support research projects related to the COVID-19 response, \$3.5M to support the operations and maintenance related to Advanced Research Computing in Ontario (co-funded with CFI), and up to \$2 million in funding to enhance collaboration across the research sector.

Financial Sustainability Advocacy

In the context of COVID-19, COU has been advocating for adequate revenue as well as affordability and access for students. COVID-19 costs and lost revenues are estimated to be more than \$1B for this fiscal year. Most of the costs are for upgrades to remote learning, student supports and health and safety. The lost revenue is mainly on the ancillary services side (parking, residences, conference services) – which continue to have costs but are not generating revenues.

SMA3

Strategic Management Agreements are now publicly posted. The government has agreed to decouple funding from performance for the first two years of SMA3 because of de-stabilizing effects of COVID-19.

3. Committee Reports

Budget and Audit Committee

Please see attached report.

Quality Council

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Please see attached report.

Attachments

Presentation on the release of the Indigenous Faculty Survey Report QC Report to Academic Colleagues Dec 2020 COU Budget and Audit Report Dec 2020

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REPORT TO SENATE from GRADUATE COUNCIL

FOR INFORMATION

At its meeting on December 8th, Graduate Council approved revisions to the Aid and Awards Policy and revisions to the Policy on Academic Program Development and Review. Please see the report from Undergraduate Council for details.

Faculty of Engineering

I. Change to Calendar Copy

At the same meeting, Graduate Council approved revisions to the M.A.Sc. calendar copy for Chemical Engineering around expected time to completion for the accelerated option, to ensure it was in accordance with the time to completion for the overall program.

II. Change to Comprehensive Examination

At the same meeting, Graduate Council approved revisions to the comprehensive examination requirements for Computing and Software transitioning away from the model of students preparing answers to a set of questions and to a model where students prepare a report ahead of the oral examination.

III. Change to Program Requirements and Calendar Copy

At the same meeting Graduate Council approved revisions to the M.A.Sc. program offered by Materials Science and Engineering to formalize the requirement for a supervisory committee meeting and, with respect to their accelerated option, to add additional course requirements for entry into the option.

IV. Change to Course Requirements

At the same meeting Graduate Council approved revisions to the available electives to students in the MEPP and MEME programs in the School of Engineering Practice and Technology.

Faculty of Science

V. Change to Program Requirements

At the same meeting, Graduate Council approved revisions to the program requirements for the Ph.D. in Math, changing Part 1 of the comprehensive (the written component) into a qualifying examination.

VI. Change to Program Requirements

At the same meeting, Graduate Council approved revisions to the transfer requirements for the M.Sc. in Chemistry, allowing students to transfer without first completing all of their coursework and colloquium.

VII. <u>Curriculum Updates</u>

Graduate Council also received, for information, an update from the Faculty of Engineering on a temporary curriculum change made in 2020 as a result of Covid-19.

[Note: A complete file for the information items listed above is available in the Graduate Council office, cbryce@mcmaster.ca.]



UNIVERSITY SECRETARIAT

Board of Governors
Senate

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REPORT TO SENATE

FROM THE

UNIVERSITY PLANNING COMMITTEE

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

At its meeting of December 9, 2020, the University Planning Committee approved the establishment of the Certificated of Completion in Advanced Manufacturing.

The University Planning Committee now recommends,

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

Senate: FOR APPROVAL January 13, 2021



UNIVERSITY SECRETARIAT

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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



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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 indemand 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.



Learning Outcomes

The MMRI Industrial Training Program current plans to offer 20+ short one day courses (microcredentials) 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.



Table 1. MMRI Industry Training Program

Courses	Streams			
R: Required E: Elective	Advanced Manufacturing Processes	Advanced Manufacturing Materials	Advanced Manufacturing Industry 4.0	Learning Outcomes
Metal Cutting (I) (Introduction)	R (Exemption Available)	E	E	 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. Machine test parts on a manual machine. Be able to machine a common part, measure it and record the cycle time.
Metal Cutting (II) (Intermediate)	R (Exemption Available)	E	E	 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. Generate a G-Code program for a CNC machine. Be able to machine a complex part and optimize the cycle time.
Metal Cutting (III) (Advanced)	R	E	E	 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. Perform a machining study and use optical microscopy to assess tool wear and perform surface quality analyses. Be able to suggest cutting conditions resulting in minimum tool wear, surface integrity and cost for machining of a specific material and operation.



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Cutting Tools/ Tool design	R	Е	E	 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. Perform machining tests and use optical microscopy to assess tool wear and perform tool failure analysis. Be able to suggest a proper tool geometry, material, and coating for a specific machining operation.
Dynamics of Machining	R	Е	E	 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. Run a machining test and measure cutting force and vibration. Be able to tune a process based on its dynamic performance.
Coatings for Cutting Tools	R	E	E	 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. Be able to use different characterization instrumentation and be able to understand and analyze results. 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	 Learn the fundamentals of design requirements for reliability and manufacturability of products by covering test method validation, process capability and voice of X (VOX). Use a statistical tool like Minitab to develop a testing framework. 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	 Learn about design challenges in Advanced Manufacturing Limitations and opportunities Physical based optimization of the manufacturing processes using advanced modeling. Use Computer-aided design (CAD) software to solve design problems. 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	 Study the background theory and application of micro/nano-mechanical testing techniques available for near/sub- surface material property assessments. Get familiar with material testing and characterization equipment and procedures. 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	 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. Become familiar with the instruments, testing procedures and interpreting results. 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	 Learn basic failure analysis methodologies, failure modes and mechanisms. Identify different failure modes using advanced microscopy. 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	 Get exposure to the science and application of different imaging technologies (both high and low resolution) available for material characterization. Use the different microscopes available to identify common problems in materials and manufacturing. 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	 Introduction to composite material, basic mechanics, and failure modes. Mechanical testing of composites at low and high temperatures. Perform fracture toughness testing to understand delamination behavior of composites. 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)	Е	E	R	 Understand the basics of FEA applied to machining process modelling. Apply FEA based modelling of processes using a commercial software package to solve problems. Be able to solve a production problem using FEA based process modeling.
Finite Element Analysis (FEA) Modeling of Machining Processes (Applications)	E	E	R	 Understand the basics of machining operations and the use of FEA based models for modeling different metal-cutting processes. Learn FEA based modelling techniques of metal cutting processes using a commercial software. Be able to shed light on a machining problem using FEA.
Finite Element Analysis (FEA) Modeling for Machine Tooling Design	E	E	R	 Understand the basics of FEA based modeling for machining processes. Apply FEA based modelling of machining process tooling using a commercial software package. Be able to solve a tooling problem using FEA.



Finite Element Analysis (FEA) Modeling of Metal Forming Processes	Е	E	R	 Understand the basics of applying FEA for modeling metal forming processes. Apply FEA based modelling of metal forming processes using a commercial software. Be able to investigate a metal forming process using FEA.
Modeling of Additive Manufacturing Processes	E	E	R	 Understand the basics of modeling of additive manufacturing processes. Apply modelling of additive processes using commercially available software. 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	 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. Apply tools for waste identification, basics of process mapping, 5S, plan-do-check- act (PDCA) methodology. Be able to apply lean principles to improve an operation.
Lean Manufacturing (Toolbox)	E	E	R	 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. Review examples and practice applying concepts on processes. Map a current state of a given process, identify issues and suggest a future state using the tools covered



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 $\frac{1}{2}$ 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.







Training space under development at MIP



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



Freeform 7000 Micro Machining Rotary C-Axis Rotary B-Axis

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



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

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



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









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) ~

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 balltipped carbide pin, coated or

uncoated, which interacts with a

sample of work material.

- 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

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
- Electronics
- Petroleum

- Metals (bulk, advanced alloys, metallic composites)







11

- ~
 - measurements
 - Critical load to failure, frictional force. co-efficient of friction and
 - Panoramic imaging directly synchronized with scratch



- Chemicals
- Paint & coatings Rubber & plastics
- Metal Non-metal
- Textile
- Life science

- 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)
- 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.)

Anton-Paar Revetest Scratch Tester Mico-/Macro- scratch and Wear

- test Conventional hardness
- Toughness Measurements
- penetration depth determination



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".



Appendix – Statement of Academic Merit, Faculty of Engineering



Office of the Dean John Hodgins Engineering, Room 261 1280 Main Street West Hamilton, ON L8S 4L8 Section Secti

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,

Den k. T.

Ishwar K. Puri Dean of Engineering and Professor

BRIGHTER WORLD

University Student Fees Committee



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	No
funded?	
Description of Program and Plan. Please	To meet the ever-increasing global demand for
also suggest description strings to be used	high-value manufactured products, manufacturers
In Mosaic	are striving to maintain their competitive edge in
ACAD PROG (5 chars length)	the global market by optimizing processes,
DESCR (max 30 chars length)	applying automation, and creating innovative
Plan:	products and services. New technologies can
DECSR (max 30 chars length)	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 concep	ots quickly in small units
	which are focused on	providing the necessary
	background to solve	a problem or realize a
	production performanc	e opportunity.
		, ,
	Experiential problem-ba	ased learning of this nature
	is the most powerful	way for people in the
	manufacturing sector	to acquire the necessary
	skills and experience	s that will build their
	background to connect y	with new job opportunities
	and develop a lifelong ca	areer in manufacturing Ry
	linking learning with	problems and production
	improvement opportuni	tion amplements and production
	finiprovement opportuni	
	from the results of the	learner's project work in
	their operations.	
Indiants the survey and fee survey (a) her Fee	//>	F H H
Indicate the proposed fee amount(s) by Fee	Fee Amount (\$)	гее Туре
Type: (Under Fee Type, please specify if the fees	Fee Amount (\$)\$500 / course	Cash but some
Type: (Under Fee Type, please specify if the fees specified are program, course, term, unit, or annual fees)	Fee Amount (\$) \$500 / course \$4,500 / certificate	Cash but some government support
Type: (Under Fee Type, please specify if the fees specified are program, course, term, unit, or annual fees) Domestic Tuition:	Fee Amount (\$) \$500 / course \$4,500 / certificate (involving 8 course + 1	Cash but some government support programs are available.
Type: (Under Fee Type, please specify if the fees specified are program, course, term, unit, or annual fees) Domestic Tuition:	Fee Amount (\$) \$500 / course \$4,500 / certificate (involving 8 course + 1 project course)	Cash but some government support programs are available.
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Type: (Under Fee Type, please specify if the fees specified are program, course, term, unit, or annual fees) Domestic Tuition: International Tuition:	Fee Amount (\$) \$500 / course \$4,500 / certificate (involving 8 course + 1 project course) \$500 / course \$4,500 / certificate (involving 8 course + 1 project course) Choose an item.	Cash but some government support programs are available.
Type: (Under Fee Type, please specify if the fees specified are program, course, term, unit, or annual fees) Domestic Tuition: International Tuition: Supplementary Fees:	Fee Amount (\$) \$500 / course \$4,500 / certificate (involving 8 course + 1 project course) \$500 / course \$4,500 / certificate (involving 8 course + 1 project course) Choose an item.	Cash but some government support programs are available.
Type: (Under Fee Type, please specify if the fees specified are program, course, term, unit, or annual fees) Domestic Tuition: International Tuition: Supplementary Fees:	Fee Amount (\$) \$500 / course \$4,500 / certificate (involving 8 course + 1 project course) \$500 / course \$4,500 / certificate (involving 8 course + 1 project course) Choose an item.	Cash but some government support programs are available.
Type: (Under Fee Type, please specify if the fees specified are program, course, term, unit, or annual fees) Domestic Tuition: International Tuition: Supplementary Fees:	Fee Amount (\$) \$500 / course \$4,500 / certificate (involving 8 course + 1 project course) \$500 / course \$4,500 / certificate (involving 8 course + 1 project course) Choose an item.	Cash but some government support programs are available.
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: International Tuition: Supplementary Fees: How fees will be charged? (Proposed program or	Fee Amount (\$) \$500 / course \$4,500 / certificate (involving 8 course + 1 project course) \$500 / course \$4,500 / certificate (involving 8 course + 1 project course) Choose an item.	Cash but some government support programs are available. Choose an item.
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: International Tuition: Supplementary Fees: How fees will be charged? (Proposed program or annual fees that are charged or payable by term	Fee Amount (\$) \$500 / course \$4,500 / certificate (involving 8 course + 1 project course) \$500 / course \$4,500 / certificate (involving 8 course + 1 project course) \$course + 1 project course) Choose an item. Individuals will be invoice will have the option to pain	Cash but some government support programs are available. Choose an item.
Indicate the proposed ree amount(s) by Fee Type: (Under Fee Type, please specify if the fees specified are program, course, term, unit, or annual fees) Domestic Tuition: International Tuition: Supplementary Fees: How fees will be charged? (Proposed program or annual fees that are charged or payable by term should preferably be divisible by 3.)	Fee Amount (\$) \$500 / course \$4,500 / certificate (involving 8 course + 1 project course) \$500 / course \$4,500 / certificate (involving 8 course + 1 project course) \$Choose an item. Individuals will be invoice will have the option to pay where agencies like NGer	Cash but some government support programs are available. Choose an item. Choose an item.

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 ProgramDept. / Faculty:Faculty of EngineeringCertificate 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.

<u>If new program tuition and/or supplementary fees</u>, 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.

<u>If existing program tuition and/or supplementary fees</u>, 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. <u>For new programs</u>, 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.

If this request relates to a <u>new fee</u> 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 $\hfill \hfill \square$ $\hfill NO$ $\hfill \hfill \square$

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	20.000	
(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	20.000	
(Part Time Administrator)	50,000	
Expenses Subtotal	97,000	
		If any extra revenue is generated it will go into new
Balance	-	course development to build the program.



Faculty of Humanities CNH 112 1280 Main Street West Hamilton, ON L8S 4L9 January 7th, 2021

To: Senate and Board of Governors

From: Dr. Pamela Swett, Professor & Dean of Humanities

Re: Proposal for Name Change for Department of Communication Studies and Multimedia (CSMM)

The faculty members in the Department of Communication Studies and Multimedia (CSMM) propose to change the department's name to the Department of Communication Studies and Media Arts (CSMA). The Faculty of Humanities voted in favour of the proposal at its November meeting.

Rationale

The request for a departmental name change follows a change to the name of the undergraduate Multimedia program in October 2020. Multimedia was a term first employed in the 1960s, but it has largely been abandoned by artists and researchers in the field. Media Arts better captures the multiple areas of concentration taught in the program, including audio, still and moving images, interactive graphics, digital games, performance and installation. Following the change to the program name, CMST faculty also proposed an update to the Department's name so it will continue to highlight both undergraduate programs they deliver: Communications Studies and Media Arts (CSMA). The Department believes this name change will make it easier to recruit students and communicate with community members, potential donors and others about the Department's research, arts practice, and teaching.

BRIGHTER WORLD



29 October 2020

To: Dr. Pamela Swett, Dean, Faculty of Humanities From: Dr. Christina Baade, Chair, Department of Communication Studies and Multimedia Subject: Department name change

The faculty members in the Department of Communication Studies and Multimedia (CSMM) wish to change the department's name to the Department of Communication Studies and Media Arts (CSMA). Below, I describe the rationale for the name change and how we arrived at this decision.

Rationale

Changing the department's name ensures that it will continue to reflect the names of our two undergraduate programs, Communication Studies and Multimedia. Now that the name of the Multimedia program is being changed to Media Arts, following approval from the Faculty of Humanities Curriculum Committee, we would like to change the name of the department to Communication Studies and Media Arts.

The core motivation for the program name change is to be clearer about what students actually do in the program. Studio production is a core element in the program, with areas of concentration in audio, still and moving images, interactive graphics, digital games, performance, and installation.

There is now a growing consensus among institutions, galleries, curators, and practitioners engaged with these artforms to identify them collectively as "Media Arts." The term "multimedia," first coined in 1966, has largely been abandoned due to its imprecision.

Calling our program (and department) "Multimedia" makes it challenging to communicate about what we do. This is especially the case given that other Canadian and international baccalaureate programs have adopted the more up-to-date "Media Arts" title for production-oriented, multidisciplinary programs that blend theory and practice.

Changing the name to "Media Arts" will facilitate promotion of the program to potential students and communication with potential donors, stakeholders, and community members.

Process

On 16 October 2020, the Faculty of Humanities Curriculum Committee voted to approve our department's undergraduate curriculum changes, which included a name change for the Multimedia program: from Multimedia to Media Arts.

Following upon this approval, I put the departmental name change on the agenda for our 21 October Faculty Caucus meeting, which was distributed to all departmental faculty and staff on 19 October. The CSMM Faculty Caucus consists of all tenured, tenure-track, and permanent faculty members in the department.

At the meeting, after discussing several potential department names, a strong consensus emerged around: "Department of Communication Studies and Media Arts" (CSMA). Dr. Terry Flynn made a motion to approve the name change, which was seconded by Dr. Alex Sévigny. The motion was approved unanimously by all faculty in attendance, who are as follows: Sara Bannerman, Lindsey Beutin, Terry Flynn, Paula Gardner, Faiza Hirji, Andrew Mactavish, Dilyana Mincheva, Selina Mudavanhu, Chris Myhr, David Ogborn, Liss Platt, Chrisitne Quail, Alex Sevigny, And Andrea Zeffiro.