

GRADUATE STUDIES COMMITTEE REPORT

ACTION REQUESTED:

Recommendation	<input checked="" type="checkbox"/>
Decision	<input checked="" type="checkbox"/>
Discussion/Direction	<input type="checkbox"/>
Information	<input type="checkbox"/>

DATE: 27 April 2021

FROM: Graduate Studies Committee

SUBJECT: New Program Proposal – Master of Business Analytics and AI

COMMITTEE MANDATE:

In accordance with Section c) of the Graduate Studies Committee (GSC) Terms of Reference, GSC has the responsibility “Examine proposals for new graduate degree and diploma programs” and “to recommend their approval, as appropriate, to Academic Council”.

MOTION FOR CONSIDERATION:

That, pursuant to the recommendation of the Graduate Studies Committee, Academic Council hereby approve the Master of Business Analytics and AI and recommend approval to the Board of Governors.

BACKGROUND/CONTEXT & RATIONALE:

The proposed program prepares students for highly successful careers in a variety of business analytics careers in private and public sectors where data is used to make decisions. It is a 10-12 month full-time (just under two years, part-time) course-based professional master’s program including 4 courses in the Fall, 4 courses in the Winter, and internship or comprehensive capstone projects in the Summer. The content of the degree will cover three main domains, which are applications of AI, Business Analytics and Management Opportunities. The program is targeted at graduates of Commerce or Business undergraduate degrees. Mode of delivery is hybrid / online with on-campus tutorials on selected weekends during the semester.

Although the Faculty of Business and IT offers a Master of IT Security and supervises the majority of the shared (with Faculties of Science & Engineering) Master and PhD in Computer Science students, it currently has no graduate programs that serve its own Commerce graduates. The proposed degree leverages strengths in information technology by providing a market oriented professional business master’s degree. The Master of Business Analytics and AI will build upon the core functional knowledge learned in the undergraduate program with advanced analytics and AI solutions to business problems.

In order for the program to be accessible to working students, it is offered hybrid in class and online with tutorial sessions on campus on selected weekends. In order to accommodate working parents, care was taken to design the degree from the onset to be achievable at a 50% course progression speed (2 classes/ term).

This degree is an integral part of other new programs in the Faculty that are being developed such as the Master of Computational Finance, and the MSc/PhD in Business and IT. Courses from this degree can be utilized in the other FBIT professional or research programs, and it is anticipated that there will be resource efficiencies through joint program marketing and advising. Surpluses from the professional programs will offset expenses from the research degrees. The choice of program name is based on other programs in business schools and is reflective of its content which is Business Analytics and Artificial Intelligence.

RESOURCES REQUIRED:

The Faculty of Business and IT has the expertise and capability to deliver the program with existing faculty who would have to be reassigned to the MBAI from other teaching duties. It is anticipated that new hires may be needed to facilitate the increase in teaching capacity. There is also an expected need for some additional acquisitions for the Library. The budget summary for illustrative purposes shows estimated enrolments with corresponding expenses and the actual Faculty budget will be reviewed annually and determined based on the full environmental context. The Teaching Assistantships are a function of the student enrolment and are expected to alter as the numbers increase. All resource requirements have been reviewed by the Academic Resource Committee (ARC) and the program approved to proceed.

CONSULTATION AND APPROVAL:

Academic Resource Committee Review March 2021

Final Faculty Council Approval: 16 March 2021

FBIT Graduate Education Committee: March 2021

GSC: March 2021

NEXT STEPS:

- Pending the approval of Academic Council and recommendation to the Board, the proposal must proceed through the following approval steps subsequent to AC:
 - Board of Governors
 - Ontario Universities Council on Quality Assurance
 - Ministry of Colleges and Universities
- The expected date of implementation is the fall semester of 2022

SUPPORTING REFERENCE MATERIALS:

- New Program Proposal with Appendices (Bookmarked PDF File)



University of Ontario Institute of Technology

New Graduate Program Proposal

Name of proposed program:	Master of Business Analytics and AI
Degree Designation/Credential:	MBAI
Faculty (where the program will be housed):	Faculty of Business and IT
Collaborating Faculty (if applicable):	
Program Delivery Location:	Hybrid Online and onsite at Ontario Tech University
Collaborating Institution(s) (if applicable):	
Proposed Program Start Date:	September 2022
Proposal Contact:	Michael Bliemel
Prepared Date:	January 3, 2020 – Revised March 15, 2021

Table of Contents

1	Introduction	3
2	Program Requirements	8
3	Consultation	14
4	Resource Requirements	15
5	Quality and Other Indicators	23
●	APPENDICES	23

1 Introduction

a) Program Abstract

Please provide a brief overview of the proposed program, in 1000 characters or less, including:

- *A clear statement of the purpose of the program*
- *Any program components, such as fields or pathways (note that fields and pathways are not required)*
- *Any distinctive elements, including alternative modes of delivery (including online)*

Master of Business Analytics and AI prepares students for highly successful careers in a variety of business analytics careers in private and public sectors where data is used to make decisions. It is a 10-12 month course-based professional master program including 4 courses in the Fall, 4 courses in the Winter, and internship or comprehensive capstone projects in the Summer. The content of the degree will cover three main domains which are applications of AI, Business Analytics and Management Opportunities. The program is targeted at graduates of Commerce or Business undergraduate degrees, and can be completed part-time in just under two years or full-time in 10-12 Months depending on the choice of internship or project. Mode of delivery is hybrid / online with on-campus tutorials on selected weekends during the semester.

b) Background and Rationale

- *Identify what is being proposed and provide an academic rationale for the proposed program*
- *Explain the appropriateness of the program name and degree nomenclature; list any program fields, pathways, etc. (note that fields and pathways are not required)*
- *If applicable, describe the mode of delivery and how it will support students in achieving the learning objectives of the program*
- *Describe the ways in which the program fits into the broader array of program offerings*

Although the Faculty of Business and IT offers a Master of IT Security and supervises the majority of the shared (with Faculties of Science & Engineering) Masters and PhD in Computer Science students, it currently has no graduate programs that serve our own Commerce graduates. This degree leverages our strengths in information technology by providing a market oriented professional business masters degree. Our undergraduate business majors include Marketing, Finance, Accounting, Human Resources and Technology Management. The Masters of Business Analytics and AI will build upon the core functional knowledge learned in the undergraduate program with advanced analytics and AI solutions to business problems.

In order for the program to be accessible to working students, it is offered hybrid in class and online with tutorial sessions on campus on selected weekends. In order to accommodate working parents, care was taken to design the degree from the onset to be achievable at a 50% course progression speed (2 classes/ term).

This degree is an integral part of our other new programs in the Faculty that are being developed such as the Master of Computational Finance, and the MSc/PhD in Business and IT. Courses from this degree can be utilized in the other FBIT professional or research programs, and we will have resource efficiencies through joint program marketing and advising. Surpluses from the professional programs will offset expenses from our research degrees.

The choice of program name is based on other programs in business schools and is reflective of its content which is Business Analytics and Artificial Intelligence. The course code is MBAI which condenses the name into 4 letters for our information system.

c) Mission, Vision, Strategic Plan, and Strategic Mandate Agreement

- *Describe how the program contributes to the University's Mission and Vision*
- *Explain how the program aligns with the goals and priorities outlined in the Faculty's(ies') and University's [Strategic Plans](#)*
- *Identify how the program fits within one or more areas of strength or growth in Ontario Tech University's [Strategic Mandate Agreement](#)*

The Master of Business Analytics and AI aligns with the University and Faculty priorities in being a market driven degree in an in-demand field that is at the intersection of Technology and Business. It fits the FBIT mission nicely which is "To prepare students with the skills, knowledge and networks that they need to succeed in today's workplace as well as the ability to continue to learn and adapt to the needs of the workplaces of the future." , "To leverage our strengths in business transformation, digital economy, data analytics and artificial intelligence, and digital technologies for good; to improve productivity through innovation while being mindful that the impact of technology shall also improve the quality of life." , "To create value for the university and the province by creating new knowledge through research excellence, by building communities with our neighbours, and by growing talent pipelines with industry partners".

The program will also align well with the "Tech with a Conscience" brand as it covers both the ethical / social as well as the technical components. Further the degree fits with the strategic mandate agreement in the area of strength in Information and Communication Technology and Informatics. The MBAI fits our Ontario Tech Vision in several ways, especially to "Provide superior undergraduate and graduate programs that are technology enriched and responsive to the needs of students and the evolving workplace". At this time there is no such program in Durham Region.

d) Student Demand

- Provide evidence of student demand, including number of prospective student inquiries; applications and registrations for similar programs; results from surveys/focus groups of existing students, graduates, or professionals in the field
- Include information about domestic vs. international student interest

According to Graduate Management Admission Council (<https://www.gmac.com/-/media/files/gmac/research/admissions-and-application-trends/application-trends-survey-report-2019.pdf>), Master of Data Analytics programs grew their total application volume in 2019 by 53% across 75 US programs that use the GMAT as admission requirements, while most MBA programs saw declines in applications again. Business Masters of Data Analytics is the second most popular program and the median number of applications for each seat was 4.1 to 1, with a 57% Median Acceptance Rate, indicating an overall healthy demand in the US that was mirrored in the Ontario market which is only served by a few small programs at this time; most of which are very new with limited data. Maclean’s (<https://www.macleans.ca/education/specialized-graduate-school-business-program-mba-requirements/>) reports that the McGill Program in Master of Management Analytics saw 547 applications for a class of 55 students most recently. Similar ratios have been informally reported by programs in the Ontario market.

Enrolment Information

- Provide information regarding enrolment projections and complete Table 1

The numbers below are the anticipated of new enrollments / year

Table 1: Projected Enrollment by Academic and Program Year

Level of Study	Master’s year 1	Master’s year 2	Ph.D. year 1	Ph.D. year 2	Ph.D. year 3	Ph.D. year 4	Ph.D. year 5	Total Enrolment
Academic Year 2022 – 2023	15							15
Academic Year 2023 – 2024	20							20
Academic Year 2024 – 2025	25							25
Academic Year 2025 – 2026	30							30
Academic Year 2026 – 2027	35							35
Academic Year 2027 – 2028	40							40





e) Societal Need

- *Evidence of the need for graduates of the program and in which fields (within academic, public, and/or private sectors)*
- *Please indicate up to three occupations in which graduates from this proposed program may be employed using the [Ontario Job Futures](#) website*
- *For professional programs, a description of the program's congruence with current regulatory requirements*
- *Mention if any employers in the area support the need for this program and include a letter of support as an additional appendix.*

The amount of data being generated every day is staggering, at over 2.5 quintillion bytes of data coming from our activities on the web and from devices embedded everywhere (<https://www.forbes.com/sites/bernardmarr/2018/05/21/how-much-data-do-we-create-every-day-the-mind-blowing-stats-everyone-should-read/>). There is an increased need in understanding how to work with data to increase our ability to make sense of business, society and the planet. The Master of Business Analytics and AI will create graduates who can work with tools and methods to equip organizations to make sense of the past and predict the future using advanced analytics and AI. Graduates will also become trained in how to manage the data as well as the legal, ethical and moral issues surrounding the use of digital information in its many forms that include sensor data, images, text, voice and video.

Many businesses struggle to hire employee with data and business analytics skills, with the Asia-Pacific Economic Cooperation projecting a workforce demand of 43,300 workers needed in Canada only by 2020 https://www.apec.org/-/media/APEC/Publications/2017/11/Data-Science-and-Analytics-Skills-Shortage/217_HRD_Data-Science-and-Analytics-Skills-Shortage.pdf).

As for Ontario, the Ontario Job Futures website lists 3 occupations that could be filled by graduates of the MBAI. These are Computer and Information Systems Managers (growth rate= 14-15%, 9000-10000 openings), Database Analysts and Data Administrators (growth rate= 14-15%, 3000-4000 openings), and Information Systems Analysts and Consultants (growth rate = 10-11%, 15000-20000 openings).

Occupation 	Outlook rating 	Median income 	Skill level 
<input checked="" type="checkbox"/> Computer and information systems managers Computer and information systems managers plan, organize, direct, control and evaluate the activities of organizations that analyze, design, develop, ...	Above average	\$108,297	University education
<input checked="" type="checkbox"/> Database analysts and data administrators Database analysts design, develop and administer data management solutions using database management software. Data administrators develop and impleme ...	Above average	\$83,370	University education
<input checked="" type="checkbox"/> Information systems analysts and consultants Information systems analysts and consultants analyze and test systems requirements, develop and implement information systems development plans, polic ...	Above average	\$82,224	University education

While there is no professional regulatory requirement for Business Analytics professions yet, some standards are emerging such as the Certified Analytics Professional from INFORMS or the SAS Certified designations. The body of knowledge in this degree covers the topics tested in those professional tests and it is anticipated that a subset of students will pursue credentials in parallel with the Masters, which will be encouraged after they complete the appropriate classes.

f) Duplication

- Describe how the program is distinct from other programs at Ontario Tech. Is it reasonable to anticipate this program might affect enrolment in other related programs? If so, how might this be addressed?
- Identify similar or complementary programs offered elsewhere in Ontario in Table 2. Provide additional comment on the justification for this duplication.

The are no other graduate programs at Ontario Tech that cover Business Analytics and Applications of AI in business. Ontario Tech has no other graduate programs open to Commerce/ Business students.

Table 2: List of Similar Programs in Ontario

Institution Name	Credential Level and Program Name
University of Toronto (Rotman)	Master of Management Analytics
Link to Program Web Page: https://www.rotman.utoronto.ca/Degrees/MastersPrograms/MMA	
Brief Program Description: 9-month full time Master of Analytics program.	
What differentiates the new program from this existing program: Class mode of the Rotman MMA is on campus targeting full time learners without a part time option Domestic Tuition: \$41,400, International: \$64,580	

Institution Name Queen's University (Smith)	Credential Level and Program Name Master of Management Analytics
Link to Program Web Page: https://smith.queensu.ca/grad_studies/mma/program/mma-toronto/index.php	
Brief Program Description: 12-month Master of Analytics program with evening and weekend offerings.	
What differentiates the new program from this existing program: Queen's MMA has less emphasis on technology and management issues than the Ontario Tech MBAI does. Domestic Tuition: \$42,905, International: \$72,500	
Institution Name York University (Schulich)	Credential Level and Program Name Master of Business Analytics
Link to Program Web Page: https://schulich.yorku.ca/programs/mban/	
Brief Program Description: 12-month May entry fulltime business analytics program with an emphasis on predictive modelling and data science.	
What differentiates the new program from this existing program: Class mode for the Schulich MBAN is full time only, with elective courses from other Schulich graduate programs. Domestic Tuition: \$53,736, International: \$76,185	

2 Program Requirements

a) Admission Requirements

- *Outline the formal admission requirements; explain how these are appropriate for the program learning outcomes: How will they help to ensure students are successful? How do they align with the learning outcomes of the program?*
- *Explain any additional requirements for admission to the program such as special language, portfolio, etc. (and how the program recognizes prior work or learning experience, if applicable)*
- *Indicate the programs from which students may be drawn*

While applicants may hold any four-year honours undergraduate degree (or its equivalent from a recognized institution), preference is given to applicants whose undergraduate degree is in the field of business, management, economics, Informatics or related fields.

- Minimum overall academic standing of a B (GPA: 3.0 on a 4.3 scale or 73 to 76 per cent), with a minimum B average in the last two full-time years (four semesters) of undergraduate work or equivalent. Work experience or a strong GMAT can be used in lieu of the GPA requirement
- Successful completion of at least one course in information systems and one course in advanced mathematics (e.g., linear algebra, calculus, statistics etc.)
- For non-English degree of study, the IELTS test of 7.0 or TOEFL of 100 is required

b) Program Learning Outcomes and Assessment of Student Knowledge

- *In Table 3 below, please describe what the student will know or be able to do (knowledge, methodologies, and skills) by the end of the program and indicate how that knowledge or skill will be demonstrated*
- *An example has been provided in purple in the first row and can be removed.*
- **Connect with the Quality Enhancement Analyst in CIQE (cique@ontariotechu.ca) early in the program development to review learning outcomes.**

Degree Level Expectations are set by the Quality Council of Ontario and should not be modified. For the list of and more information on these expectations, including a detailed description, visit their [website](#).

Table 3: Program Learning Outcomes

Program Learning Outcomes By the end of the program, students graduating will be able to... (normally 6-8 outcomes per program with 12 being the maximum)	Degree Level Expectations (list all that apply; you must align with each expectation at least once)	Relevant courses (provide course code and course title)	Assessment of Learning Outcomes (e.g. test, rubric, self-assessment, etc.)
Design and construct appropriate analytics solutions to solve business problems for data-driven decision making	Depth and breadth of knowledge; Research and scholarship; Level of application of knowledge; Professional capacity/autonomy	MBAI 5100 Business Analytics	Term projects, tests, and presentations
Conceptualize and produce impactful presentations to communicate complex information to various stakeholders using data driven storytelling	Level of application of knowledge; Level of communications skills; Awareness of limits of knowledge	MBAI 5400 Visualization and Storytelling	Applied assignments, practical tests and presentations
Examine, adapt, and appraise machine learning and AI models for business problems utilizing commercial and open source technologies	Depth and breadth of knowledge; Research and scholarship; Level of application of knowledge	MBAI 5100 Business Analytics MBAI 5310 Artificial Intelligence Programming	Term projects, practical tests and critical analysis papers
Systematically examine implications of analytic models from multiple perspectives including identifying issues strategic value, business ethics, bias, privacy, trustworthiness and fairness	Depth and breadth of knowledge; Level of application of knowledge; Awareness of limits of knowledge; Professional capacity/autonomy	MBAI 5100 Business Analytics MBAI 5200 Ethical and Legal Issues in Analytics and AI MBAI 5100 Business Analytics MBAI 5410 Digital Transformation	Tests, critical analysis papers and presentations

		MBAI 5500 Security, Privacy and Trust in AI Systems	
Analyze data and use principles of database design implementation and administration	Depth and breadth of knowledge; Research and scholarship; Level of application of knowledge	MBAI 5300 Programming and Data Processing MBAI 5110 Big Data Systems Design	Tests, business cases, applied projects
Critically examine data quality and combine multiple data sources and formats in preparation of ingesting data into analytic models	Depth and breadth of knowledge; Research and scholarship; Level of application of knowledge	MBAI 5300 Programming and Data Processing MBAI 5110 Big Data Systems Design	Practical tests and applied projects
Create solutions using AI & analytics in new and existing business processes	Research and scholarship; Level of application of knowledge; Level of communications skills	MBAI 5410 Digital Transformation	Business cases, projects and presentations
Systematically appraise and contrast the significance and reliability of competing models and analytics methodologies	Research and scholarship; Level of application of knowledge; Level of communications skills	MBAI 5100 Business Analytics MBAI 5310 Artificial Intelligence Programming	Assignments, tests, applied projects, presentations
Develop a cognizance of the complexity of a complete data modelling project lifecycle from opportunity recognition & scoping to model maintenance and drift determination	Depth and breadth of knowledge; Professional capacity/autonomy; Awareness of limits of knowledge	MBAI 5110 Big Data Systems Design MBAI 5410 Digital Transformation	Business cases, projects and presentations

- *Selecting a few examples from above, explain in detail how the program design and requirements support the attainment of the Program Learning Outcomes*
- *With assistance from the Academic Planning Officer in CIQE (ciqe@ontariotechu.ca), please provide further details on the Assessment of the Program Learning Outcomes, as outlined in the Quality Council's Quality Assurance Framework Section 2.1.6 - Assessment of teaching and learning:*

- *Appropriateness of the proposed methods for the assessment of student achievement of the intended program learning outcomes and Degree Level Expectations (How will students demonstrate they have learned and can do what we expect them to by the end of the program?).*
- *Completeness of plans for documenting and demonstrating the level of performance of students, consistent with the Degree Level Expectations (How will the effectiveness of the program be assessed?)*

The very nature of the program is applied and the approach to instruction is very hands on with practical examples using state of the art software for analytics and AI. “Learning by doing” is the dominant approach of instruction, with an emphasis of critical reflection on the experiential learning.

For example, the knowledge of statistical concepts and techniques, is taught in MBAI 5100 Business Analytics and MBAI 5310 Artificial Intelligence Programming using many practical examples of problems solved in class to teach how different techniques work. This is followed by applied projects where different approaches are compared and contrasted by students independently, and they deliver project results in written reports and presentations to demonstrate the depth of their knowledge of statistical concepts and techniques.

Another example is the learning outcome, knowledge of visualisation approaches and the art of persuasion. This topic is covered in MBAI 5400 Visualization and Storytelling, through a series of practical exercises where students learn how to interpret, evaluate and communicate data using advanced graphics in state-of-the-art software. Students also learn how audiences interpret complexity, and what best practices are for visual communication. Students demonstrate their knowledge through applied assignments, practical tests, and presentations.

A third example is, knowledge of legal, ethics, bias, privacy and trust principles in analytics, which is covered in MBAI 5200 Ethical and Legal Issues in Analytics and AI MBAI 5500 Security, Privacy and Trust in AI Systems. Here students learn about topics using critical discourse, cases and research papers examining multiple issues around the use of analytics. Students demonstrate their learning outcomes through written tests, critical analysis papers and presentations throughout the classes.

c) Program Structure and Content

- *Describe the requirements and structure of the program. Is it full-time/part-time? Is this an online or partially online program? What are the unique curriculum or program innovations or creative components in this program?*
- *Provide evidence that each graduate student is required to take a minimum of two-thirds of the course requirements from among graduate-level courses*

- *What is the program length? Provide a rationale for the length that ensures the program requirements can be reasonably completed*
- *Address how the programs structure will help students to meet the program learning outcomes and Degree Level Expectations*

The program is designed to be completed in 10-12 months depending on students choosing to do the 2-month comprehensive capstone project or take up a 4-month internship over the summer.

Courses are structured to be hybrid online with asynchronous lecture components as well as synchronous online or on campus discussions & presentations. Tutorials covering the application of technical tools will take place on campus with a remote participation option available for distance learners.

Courses are all new graduate classes, with the content and sequence of topics laid out in a logical way throughout the newly designed classes which cover the managerial and legal issues, technical skills, and applications of emerging technologies for Analytics and AI in Business. The learning outcomes are based on best practice of other programs in this space, guidelines from literature as well as the unique strengths of our Business and IT Faculty spanning Legal, Privacy, Ethical, Big Data Management, Statistics, Design Thinking, Visualisation, Digital Transformation and AI Programming specialties. What sets this program apart from others in this space, is that these courses are newly designed from the ground up in an integrative way by multidisciplinary faculty. No other Business school has as many Computer Scientists integrated in it, and this is something we intend to leverage in the delivery of the program through the use of the dual lens of business and IT in applied course projects.

All students will participate in a 3-day intensive orientation bootcamp in early September that will prepare students for the program and review social competencies, such as teamwork, presentation skills, case methodology; functional competencies, such as programming in python, calculus and linear algebra, and statistics; and cognitive competencies such as AI and its value to business, and ethics and fairness in algorithmic decision making. Details included in Appendix E.

The program structure for full time students is as follows:

Fall

- MBAI 5100 Business Analytics (3CR)
- MBAI 5200 Ethical and Legal Issues in Analytics and AI (3CR)
- MBAI 5300 Programming and Data Processing (3CR)
- MBAI 5400 Visualization and Storytelling (3CR)

Winter

- MBAI 5110 Big Data Systems Design (3CR)

MBAI 5500 Security, Privacy and Trust in AI Systems (3CR)
MBAI 5310 Artificial Intelligence Programming (3CR)
MBAI 5410 Digital Transformation (3CR)

Spring

MBAI 5600 Applied Integrative Analytics Project or MBAI 5700 Business Analytics Internship*(6CR)

The program can also be completed part-time following the sequence below:

Fall YR1

MBAI 5100 Business Analytics (3CR)
MBAI 5400 Visualization and Storytelling (3CR)

Winter YR1

MBAI 5110 Big Data Systems Design (3CR)
MBAI 5410 Digital Transformation (3CR)

Fall YR2

MBAI 5200 Ethical and Legal Issues in Analytics and AI (3CR)
MBAI 5300 Programming and Data Processing (3CR)

Winter YR2

MBAI 5500 Security, Privacy and Trust in AI Systems (3CR)
MBAI 5310 Artificial Intelligence Programming (3CR)

Spring YR2

MBAI 5600 Applied Integrative Analytics Project or MBAI 5700 Business Analytics Internship*(6CR)

- *Describe the ways in which the curriculum addresses the current state of the discipline*
- *For researched-focused graduate programs, provide a clear indication of the nature and suitability of the major research requirements for degree completion*

Business Analytics programs are relatively new in Ontario with most less than 5 years old. We have based our curriculum on best practices within the province as well as international masters of business analytics degrees. The learning outcomes meet the Certified Analytics Professional content by INFORMS, and cover newer topics in Artificial Intelligence from both the practical applications, strategic digital transformation opportunities and an exploration of the management and societal issues surrounding AI.

- *Is there an experiential learning component (e.g. workplace learning, co-op, internship, field placements, service learning, mandatory professional practice) to the program? If yes, please describe this component in 2500 words or less. Include confirmed partners,*

duration of the experiential learning component(s), and projected number of placements (where applicable)

The program culminates with the choice of a capstone project or an internship. The capstone project is completed in the spring term in an intensive pass/fail course over an 8-week period.

The Internship option can vary in duration from 4 to 16 months depending on the nature of the position, the needs of the employer and the student.

- *Describe how the potential need to provide accessibility accommodations has been considered in the development of this program*

Learning outcomes assessment is deliberately not exam based with an emphasis on projects and experiential learning. This will provide the greatest flexibility to address potential accessibility accommodations.

d) Calendar Copy with Program Map(s)

- *Provide, as Appendix A, a clear and full calendar copy. Please use the template provided in Appendix A to create the Calendar Copy for the new program. This template ensures consistency across all programs in the Academic Calendar*
 - *If the program is to be accredited, include with this Appendix the accreditation tables, if available*
- *Provide, as Appendix B, a full list of the all courses included in the program including course numbers, titles, and descriptions. Please indicate clearly whether they are new/existing. Include full course proposals for new courses, and the most recent course syllabi for existing courses. If you are making changes to existing courses, include instead a course change form.*

Please see Appendix A for proposed calendar copy.

Please see Appendix B for new course proposals.

3 Consultation

- *Describe the expected impact of the new program on the nature and quality of other programs delivered by the home and collaborating Faculty(ies) and any expected impact on programs offered by other Faculties*
- *Outline the process of consultation with the Deans of Faculties that will be implicated or affected by the creation of the proposed program*

- *Provide letters of support for the program from Deans at Ontario Tech and/or from other institutions/partners*

There is no anticipated impact on existing programs.

Does this Program/Change contain any Indigenous content? Yes No Unsure

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the [Protocol for Consultation with the Indigenous Education Advisory Circle](#).

Has the IEAC been contacted Yes No

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? Yes No

If yes, have they completed their review? Yes No N/A

4 Resource Requirements

a) General Resource Considerations

- *Note here if this new program may impact significant enrolment agreements with the Faculty/Provost's office.*
- *Indicate if the new program will affect any existing agreements with other institutions, or will require the creation of a new agreement. Please consult with CIQE (cique@uoit.ca) regarding any implications to existing or new agreements.*

The program does not impact any agreements with other institutions.

b) Faculty Members - Current and New Faculty Requirements

- *Brief statement to provide evidence of the participation of a sufficient number and quality of faculty who will actively participate in the delivery of the program*
- *The role of any sessional faculty*

- *The provision of supervision of experiential learning opportunities; how will supervisory loads be distributed?*
- *The plan to provide additional faculty resources to support the program, if needed*
- *Complete Appendix C, detailing the list of faculty committed to the program (template in Appendix) and provide any additional details, if necessary; the information in the Appendix or additional information must include clear evidence that faculty have the recent research or professional/clinical expertise needed to sustain the program, promote innovation, and foster an appropriate intellectual climate.*
- *Indicate that faculty CVs are included in Appendix D, and please provide CVs for all faculty committed to the program*

The Faculty of Business and IT has the expertise and capability to deliver the program with existing faculty who would have to be reassigned to the MBAI from other teaching duties. The budget allocates two hires to facilitate this increase in teaching capacity in the Faculty as part of our growth strategy (Please refer to Section 4 g) on page 21). As this is a professional, premium priced program we will not utilize sessional faculty to ensure quality. Sessional hires indicated in the first years of the budget will be utilized to cover undergraduate courses, freeing up FBIT experts to teach in the Graduate Programs. Please see Appendix C for detailed faculty information.

c) Additional academic and non-academic human resources

- *Give details regarding the nature and level of Sessional Instructor and TA support required by the program, the level of administrative and academic advising support, etc.*
- *Please describe the plan to provide additional resources to support the program, if needed*

Support for the delivery of the program will include a budget for TAs, new faculty, as well as a Graduate Student Advisor who will also serve FBIT grad students in the MITS, MCS, and future degree programs. (Please refer to Section 4 g) on page 21)

d) Existing non-financial student supports

All graduate students have access to an extensive support system that ensures a quality student experience. In addition to the outlined services below, students may also take advantage of the Campus Childcare Centre, Campus Bookstores, Housing and Living Resources, as well as the Student Union. Further information can be found at:

<http://studentlife.uoit.ca/>

Faculty-Specific Support

Academic Advising (if relevant)

Please provide details on your Faculty Academic Advising Office and supports.

Currently graduate academic advising in existing graduate programs is done by the program director. As part of this proposal FBIT budgeted to hire a Graduate Academic Advisor who will support the program director with administration, student process management, and recruitment initiatives for all the graduate programs in FBIT.

School of Graduate and Post-Doctoral Studies

Quality graduate and postdoctoral education combines teaching, research, professional development, disciplinary community involvement and personal growth. It is by nature a shared responsibility between students, faculty members, the programs and a large number of support units, with overarching administration being provided by the School of Graduate and Postdoctoral Studies.

The School of Graduate and Postdoctoral Studies furthers the scholarly mission of the university by providing academic and administrative support to the university's postgraduate educational, research, innovation and international activities. Our responsibilities include graduate program development, graduate enrolment management, oversight of academic and quality standards, and the implementation of policies and practices that enhance graduate/postdoctoral scholarly success, career readiness and personal growth. SGPS supports prospective, new and current graduate students through many administrative services including, but not limited to, recruitment, admission, registration, funding and scholarships, orientation, professional development workshops and events, and processing of final theses, projects and papers. SGPS is a single-point-of-contact, multifunctional administrative unit tailored to the complete "life-cycle" of graduate students, providing coordinated support to students and all other stakeholders.

Student Life

Student Learning Centre

The Student Learning Centre fosters a high level of academic excellence in the Ontario Tech community by working with all Ontario Tech students, undergraduate and graduate, to achieve educational success. Foundational knowledge and prerequisite skills are essential to all university level courses, and competency with these skills is vital for strong academic performance. The subject specialists offer support services in mathematics, writing, study skills, ESL and physics. With the additional support of peer tutors and workshops, the Centre can further accommodate the needs of a specific course or program.

<http://studentlife.uoit.ca/student-learning/>

Student Accessibility Services

The staff work as a collaborative team to ensure students with disabilities have equal opportunities for academic success. The SAS operates under the Ontario Human Rights Code (OHRC) and the Accessibility for Ontarians with Disabilities Act (AODA). Services are provided for students with documented disabilities. Accommodation supports include but are not limited to:

- Adaptive technology training;
- Alternate format course material;
- Learning skills support;
- Testing support; and
- Transition support for incoming students.

Careers and Internships

The Career Centre offers comprehensive career service assistance and a variety of valuable resources to help students along their career paths:

- Assistance with creating effective job-search documents;
- Career Counselling;
- Interview preparation;
- Job market information; and
- Job search strategies.

A variety of events hosted on campus during the academic year including employer information and networking sessions, job fairs, and interviews conducted by leading employers.

Student Engagement and Equity

The Student Engagement and Equity supports students' successful transition into the university and provides opportunities for them develop your leadership and professional skills throughout their university career.

Services provided through Student Engagement and Equity includes:

- Orientation and events through first year
- Specialized programming for first generation, graduate, indigenous, international, mature, online, transfer, and diploma-to-degree pathways students
- Equity and inclusivity programming
- Assistance and advice for living off campus
- Peer mentoring to help students through first year
- Opportunities to grow and develop leadership skills through the Ambassador program.

Student Mental Health Services

Student Mental Health Services helps students learn how to better manage the pressures of student life. Students can:

- Attend a drop-in session;
- Participate in events and activities that promote positive health and well-being;
- Access tools and resources online to learn about mental health and how to maintain good health and wellness;
- Work with a mental health professional to address concerns;
- Contact the Student Lifeline for immediate help and assistance; and
- Get answers to frequently asked questions about mental health.

Student Mental Health Services offers short-term counselling and therapy services to students. Students in distress will also be provided support and counselling as needed. There is no cost and services are confidential. For students who need long-term counselling support or specialized mental health services, UOIT will provide referrals to assist the student in accessing resources in the local community or in the student's home community.

Athletics and Recreation Facilities

UOIT offers a number of recreation facilities and fitness opportunities to meet all lifestyles and needs. On-campus facilities include the state-of-the-art FLEX Fitness Centre which overlooks Oshawa Creek, five gymnasiums, a 200-metre indoor track, two aerobic/dance studios, the Campus Ice Centre, Campus Fieldhouse, a soccer pitch, a fastball diamond, squash courts and an indoor golf-training centre.

Campus Health Centre

The Campus Health Centre provides assistance in numerous confidential health-care options including:

- A medical clinic with daily access to physician and nursing staff;
- Allergy injections, immunizations and influenza injections;
- An on-site laboratory (blood work, STI testing, throat swabs, etc.);
- Treatment of disease, illness and injury;
- Complementary Health Services featuring acupuncture, chiropractic, custom orthotics, massage therapy, nutritional counselling and physical therapy; and
- Gynaecological health-care and prescriptions.

Student Awards and Financial Aid

Student Awards and Financial Aid (SAFA) is dedicated to helping students understand the variety of options available to finance their education. Budgeting and financial planning are essential to their success and Student Awards and Financial Aid is on hand to help create the right financial plan. Financial assistance can be in the form of bursaries, employment (both oncampus and off), parental resources, scholarships, student lines of credit and the Ontario Student Assistance Program (OSAP).

Information Technology Resources

IT Services strives to provide quality services to students at Ontario Tech. To support these objectives, the following components are included:

- Wireless network
- Wired network
- IT Service Desk
- General workstations
- Printing services

Wireless network

Wireless internet connection is available in public areas and open-air locations around the Ontario Tech campus where students congregate (North Oshawa and Downtown locations).

Wired network

To ensure the success of the technology-enriched learning environment, a comprehensive data network has been installed on campus. This includes a network drops in lecture halls and designated areas as well as network drops for each residence suite.

Ontario Tech students benefit from networked classrooms and learning spaces. Each ergonomically-designed space has data network connection access and electrical connections to ensure battery regeneration. In addition, classrooms include electronic projection equipment and full multimedia support.

Teaching & Learning Centre

The mission of the Teaching and Learning Centre (TLC) at Ontario Tech is to empower faculty to reach their potential as educators and to create a culture where effective teaching is valued. We champion the scholarship of teaching and implementation of pedagogy. We create valuable teaching and learning professional development experiences. We move UOIT towards being a leader in teaching excellence, ultimately leading to greater student success.

The TLC provides faculty with a range of tools and facilities to assist them in providing a rich learning experience for students. Experts at the TLC provide support in various areas including curriculum development, multimedia design, learning technology and in the overall improvement of teaching practice.

In addition, the TLC funds teaching-related projects from the Teaching Innovation Fund (TIF) for proposals by faculty members aimed at developing new methods in teaching and learning. The TLC facilitates teaching awards at the University and supports faculty in their application for external awards and funding opportunities that focus on teaching and learning.

e) Graduate student financial support

- *Provide evidence that financial assistance will be sufficient to ensure quality and numbers of students*
- *Provide the teaching assistant hours and capacity within the Faculty*
- *Refer to the Business Plan (Section 4g) where appropriate*

This is not a thesis graduate program and we do not intend to provide direct financial support to students initially. We will seek out support from industry partners for scholarship opportunities and work with local financial institutions to secure financing options for students.

f) Physical resource requirements

We do not anticipate additional space requirements. Library report is attached as Appendix D. We will require \$2500 in additional acquisitions to support the MBAI program with up-to-date materials as per library recommendation.

g) Business Plan

- *Provide a brief statement of the funding requirements, and insert the Program Summary tab from the [Graduate Program Proposal Budget](#) spreadsheet here as Table 4 or attach a copy as Appendix F. Also, please submit a copy of the full Excel document to CIQE, as an attachment.*
- *Complete the highlighted sections of the [New Program Funding and Tuition](#) form and submit the form to CIQE as soon as possible*

The enclosed budget is for illustrative purposes only to show estimated enrolments with corresponding expenses. The actual faculty budget will be reviewed annually and determined based on the full environmental context.

The Teaching Assistantships are a function of the student enrolment and are expected to alter as the numbers increase.

Table 4: New Degree Program Proposed Budget Summary

Enrolment	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
Fulltime Equivalent	15	20	25	30	35	40
TOTAL New Students	15	20	25	30	35	40

Revenue	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
Domestic Tuition	304,434	414,030	527,889	646,136	768,901	896,319
International Tuition	154,247	209,775	267,464	327,375	389,577	454,135
Grant	78,293	82,782	111,274	133,529	155,783	178,038
Total Revenue	536,974	706,588	\$906,626	1,107,040	1,314,261	1,528,493

Course Summary	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
# of lecture sections	10	10	10	10	10	10

Required Hires	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
# of TTT	0	1	2	2	2	2
# of PT Faculty	10	7	3	2	2	2

Expenses	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
Academic Salaries						
FT Faculty	0	139,113	286,573	295,170	304,025	313,146
FT Benefits (18.5%)	0	25,736	53,016	54,606	56,245	57,932
FT Total	0	164,849	339,588	349,776	360,269	371,077
PT Faculty	88,915	65,353	29,409	20,586	21,615	22,696
Additional TAs/hips	47,902	67,062	88,019	110,904	135,858	163,029
PT Benefits (11%)	15,050	14,566	12,917	14,464	17,322	20,430
PT Total	151,867	146,981	130,345	145,954	174,795	206,155
Total Academic Salaries	151,867	311,829	469,934	495,730	535,065	577,233

Support Staff Salaries	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
Graduate Programs Advisor	70,800	72,216	73,660	75,134	76,636	78,169
Benefits (18.5%)	13,098	13,360	13,627	13,900	14,178	14,461
Total Support Staff Salaries	83,898	85,576	87,287	89,033	90,814	92,630

Operational Expense	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
Instructional Supplies	6,000	8,000	10,000	12,000	14,000	16,000
Start-up	0	10,000	10,000	0	0	0
PD (\$2,000/ faculty)	0	2,000	4,000	4,000	4,000	4,000
Travel	8,000	8,500	4,500	5,000	5,500	6,000
Recruitment/Moving Expenses	0	10,000	10,000	0	0	0
Promotion	50,000	25,000	10,000	10,000	10,000	10,000
Telecommunication	500	500	500	500	500	500
Office Supplies	1,500	1,500	1,500	1,500	1,500	1,500
Orientation Bootcamp	25,000	25,000	25,000	25,000	25,000	25,000
Library Acquisitions	2,500	0	0	0	0	0
TOTAL Operating	93,500	90,500	75,500	58,000	60,500	63,000

Total Expenses	329,265	487,905	632,721	642,764	686,379	732,863
NET Income with Grant	207,709	218,682	273,905	464,276	627,883	795,630
NET Income without Grant	129,416	135,900	162,631	330,747	472,100	617,592

5 Quality and Other Indicators

- *Please describe the appropriateness of the collective faculty expertise to contribute substantively to the proposed program; areas of faculty strength and expertise, innovation, and scholarly record will contribute to the quality of the program and student experience*
- *Please explain how the program structure and faculty research will ensure the intellectual quality of the student experience*
- *Refer to Appendices C and D, and provide information on how the research experience, current projects, and funding contribute to the quality of the program*

Faculty expertise supporting the proposed program is substantive, with 19 full time faculty who all have PhDs. 15 of which are tenured / tenure track professors with many peer reviewed publications related to courses in the program. The majority of our tenured faculty also have extensive supervisory experience, and grant funding. Most of the 4 full time teaching faculty participating in the program are also active in research, and can supervise graduate projects. Summaries of the Faculty can be found in Appendix C.

The faculty participating in the program hold expertise in Math, Statistics, Artificial Intelligence, Programming, Management Information Systems, Legal Aspects of Analytics in Business, Marketing, Operations Research, Ethics, Privacy, Trust and Fairness, Big Data Systems, as well as Data Visualization and Strategic Management.

● APPENDICES

Please include at minimum the below. Additional Appendices may be added, as appropriate.

- A. Calendar Copy with Program Maps
- B. New Course Proposals
- C. Detailed Listing of Faculty Committed to the Program
- D. Library Report
- E. Orientation Bootcamp
- F. Letter of Support

Appendix A – Calendar Copy

Program

Graduate faculty

Include a bulleted list of graduate faculty affiliated with the program (graduate and associate).

- Amirali Abari, BS, MSc, PhD
- Nader Azad, BS, MSc, PhD
- Michael Bliemel, BSc, MMS, PhD
- Ana Duff, BSc, MSc, PhD
- Patrick Hung, BSc, MASc, MPS, PhD
- Stephen Jackson, BSc, PhD
- Amin Ibrahim, BASc, MASc, PhD
- Salma Karray, BComm, MSc, PhD
- Fletcher Lu, BMath, MMath, PhD
- Stephen Marsh, BSc, PhD
- Samaneh Mazaheri, BSc, MSc, PhD
- Carolyn McGregor, AM, PhD, BAppSc, SMIEEE
- Theresa Miedema, BA, LL.B, SJD
- Amir Rastpour, BSc, MSc, PhD
- Karthik Sankaranarayanan, BSc, MSc, PhD
- Alexander Serenko, MBA, PhD
- Julie Thorpe, BCompSci, PhD
- Miguel Vargas Martin, BSc, MASc, PhD
- Wei-Lin Wang, BBA, MBA, PhD

Program information

The Master of Business Analytics and Artificial Intelligence (MBAI) is a professional degree program which provides students with a theoretical knowledge base and practical experience working with data and people in decision making. The content of the degree will cover three main domains which are applications of AI, Business Analytics and Management Opportunities. The program provides students with multiple perspectives about business analytics and artificial intelligence, ranging from ethical and managerial level understanding of implications to practical applications of programming business analytics and AI solutions. Graduates of the Master of Business Analytics and AI can find highly successful careers in a variety of business analytics roles in private and public sectors where data is used to make decisions.

Admission requirements

In addition to the general admission requirements for graduate studies, Master of Business Analytics and AI applicants must meet the following program-specific requirements.

- While applicants may hold any four-year honours undergraduate degree (or its equivalent from a recognized institution), preference is given to applicants whose undergraduate degree is in the field of business, management, economics, Informatics or related fields.
- Minimum overall academic standing of a B (GPA: 3.0 on a 4.3 scale or 73 to 76 per cent), with a minimum B average in the last two full-time years (four semesters) of undergraduate work or equivalent. Work experience or a strong GMAT can be used in lieu of the GPA requirement
- Successful completion of at least one course in information systems and one course in advanced mathematics (e.g., linear algebra, calculus, statistics etc.)
- For non-English degree of study, the IELTS test of 7.0 or TOEFL of 100 is required

Part-time studies

To facilitate access to all potential students, part-time studies are permitted.

Degree requirements

Students are required to complete 8 required courses and either an Applied Integrative Analytics Project or a Business Analytics Internship, for a total of 30 credits. Approximate time for program completion, based on full-time status, is 10-12 months.

Course listing

- MBAI 5100 Business Analytics
- MBAI 5110 Big Data Systems Design
- MBAI 5200 Ethical and Legal Issues in Analytics and AI
- MBAI 5300 Programming and Data Processing
- MBAI 5310 Artificial Intelligence Programming
- MBAI 5400 Visualization and Storytelling
- MBAI 5410 Digital Transformation
- MBAI 5500 Security, Privacy and Trust in AI Systems
- MBAI 5600 Applied Integrative Analytics Project
- MBAI 5700 Business Analytics Internship

Appendix B – New Course Proposals

NEW COURSE TEMPLATE*For changes to existing courses see Course Change Template*

Faculty: FBIT

This new course is associated with:
--

<input type="checkbox"/> Minor Program Adjustment <input type="checkbox"/> Major Program Modification <input checked="" type="checkbox"/> New Program <input type="checkbox"/> None

Will this course appear anywhere other than the course description section of the Calendar?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
--	---

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor: *Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map: *Course Sequencing or Course Placement*

A new course (core or elective) related to a Major Program Modification: *Major Program Modification*

Note: If the new course is for a new program, you do not need to show course placement as it will be captured in the new program proposal.

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

Master of Business Analytics and AI
--

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

Fall 2022

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2022

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

See new program proposal

Subject Code: MBAI	Course Number:
---------------------------	-----------------------

5100G

Full Course Title: Business Analytics
--

Short-Form Course Title (max. 30 characters):
--

Course Description

This course will provide a coverage of concepts and tools used in different stages of a data analytics project, including problem definition, data collection and preparation, data analysis, and knowledge transfer. Statistical and other analytical tools such as data mining, machine learning, social network analytic, text mining, and their application to business will be explored.

In the current business world, data is a crucial valuable asset owned companies. It is vital for businesses to be able to effectively and efficiently define their problems, collect required data, examine the data, and communicate this information in an appropriate manner to decision makers. Given the massive amount of data available and constant technological advancements in the field of data analytics, it is crucial that students gain skills required to tackle these data-related problems. This course will provide hands-on training for learning these sought-after skills.

Credit Hours: 3.0	
Contact Hours – please indicate total number of hours for each component	
Lecture: 3.0	Lab:
Tutorial: 3.0 (monthly)	Other:
Cross-listings	
Prerequisites for Calendar	None
Prerequisites for Banner	
Co-requisites	
Prerequisites with concurrency (pre or co-requisite)	
Credit restrictions	<input type="checkbox"/> Equivalency*
Recommended Prerequisites	
Course Restrictions	
Course Type	<input checked="" type="checkbox"/> Core <input type="checkbox"/> Elective <input type="checkbox"/> Core or Elective
Is the course: <input type="checkbox"/> Undergraduate <input checked="" type="checkbox"/> Graduate <input type="checkbox"/> Professional (e.g. some Education courses)	
Grading scheme	<input checked="" type="checkbox"/> N (normal alpha grade) <input type="checkbox"/> P (pass/fail)

***Equivalency:** If it is equivalent, students can retake either course. If it is not equivalent, students are not allowed to register in the restricted course.

Course instructional method:

CLS (In Class Delivery)		HYB (In Class and Online Delivery)	x
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)	x	WEB (Fully Online – Asynchronous)	x
Not Applicable			

Teaching and assessment methods:

This course utilizes an online blended teaching mode. Course content/lecture based material will be available as either multi-media presentations available for download from the course Blackboard site or material delivered by the lecturer in person in class.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning [website](#), or contact them at teachingandlearning@uoit.ca.)

By the end of this course, students will be exposed to different stages of a data analytics project and will be expected to be able to conduct the following activities:

- a) Pose interesting business questions that could be investigated by data.
- b) Collect data, including data scraping from the web
- c) Data preparation and data cleaning
- d) Data summarizing that will be conducted using prescriptive statistics methods

After preparing data, students will learn how to use the data to answer the raised business questions in the following contexts:

- e) Predictive analytics to provide estimates of the value of variables in the future
- f) Recommender systems to predict customers' preferences
- g) Social Media Analytics to extract information from the social media
- h) Sentiment Analytics to extract information from a text
- i) Spatial Data (GIS) analytics to extract information from "where things happen"

Does this course contain any experiential learning components? Yes No

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences:			

We have consulted with all impacted areas: Yes NA

Process of consultation, if applicable:

Does this course contain any Indigenous content? Yes No Unsure

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the [Protocol for Consultation with the Indigenous Education Advisory Circle](#).

Has the IEAC been contacted? Yes No

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? Yes No

If yes, have they completed their review? Yes No N/A

Financial Implications

See new program proposal.

FACULTY INTERNAL APPROVAL DATES

Faculty Council approval	
Curriculum Committee approval	
Internal Committee approvals	

NEW COURSE TEMPLATE

For changes to existing courses see *Course Change Template*

Faculty:
FBIT

This new course is associated with:

Minor Program Adjustment Major Program Modification New Program None

Will this course appear anywhere other than the course description section of the Calendar?

Yes No

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor: *Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map: *Course Sequencing or Course Placement*

A new course (core or elective) related to a Major Program Modification: *Major Program Modification*

Note: If the new course is for a new program, you do not need to show course placement as it will be captured in the new program proposal.

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

Master of Business Analytics and AI

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

Fall 2022

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2022

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

See new program proposal

Subject Code: MBAI

Course Number:
5110G

Full Course Title: Big Data Systems Design

Short-Form Course Title (max. 30 characters): Big Data Systems Design

Course Description

The ability for organizations to ingest and analyze significant volumes of data as it is generated and retrospectively is becoming a fundamental organization need for organizational success. Big Data systems design is a design and planning approach that enables the systemic planning of how an organization will ingest and analyze these significant volumes of data for a given organization objective(s). The goal of Big Data systems design is to improve organizational success and through improved organization processes and improved customer experiences. This course enables students to combine solution components based on the type of Big Data and organizational objective to formulate an integrated Big Data systems design. Solution components include Big Data storage, Big Data processing and Big Data analytics including artificial intelligence. Students will also assess how the Big Data systems design can be provisioned in the cloud.

Credit Hours: 3.0	
Contact Hours – please indicate total number of hours for each component	
Lecture: 3.0	Lab:
Tutorial: 3.0 (monthly)	Other:
Cross-listings	
Prerequisites for Calendar	MBAI 5100G
Prerequisites for Banner	
Co-requisites	
Prerequisites with concurrency (pre or co-requisite)	
Credit restrictions	<input type="checkbox"/> Equivalency*
Recommended Prerequisites	
Course Restrictions	
Course Type	<input checked="" type="checkbox"/> Core <input type="checkbox"/> Elective <input type="checkbox"/> Core or Elective
Is the course: <input type="checkbox"/> Undergraduate <input checked="" type="checkbox"/> Graduate <input type="checkbox"/> Professional (e.g. some Education courses)	
Grading scheme	<input checked="" type="checkbox"/> N (normal alpha grade) <input type="checkbox"/> P (pass/fail)

***Equivalency:** If it is equivalent, students can retake either course. If it is not equivalent, students are not allowed to register in the restricted course.

Course instructional method:

CLS (In Class Delivery)		HYB (In Class and Online Delivery)	x
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)	x	WEB (Fully Online – Asynchronous)	x
Not Applicable			

Teaching and assessment methods:

This course utilizes an online blended teaching mode. Course content/lecture based material will be available as either multi-media presentations available for download from the course Blackboard site or material delivered by the lecturer in person in class.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning [website](#), or contact them at teachingandlearning@uoit.ca.)

On the successful completion of the course, students will be able to:

- Assess different forms of Big Data such as IoT data, social media and biometric data to understand the structure of Big Data.
- Appraise the latest forms of Big Data storage solutions such as HANA Datastores, Hadoop and NoSQL.
- Appraise the latest forms of Big Data processing solutions including data cleaning, integration, real-time analytics and retrospective data analysis
- Appraise the latest forms of Big Data analytics solutions including artificial intelligence
- select appropriate storage methods for a given organizational need from current forms of Big Data storage
- select appropriate big data processing methods for a given organization need from current forms of Big Data processing such as event stream processing
- select appropriate big data analytics methods for a given organization need from current forms of Big Data analytics such as streaming predictive analytics, optimization and game theory and consider this within the context of model lifecycle management
- Combine solution components of data models, Big Data storage, Big Data processing and Big Data analytics including artificial intelligence to formulate an integrated Big Data systems design.
- Assess how the Big Data systems design can be provisioned in the cloud

Does this course contain any experiential learning components? Yes No

If yes:

Case Study	X	Simulated Workplace Project	X
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences:			

We have consulted with all impacted areas: Yes NA

Process of consultation, if applicable:

Does this course contain any Indigenous content? Yes No Unsure

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the [Protocol for Consultation with the Indigenous Education Advisory Circle](#).

Has the IEAC been contacted? Yes No

If yes, when?

--

What was the advice you received from the IEAC, and how has it been included in your proposal?

--

Did the IEAC ask you to return the proposal to them for review? Yes No

If yes, have they completed their review? Yes No N/A

Financial Implications

See new program proposal.

FACULTY INTERNAL APPROVAL DATES

Faculty Council approval	
Curriculum Committee approval	
Internal Committee approvals	

NEW COURSE TEMPLATE

For changes to existing courses see *Course Change Template*

Faculty:
FBIT

This new course is associated with:

Minor Program Adjustment Major Program Modification New Program None

Will this course appear anywhere other than the course description section of the Calendar?

Yes No

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor: *Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map: *Course Sequencing or Course Placement*

A new course (core or elective) related to a Major Program Modification: *Major Program Modification*

Note: If the new course is for a new program, you do not need to show course placement as it will be captured in the new program proposal.

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

Master of Business Analytics and AI

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

Fall 2022

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2022

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

See new program proposal

Subject Code: MBAI

Course Number:
5200G

Full Course Title: Ethical and Legal Issues in Analytics and AI

Short-Form Course Title (max. 30 characters): Eth. & Legal Issues in Analytics & AI

Course Description

This course highlights key legal and ethical issues related to data analytics and AI. Increasingly, scholars and practitioners are urging data scientists and businesspersons to be more cognizant of the accidental and intentional harms caused by the widespread deployment of machine learning and AI. This course examines potential liabilities in law related to data analytics and AI and juxtaposes legal requirements with ethical considerations. The course will also explore some of the most pressing ethical issues related to data analytics and AI. This course situates these explorations in the context of a set of core guiding principles for ethical and responsible data management.

Possible topics include: obtaining meaningful consent to the collection of data; standard contractual provisions related to data analytics; liabilities related to outsourcing elements of data analytics (jurisdiction); privacy-related torts, negligence liability; ethical frameworks; implicit bias and the problem of bias in AI; tensions fairness and IP rights in black box AI; and the principles of ethical research in AI.

Credit Hours: 3.0	
Contact Hours – please indicate total number of hours for each component	
Lecture: 3.0	Lab:
Tutorial: 3.0 (monthly)	Other:
Cross-listings	
Prerequisites for Calendar	
Prerequisites for Banner	
Co-requisites	
Prerequisites with concurrency (pre or co-requisite)	
Credit restrictions	<input type="checkbox"/> Equivalency*
Recommended Prerequisites	
Course Restrictions	
Course Type	<input checked="" type="checkbox"/> Core <input type="checkbox"/> Elective <input type="checkbox"/> Core or Elective
Is the course: <input type="checkbox"/> Undergraduate <input checked="" type="checkbox"/> Graduate <input type="checkbox"/> Professional (e.g. some Education courses)	
Grading scheme	<input checked="" type="checkbox"/> N (normal alpha grade) <input type="checkbox"/> P (pass/fail)

***Equivalency:** If it is equivalent, students can retake either course. If it is not equivalent, students are not allowed to register in the restricted course.

Course instructional method:

CLS (In Class Delivery)		HYB (In Class and Online Delivery)	x
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)	x	WEB (Fully Online – Asynchronous)	x
Not Applicable			

Teaching and assessment methods:

The course will use lectures, case studies, and simulations.

Evaluation:

Participation: 10%

Critical reflections: 2 x 10% = 20%

Contract drafting exercise = 10%

Case analysis (critical assessment of response to legal risks): 20%

Major project (developing and deploying ethical decision-making process): 40%

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning [website](#), or contact them at teachingandlearning@uoit.ca.)

- Explain the core principles and values associated with ethical research in data analytics and AI
- Explain the meaning and importance of a variety of standard terms and conditions in contracts related to data analytics
- Explain possible sources of tort liability related to data analytics and AI
- Explain the legal and ethical issues that arise from out-sourcing parts of the process of collecting and analyzing data
- Critically assess the strengths and weaknesses (legal and ethical) of different approaches to managing potential legal liabilities
- Analyze the legal and ethical issues associated with developing and deploying algorithms in data analytics
- Use a general framework for legal and ethical decision-making
- Develop a framework for legal and ethical decision-making and issue management specific to data analytics and AI

Does this course contain any experiential learning components? Yes No

If yes:

Case Study	X	Simulated Workplace Project	x
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences:			

We have consulted with all impacted areas: Yes NA

Process of consultation, if applicable:

Does this course contain any Indigenous content? Yes No Unsure

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the [Protocol for Consultation with the Indigenous Education Advisory Circle](#).

Has the IEAC been contacted? Yes No

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? Yes No

If yes, have they completed their review? Yes No N/A

Financial Implications

See new program proposal.

FACULTY INTERNAL APPROVAL DATES

Faculty Council approval	
Curriculum Committee approval	
Internal Committee approvals	

NEW COURSE TEMPLATE

For changes to existing courses see *Course Change Template*

Faculty:
FBIT

This new course is associated with:

Minor Program Adjustment Major Program Modification New Program None

Will this course appear anywhere other than the course description section of the Calendar?

Yes No

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor: *Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map: *Course Sequencing or Course Placement*

A new course (core or elective) related to a Major Program Modification: *Major Program Modification*

Note: If the new course is for a new program, you do not need to show course placement as it will be captured in the new program proposal.

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

Master of Business Analytics and AI

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

Fall 2022

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2022

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

See new program proposal

Subject Code: MBAI

Course Number:
5300G

Full Course Title: Programming and Data Processing

Short-Form Course Title (max. 30 characters): Programming and Data Processing

Course Description

The first part of the course studies data processing using the following Python libraries: Pandas, Matplotlib, NumPy, SciPy, and others. Jupyter notebooks will be used for visualization. In the process, the course introduces Calculus and Statistics for machine learning. The second part of the course studies natural language processing techniques, network analysis, web log data analysis, and data integration techniques including data wrangling.

Credit Hours: 3.0	
Contact Hours – please indicate total number of hours for each component	
Lecture: 3.0	Lab:
Tutorial: 3.0 (monthly)	Other:
Cross-listings	
Prerequisites for Calendar	
Prerequisites for Banner	
Co-requisites	
Prerequisites with concurrency (pre or co-requisite)	
Credit restrictions	<input type="checkbox"/> Equivalency*
Recommended Prerequisites	
Course Restrictions	
Course Type	<input checked="" type="checkbox"/> Core <input type="checkbox"/> Elective <input type="checkbox"/> Core or Elective
Is the course: <input type="checkbox"/> Undergraduate <input checked="" type="checkbox"/> Graduate <input type="checkbox"/> Professional (e.g. some Education courses)	
Grading scheme	<input checked="" type="checkbox"/> N (normal alpha grade) <input type="checkbox"/> P (pass/fail)

***Equivalency:** If it is equivalent, students can retake either course. If it is not equivalent, students are not allowed to register in the restricted course.

Course instructional method:

CLS (In Class Delivery)		HYB (In Class and Online Delivery)	x
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)	x	WEB (Fully Online – Asynchronous)	x
Not Applicable			

Teaching and assessment methods:

Participation	10
Assignment 1	15
Assignment 2	15
Midterm I	15
Midterm II	15
Final Project	30

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning [website](#), or contact them at teachingandlearning@uoit.ca.)

On the successful completion of the course, students will be able to:

1. Analyze data to understand its attributes.
2. Generate graphs that help understand properties of data that may not be so apparent otherwise.
3. Make an informed decision as to what learning algorithm is most appropriate for a given data set.
4. Create a machine learning model based on the data characteristics.
5. Use machine learning libraries to perform data analysis.
6. Generate graphs that help understand data and the performance of machine learning algorithms.
7. Analyze natural language problems to determine the type of problem at hand and the best possible way to address it.
8. Analyze and evaluate data from heterogeneous sources to apply the best integration techniques available.

Does this course contain any experiential learning components? Yes No

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences:			

We have consulted with all impacted areas: Yes NA

Process of consultation, if applicable:

Does this course contain any Indigenous content? Yes No Unsure

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the [Protocol for Consultation with the Indigenous Education Advisory Circle](#).

Has the IEAC been contacted? Yes No

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? Yes No

If yes, have they completed their review? Yes No N/A

Financial Implications

See new program proposal.

FACULTY INTERNAL APPROVAL DATES

Faculty Council approval	
Curriculum Committee approval	
Internal Committee approvals	

NEW COURSE TEMPLATE

For changes to existing courses see *Course Change Template*

Faculty:
FBIT

This new course is associated with:

Minor Program Adjustment Major Program Modification New Program None

Will this course appear anywhere other than the course description section of the Calendar?

Yes No

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor: *Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map: *Course Sequencing or Course Placement*

A new course (core or elective) related to a Major Program Modification: *Major Program Modification*

Note: If the new course is for a new program, you do not need to show course placement as it will be captured in the new program proposal.

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

Master of Business Analytics and AI

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

Fall 2022

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2022

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

See new program proposal

Subject Code: MBAI

Course Number:
5310G

Full Course Title: Artificial Intelligence Programming

Short-Form Course Title (max. 30 characters): AI Programming

Course Description

Students will learn to program a computer system to make predictions on, classify, or cluster data that the system has never seen before. Topics include theory and practice of supervised and unsupervised learning such as reinforcement learning, covering well-known algorithms such as linear regression, Naïve Bayes, support vector machines, ensemble methods, K-means, and convolutional and recurrent neural networks. The course uses the Python programming language with TensorFlow and Keras.

Credit Hours: 3.0	
Contact Hours – please indicate total number of hours for each component	
Lecture: 3.0	Lab:
Tutorial: 3.0 (monthly)	Other:
Cross-listings	
Prerequisites for Calendar	MBAI 5300G
Prerequisites for Banner	
Co-requisites	
Prerequisites with concurrency (pre or co-requisite)	Programming and Data Processing
Credit restrictions	<input type="checkbox"/> Equivalency*
Recommended Prerequisites	
Course Restrictions	
Course Type	<input checked="" type="checkbox"/> Core <input type="checkbox"/> Elective <input type="checkbox"/> Core or Elective
Is the course: <input type="checkbox"/> Undergraduate <input checked="" type="checkbox"/> Graduate <input type="checkbox"/> Professional (e.g. some Education courses)	
Grading scheme	<input checked="" type="checkbox"/> N (normal alpha grade) <input type="checkbox"/> P (pass/fail)

***Equivalency:** If it is equivalent, students can retake either course. If it is not equivalent, students are not allowed to register in the restricted course.

Course instructional method:

CLS (In Class Delivery)		HYB (In Class and Online Delivery)	x
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)	x	WEB (Fully Online – Asynchronous)	x
Not Applicable			

Teaching and assessment methods:

Participation	10
Assignment 1	15
Assignment 2	15
Midterm I	15
Midterm II	15
Final Project	30

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning [website](#), or contact them at teachingandlearning@uoit.ca.)

On the successful completion of the course, students will be able to:

1. Analyze data to understand its attributes.
2. Make an informed decision as to what learning algorithm is most appropriate for a given data set.
3. Create a machine learning model based on the data characteristics.
4. Use machine learning libraries to perform data analysis.
5. Generate graphs that help understand data and the performance of machine learning algorithms.
6. Obtain the foundations to develop a machine learning logic adequate for IT professionals.

Does this course contain any experiential learning components? Yes No

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences:			

We have consulted with all impacted areas: Yes NA

Process of consultation, if applicable:

Does this course contain any Indigenous content? Yes No Unsure

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the [Protocol for Consultation with the Indigenous Education Advisory Circle](#).

Has the IEAC been contacted? Yes No

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

--

Did the IEAC ask you to return the proposal to them for review? Yes No

If yes, have they completed their review? Yes No N/A

Financial Implications

See new program proposal.

FACULTY INTERNAL APPROVAL DATES

Faculty Council approval	
Curriculum Committee approval	
Internal Committee approvals	

NEW COURSE TEMPLATE

For changes to existing courses see *Course Change Template*

Faculty:
FBIT

This new course is associated with:

Minor Program Adjustment Major Program Modification New Program None

Will this course appear anywhere other than the course description section of the Calendar?

Yes No

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor: *Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map: *Course Sequencing or Course Placement*

A new course (core or elective) related to a Major Program Modification: *Major Program Modification*

Note: If the new course is for a new program, you do not need to show course placement as it will be captured in the new program proposal.

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

Master of Business Analytics and AI

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

Fall 2022

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2022

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

See new program proposal

Subject Code: MBAI

Course Number:
5400G

Full Course Title: Visualization and Storytelling

Short-Form Course Title (max. 30 characters):

Course Description

This is a highly-interactive and hands-on course on data visualization and storytelling designed to help students understand important concepts and techniques used to transform complex data into powerful visuals. Students will use popular, innovative, and industry-standard data visualization tools to create powerful reports, dashboards, and coherent data stories that will help individuals and organizations make fact-based decisions. Students will apply predictive analytics tools to discover data patterns such as customer purchase behavior, sales trends, or production bottlenecks to improve business decision making.

Credit Hours: 3.0	
Contact Hours – please indicate total number of hours for each component	
Lecture: 3.0	Lab:
Tutorial: 3.0 (monthly)	Other:
Cross-listings	
Prerequisites for Calendar	
Prerequisites for Banner	
Co-requisites	
Prerequisites with concurrency (pre or co-requisite)	
Credit restrictions	<input type="checkbox"/> Equivalency*
Recommended Prerequisites	
Course Restrictions	
Course Type	<input checked="" type="checkbox"/> Core <input type="checkbox"/> Elective <input type="checkbox"/> Core or Elective
Is the course: <input type="checkbox"/> Undergraduate <input checked="" type="checkbox"/> Graduate <input type="checkbox"/> Professional (e.g. some Education courses)	
Grading scheme	<input checked="" type="checkbox"/> N (normal alpha grade) <input type="checkbox"/> P (pass/fail)

***Equivalency:** If it is equivalent, students can retake either course. If it is not equivalent, students are not allowed to register in the restricted course.

Course instructional method:

CLS (In Class Delivery)	x	HYB (In Class and Online Delivery)	x
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)	x	WEB (Fully Online – Asynchronous)	x
Not Applicable			

Teaching and assessment methods:

3 Assignments	45%
Midterm	25%
Final Project	30%

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning [website](#), or contact them at teachingandlearning@uoit.ca.)

On the successful completion of the course, students will be able to:

1. Effectively use data visualization tools to create professional reports easy for users to perceive and understand in order to enhance user experience;
2. Explain data visualization principles and guidelines for effective analysis and presentation;
3. Use visual and cognitive perception concepts and practices (human-centered design) to prepare and transform data for analysis using industry-standard visualization applications built-in tools and functions;
4. Create stylish and engaging visualizations, dashboards, and storyboards using International Business Communication Standards (IBCS) that effectively communicate data trends and patterns;
5. Use filters, calculated fields, parameters, and actions to create richly interactive dashboards;
6. Create effective visualization of geospatial data;
7. Apply clustering and distribution models that allow for forecasting and trend analysis.

Does this course contain any experiential learning components? Yes No

If yes:

Case Study	x	Simulated Workplace Project	x
Consulting project/workplace project		Applied Research	x
Field Experiences			
Other Types of Experiences:			

We have consulted with all impacted areas: Yes NA

Process of consultation, if applicable:

Does this course contain any Indigenous content? Yes No Unsure

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the [Protocol for Consultation with the Indigenous Education Advisory Circle](#).

Has the IEAC been contacted? Yes No

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? Yes No

If yes, have they completed their review? Yes No N/A

Financial Implications

See new program proposal.

FACULTY INTERNAL APPROVAL DATES

Faculty Council approval	
Curriculum Committee approval	
Internal Committee approvals	

NEW COURSE TEMPLATE

For changes to existing courses see *Course Change Template*

Faculty:
FBIT

This new course is associated with:

Minor Program Adjustment Major Program Modification New Program None

Will this course appear anywhere other than the course description section of the Calendar?

Yes No

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor: *Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map: *Course Sequencing or Course Placement*

A new course (core or elective) related to a Major Program Modification: *Major Program Modification*

Note: If the new course is for a new program, you do not need to show course placement as it will be captured in the new program proposal.

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

Master of Business Analytics and AI

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

Fall 2022

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2022

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

See new program proposal

Subject Code: MBAI

Course Number:
5410G

Full Course Title: Digital Transformation

Short-Form Course Title (max. 30 characters):

Course Description

In today's business world, it has become increasingly important for organizations to deploy new digital technologies to survive, grow and transform. This course will provide students with a critical understanding of the systems, techniques, tools, methodologies and platforms needed to enable enterprise transformation in the digital era. Strategic and operational issues surrounding digital transformation, including project management, leadership and change, enterprise architecture/infrastructure, business process improvement and implementation methodologies will be considered. Students will also acquire an understanding of SAP Leonardo, specifically how it can drive digital transformation.

Credit Hours: 3.0	
Contact Hours – please indicate total number of hours for each component	
Lecture: 3.0	Lab:
Tutorial: 3.0 (monthly)	Other:
Cross-listings	
Prerequisites for Calendar	MBAI 5400G
Prerequisites for Banner	
Co-requisites	
Prerequisites with concurrency (pre or co-requisite)	
Credit restrictions	<input type="checkbox"/> Equivalency*
Recommended Prerequisites	
Course Restrictions	
Course Type	<input checked="" type="checkbox"/> Core <input type="checkbox"/> Elective <input type="checkbox"/> Core or Elective
Is the course: <input type="checkbox"/> Undergraduate <input checked="" type="checkbox"/> Graduate <input type="checkbox"/> Professional (e.g. some Education courses)	
Grading scheme	<input checked="" type="checkbox"/> N (normal alpha grade) <input type="checkbox"/> P (pass/fail)

***Equivalency:** If it is equivalent, students can retake either course. If it is not equivalent, students are not allowed to register in the restricted course.

Course instructional method:

CLS (In Class Delivery)		HYB (In Class and Online Delivery)	x
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)	x	WEB (Fully Online – Asynchronous)	x
Not Applicable			

Teaching and assessment methods:

- Online Quizzes – 25%
- Participation – 10%
- Case Study Analysis – 25%
- Individual Report – 40%

--

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning [website](#), or contact them at teachingandlearning@uoit.ca.)

On the successful completion of the course, students will be able to:

1. Demonstrate an understanding of the principles and concepts of digital transformation from a business perspective.
2. Critically understand the systems, methodologies, platforms, tools and techniques to facilitate enterprise digital transformation.
3. Discuss key strategic and operational issues facing managers seeking to achieve digital transformation.
4. Explain different digital technologies which enable business intelligence and exploit digital transformation for strategic advantage.
5. Acquire an understanding of SAP Leonardo, specifically how it can drive digital transformation.

Does this course contain any experiential learning components? Yes No

If yes:

Case Study	X	Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences:			

We have consulted with all impacted areas: Yes NA

Process of consultation, if applicable:

--

Does this course contain any Indigenous content? Yes No Unsure

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the [Protocol for Consultation with the Indigenous Education Advisory Circle](#).

Has the IEAC been contacted? Yes No

If yes, when?

--

What was the advice you received from the IEAC, and how has it been included in your proposal?

--

--

Did the IEAC ask you to return the proposal to them for review? Yes No

If yes, have they completed their review? Yes No N/A

Financial Implications

See new program proposal.

FACULTY INTERNAL APPROVAL DATES

Faculty Council approval	
Curriculum Committee approval	
Internal Committee approvals	

NEW COURSE TEMPLATE

For changes to existing courses see *Course Change Template*

Faculty:
FBIT

This new course is associated with:

Minor Program Adjustment Major Program Modification New Program None

Will this course appear anywhere other than the course description section of the Calendar?

Yes No

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor: *Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map: *Course Sequencing or Course Placement*

A new course (core or elective) related to a Major Program Modification: *Major Program Modification*

Note: If the new course is for a new program, you do not need to show course placement as it will be captured in the new program proposal.

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

Master of Business Analytics and AI

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

Fall 2022

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2022

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

See new program proposal

Subject Code: MBAI

Course Number:
5500G

Full Course Title: Security, Privacy, and Trust in AI Systems

Short-Form Course Title (max. 30 characters):

AI Security Privacy and Trust

Course Description

Artificial Intelligence (AI) increasingly impacts how humans live, work and play online and in the physical world. In all of their interactions with AI and the physical world, humans produce great quantities of data that are available for the AI to analyze and make inferences from. This raises natural questions about the potential for use, misuse and protection of these data that can go beyond purely legal approaches.

This course uses a sociotechnical outlook (humans and machines work together as a system) to examine AI and its interaction with privacy security and trust in the light of current and potential future advances. Using case studies, reflection and theory, the course will examine technologies and techniques of location-based analytics, voice enabled systems, personal AI-based assistants and blockchain as well as potential technologies of the (near and medium term) future.

The course will cover use, ethics, efficacy and impact, positive and negative, on privacy and security as well as the impacts these technologies may have on business, society and individuals as well as human-AI trust (and the perception of AI trustworthiness). The course will examine AI- and data-focused security tools and techniques as well as ways to help protect data whilst still enabling their use, including differential privacy and tools for trustworthy AI.

Credit Hours: 3.0	
Contact Hours – please indicate total number of hours for each component	
Lecture: 3.0	Lab:
Tutorial: 3.0 (monthly)	Other:
Cross-listings	
Prerequisites for Calendar	
Prerequisites for Banner	
Co-requisites	
Prerequisites with concurrency (pre or co-requisite)	
Credit restrictions	<input type="checkbox"/> Equivalency*
Recommended Prerequisites	
Course Restrictions	
Course Type	<input checked="" type="checkbox"/> Core <input type="checkbox"/> Elective <input type="checkbox"/> Core or Elective
Is the course: <input type="checkbox"/> Undergraduate <input checked="" type="checkbox"/> Graduate <input type="checkbox"/> Professional (e.g. some Education courses)	
Grading scheme	<input checked="" type="checkbox"/> N (normal alpha grade) <input type="checkbox"/> P (pass/fail)

***Equivalency:** If it is equivalent, students can retake either course. If it is not equivalent, students are not allowed to register in the restricted course.

Course instructional method:

CLS (In Class Delivery)		HYB (In Class and Online Delivery)	x
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)	x	WEB (Fully Online – Asynchronous)	x
Not Applicable			

Teaching and assessment methods:

Paper: Initial Impressions - 10 Case Studies - 20 Participation (face to face and/or online) - 10 Quizzes (several) - 10 Written Analysis Project (on a topic chosen with consultation with prof - this may also have aspects of student-workplace analysis if available)- 30 Presentations (in Tutorials) - 10 Paper: Reflection and Re-Evaluation - 10
--

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning [website](#), or contact them at teachingandlearning@uoit.ca.)

By the end of this course, students will be able to: <ul style="list-style-type: none"> ● Identify practical uses of voice enabled systems, location analytics and blockchain for AI ● Describe the potential and uses of Personal AI Assistants ● Describe Explainable AI and its impact on different technologies ● Evaluate the ways in which privacy can be affected by AI Analytics ● Summarize techniques for the protection and utilization of data, including differential privacy, information security, and trustworthy AI. ● Recognize the impacts, barriers and aids to human-AI trust
--

Does this course contain any experiential learning components? Yes No

If yes:

Case Study	X	Simulated Workplace Project	
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences: if available/sensible, analysis project may build on student-workplace experience			

We have consulted with all impacted areas: Yes NA

Process of consultation, if applicable:

--

Does this course contain any Indigenous content? Yes No Unsure

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the [Protocol for Consultation with the Indigenous Education Advisory Circle](#).

Has the IEAC been contacted? Yes No

If yes, when?

--

What was the advice you received from the IEAC, and how has it been included in your proposal?

--

Did the IEAC ask you to return the proposal to them for review? Yes No

If yes, have they completed their review? Yes No N/A

Financial Implications

See new program proposal.

FACULTY INTERNAL APPROVAL DATES

Faculty Council approval	
Curriculum Committee approval	
Internal Committee approvals	

NEW COURSE TEMPLATE

For changes to existing courses see *Course Change Template*

Faculty:
FBIT

This new course is associated with:

Minor Program Adjustment Major Program Modification New Program None

Will this course appear anywhere other than the course description section of the Calendar?

Yes No

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor: *Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map: *Course Sequencing or Course Placement*

A new course (core or elective) related to a Major Program Modification: *Major Program Modification*

Note: If the new course is for a new program, you do not need to show course placement as it will be captured in the new program proposal.

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

Master of Business Analytics and AI

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

Fall 2022

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2022

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

See new program proposal

Subject Code: MBAI

Course Number:
5600G

Full Course Title: Applied Integrative Analytics Capstone Project

Short-Form Course Title (max. 30 characters):

Applied Integrative Analytics

Course Description

This course integrates the theory and skills learned in the MBAI program through an applied integrative capstone project where students work individually or in small teams over the 6 weeks to scope, design, and implement an analytics or AI solution to a real world problem.

Students meet twice a week to work on projects and deliver on milestones to steadily progress towards a solution culminating with a report and presentation at the end of the class which demonstrates an application of skills and knowledge from the various domains in the program including technical, managerial, ethical and communications.

Credit Hours: 6.0	
Contact Hours – please indicate total number of hours for each component	
Lecture: 6.0	Lab:
Tutorial: 3.0 (monthly)	Other:
Cross-listings	
Prerequisites for Calendar	completion of core MBAI courses
Prerequisites for Banner	
Co-requisites	
Prerequisites with concurrency (pre or co-requisite)	
Credit restrictions	<input type="checkbox"/> Equivalency*
Recommended Prerequisites	
Course Restrictions	
Course Type	<input checked="" type="checkbox"/> Core <input type="checkbox"/> Elective <input type="checkbox"/> Core or Elective
Is the course: <input type="checkbox"/> Undergraduate <input checked="" type="checkbox"/> Graduate <input type="checkbox"/> Professional (e.g. some Education courses)	
Grading scheme	<input type="checkbox"/> N (normal alpha grade) <input checked="" type="checkbox"/> P (pass/fail)

***Equivalency:** If it is equivalent, students can retake either course. If it is not equivalent, students are not allowed to register in the restricted course.

Course instructional method:

CLS (In Class Delivery)		HYB (In Class and Online Delivery)	x
IND (Individual Studies)		OFF (Off Site)	
WB1 (Virtual Meet Time – Synchronous)	x	WEB (Fully Online – Asynchronous)	x
Not Applicable			

Teaching and assessment methods:

This course is the integrated application of the knowledge gained throughout the MBAI program. Students will complete an analytics project using real data and applied techniques to address a business issue. The class is conducted as a series of milestones and deliverables to culminate with the delivery of a presentation and report describing the steps along the way, lessons learned, proposed solutions, and implications thereof.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning [website](#), or contact them at teachingandlearning@uoit.ca.)

By the end of this course, students will be able to:

- Define a business problem
- Understand data models and sources
- Prepare data for model ingestion
- Perform business analytics methodologies
- Compare competing models
- Explain alternatives and tradeoffs
- Deliver impactful presentations
- Assess legal, ethical and fairness issues of implemented solutions

Does this course contain any experiential learning components? Yes No

If yes:

Case Study		Simulated Workplace Project	X
Consulting project/workplace project		Applied Research	
Field Experiences			
Other Types of Experiences: if available/sensible, analysis project may build on student-workplace experience			

We have consulted with all impacted areas: Yes NA

Process of consultation, if applicable:

Does this course contain any Indigenous content? Yes No Unsure

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the [Protocol for Consultation with the Indigenous Education Advisory Circle](#).

Has the IEAC been contacted? Yes No

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? Yes No

If yes, have they completed their review? Yes No N/A

Financial Implications

See new program proposal.

FACULTY INTERNAL APPROVAL DATES

Faculty Council approval	
Curriculum Committee approval	
Internal Committee approvals	

NEW COURSE TEMPLATE

For changes to existing courses see *Course Change Template*

Faculty:
FBIT

This new course is associated with:

Minor Program Adjustment Major Program Modification New Program None

Will this course appear anywhere other than the course description section of the Calendar?

Yes No

If you answered yes to the above, please complete:

A new core course for an existing program, specialization or minor: *Minor Program Adjustment*

A new elective course for an existing program, specialization or minor, listed in the program map: *Course Sequencing or Course Placement*

A new course (core or elective) related to a Major Program Modification: *Major Program Modification*

Note: If the new course is for a new program, you do not need to show course placement as it will be captured in the new program proposal.

Programs impacted: [Please list all impacted programs including any applicable fields or specializations.]

Master of Business Analytics and AI

Calendar start date: (When the course should first appear in the Academic Calendar 2020-2021)

Fall 2022

Registration start date: (The first time the course will be open for registration e.g. Fall 2020)

Fall 2022

Additional supporting information (optional; please indicate if you are attaching any additional documentation)

See new program proposal

Subject Code: MBAI

Course Number:
5700G

Full Course Title: Business Analytics Internship

Short-Form Course Title (max. 30 characters):

Business Analytics Internship

Course Description

The Business Analytics Internship course is an important experiential learning component of the MBAI program, and its objective is to provide students with practical exposure to actual work environments in analytics and AI, which is essential for a more complete understanding of the application of analytical and AI theories and procedures.

The Internship program permits MBAI students to be registered who have met the minimum requirements of the program. The result of the program and course are to further develop a student's skillset and experience in their field of study, and provide them with an opportunity to gain actual work experience in organizations they may consider for future careers post-graduation.

Credit Hours: 6.0	
Contact Hours – please indicate total number of hours for each component	
Lecture: 0.0	Lab:
Tutorial: 0.0	Other:
Cross-listings	
Prerequisites for Calendar	completion of core MBAI courses
Prerequisites for Banner	
Co-requisites	
Prerequisites with concurrency (pre or co-requisite)	
Credit restrictions	<input type="checkbox"/> Equivalency*
Recommended Prerequisites	
Course Restrictions	
Course Type	<input checked="" type="checkbox"/> Core <input type="checkbox"/> Elective <input type="checkbox"/> Core or Elective
Is the course: <input type="checkbox"/> Undergraduate <input checked="" type="checkbox"/> Graduate <input type="checkbox"/> Professional (e.g. some Education courses)	
Grading scheme	<input type="checkbox"/> N (normal alpha grade) <input checked="" type="checkbox"/> P (pass/fail)

***Equivalency:** If it is equivalent, students can retake either course. If it is not equivalent, students are not allowed to register in the restricted course.

Course instructional method:

CLS (In Class Delivery)		HYB (In Class and Online Delivery)	
IND (Individual Studies)		OFF (Off Site)	x
WB1 (Virtual Meet Time – Synchronous)		WEB (Fully Online – Asynchronous)	
Not Applicable			

Teaching and assessment methods:

Student interns are required to present a comprehensive report on their internship experience to the graduate program director within six weeks of completing their internship employment. The internship report must be of high-quality and professionally presented in hard copy format, organization, style, spelling, grammar, and appearance (as well as in content). A professional report should include a cover page, table of contents, an executive summary (that will state the problem or problems that the student worked on, describe their

activities and summarize their findings), and any relevant appendices. A formal citation style (APA or MLA) is also required for all sources of information presented. Reports that do not demonstrate adequate professionalism will be returned for revision. The interns' direct work supervisor/manager will provide an assessment of the intern's performance on the job, which will be incorporated into the overall evaluation by the faculty FBIT internship coordinator. It is the student's responsibility to ensure the work supervisor submitted their completed evaluation to the Coordinator by the time they submit the Final Report.

Learning outcomes: (for assistance developing course learning outcomes, please refer to the Teaching and Learning [website](#), or contact them at teachingandlearning@uoit.ca.)

By the end of this course, students will be able to:

- Gain practical experience within the analytics and AI industry;
- Acquire knowledge of the industry in which the internship contract is completed;
- Apply their academic knowledge learning in the classroom in a work setting;
- Develop a greater understanding about career options while more clearly defining personal career goals, interests, and industry connections.

Does this course contain any experiential learning components? Yes No

If yes:

Case Study		Simulated Workplace Project	
Consulting project/workplace project	X	Applied Research	
Field Experiences			
Other Types of Experiences: if available/sensible, analysis project may build on student-workplace experience			

We have consulted with all impacted areas: Yes NA

Process of consultation, if applicable:

Does this course contain any Indigenous content? Yes No Unsure

For more information on how Indigenous content is defined at Ontario Tech University and how to consult with the Indigenous Education Advisory Circle (IEAC), please refer to the [Protocol for Consultation with the Indigenous Education Advisory Circle](#).

Has the IEAC been contacted? Yes No

If yes, when?

What was the advice you received from the IEAC, and how has it been included in your proposal?

Did the IEAC ask you to return the proposal to them for review? Yes No

If yes, have they completed their review? Yes No N/A

Financial Implications

See new program proposal.

FACULTY INTERNAL APPROVAL DATES

Faculty Council approval	
Curriculum Committee approval	
Internal Committee approvals	

Appendix C – Faculty Information

Faculty members by home unit, rank, and supervisory privileges

Name	Home Faculty/Unit	Rank / Discipline	Supervisory Privileges	Teaching in the new Program
Amirali Salehi-Abari, BS, MSc, PhD	FBIT	Assistant Professor Computer Science	Graduate Faculty - Ontario Tech University - MSc/PhD Computer Science - MITS	MBAI 5600, MBAI 5700
Nader Azad, BS, MSc, PhD	FBIT	Assistant Professor, Operations Research	Graduate Faculty - Ontario Tech University - MSc/PhD Modelling and Computational Science - MEngM – Engineering Management	MBAI 5600, MBAI 5700
Michael Bliemel, BSc, MAsc, MPS, PhD	FBIT	Dean, Professor, Information Systems	Graduate Faculty - Ontario Tech University - MSc/PhD Computer Science - MITS Adjunct Faculty - Dalhousie University - Faculty of Graduate Studies/Rowe School of Business	MBAI 5600, MBAI 5700
Ana Duff, BSc, MSc, PhD	FBIT	Assistant Teaching Professor, Mathematics	NA	MBAI 5600
Patrick Hung, PhD, MPS, MAsc, BSc	FBIT	Professor, Computer Science	Graduate Faculty - Ontario Tech University - MSc/PhD Computer Science - MITS Adjunct Graduate Faculty - Computer Science Program, University of São Paulo, Brazil - Computer Science Program, Federal University of Pernambuco, Brazil - Computer Engineering Program, National Taipei University of Technology, Taiwan	MBAI 5600, MBAI 5700
Stephen Jackson, BSc, PhD	FBIT	Associate Professor,	Graduate Faculty - Ontario Tech University	MBAI 5410, MBAI 5600, MBAI 5700

		Information Systems	<ul style="list-style-type: none"> - MSc/PhD Computer Science - MITS - GDip Accounting 	
Amin Ibrahim, BAsC, MAsC, PhD	FBIT	Associate Teaching Professor, Mathematics	NA	MBAI, 5400, MBAI 5600
Salma Karray, BCom, MSc, PhD	FBIT	Professor, Marketing	Graduate Faculty - Ontario Tech University <ul style="list-style-type: none"> - MSc/PhD Modelling and Computational Science - MSc/PhD Computer Science Adjunct Graduate Faculty <ul style="list-style-type: none"> - University of Waterloo Ryerson University	MBAI 5600, MBAI 5700
Fletcher Lu, BMath, MMath, PhD	FBIT	Associate Professor, Mathematics	Graduate Faculty - Ontario Tech University <ul style="list-style-type: none"> - MSc/PhD Computer Science - MHSc/PhD Health Science - MSc/PhD Modelling and Computational Science 	MBAI 5300, MBAI 5600, MBAI 5700
Stephen Marsh, BSc, PhD	FBIT	Associate Professor, Computer Science	Graduate Faculty - Ontario Tech University <ul style="list-style-type: none"> - MSc/PhD Computer Science - MITS Adjunct Graduate Faculty <ul style="list-style-type: none"> - Darmstadt Technical University 	MBAI 5500, MBAI 5600, MBAI 5700
Samaneh Mazaheri, BSc, MSc, PhD	FBIT	Assistant Teaching Professor, Computer Science	Graduate Faculty - Ontario Tech University <ul style="list-style-type: none"> - MITS 	MBAI 5600
Carolyn McGregor, BAppSc, AM, PhD	FBIT	Professor, Computer Science	Graduate Faculty - Ontario Tech University <ul style="list-style-type: none"> - MSc/PhD Computer Science - MHSc/PhD Health Science Associate Graduate Faculty – Ontario Tech University <ul style="list-style-type: none"> - MSc/PhD – Electrical and Computer Engineering 	MBAI 5110, MBAI 5600, MBAI 5700

			Adjunct Graduate Faculty <ul style="list-style-type: none"> - University of Technology, Sydney, Australia - University of Southern Denmark - Jain University 	
Theresa Miedema, BA, LL.B, SJD	FBIT	Associate Teaching Professor, Law	NA	MBAI 5200, MBAI 5600
Amir Rastpour, BSc, MSc, PhD	FBIT	Assistant Professor, Operations Research	Graduate Faculty - Ontario Tech University <ul style="list-style-type: none"> - MSc/PhD Modelling and Computational Science - MEngM – Engineering Management 	MBAI 5100, MBAI 5600, MBAI 5700
Karthik Sankaranarayanan, BSc, MSc, PhD	FBIT	Associate Professor, Operations Research	Graduate Faculty - Ontario Tech University <ul style="list-style-type: none"> - MSc/PhD Modelling and Computational Science - MITS Adjunct Graduate Faculty <ul style="list-style-type: none"> - Amrita University 	MBAI 5600, MBAI 5700
Alexander Serenko, MBA, PhD	FBIT	Associate Professor, Information Systems	Graduate Faculty - Ontario Tech University <ul style="list-style-type: none"> - MSc/PhD Computer Science - MHSc/PhD Health Science Adjunct Graduate Faculty <ul style="list-style-type: none"> - University of Guelph - Macquarie University 	MBAI 5600, MBAI 5700
Julie Thorpe, BCompSci, PhD	FBIT	Associate Professor, Computer Science	Graduate Faculty - Ontario Tech University <ul style="list-style-type: none"> - MSc/PhD Computer Science - MITS 	MBAI 5600, MBAI 5700
Miguel Vargas Martin, BSc, MASC, PhD	FBIT	Professor, Computer Science	Graduate Faculty - Ontario Tech University <ul style="list-style-type: none"> - MSc/PhD Computer Science - MITS Associate Graduate Faculty – Ontario Tech University <ul style="list-style-type: none"> - MSc/PhD – Electrical and Computer Engineering - MHSc/PhD – Health Science Adjunct Graduate Faculty <ul style="list-style-type: none"> - University of Aguascalientes 	MBAI 5310, MBAI 5600, MBAI 5700

			<ul style="list-style-type: none"> - Centro de Investigacion y de Estudios Avanzados del IPN - Instituto Tecnologico de Aguascalientes 	
Wei-Lin Wang, BBA, MBA, PhD	FBIT	Assistant Professor, Marketing	NA	MBAI 5600, MBAI 5700

Name	Completed			Current		
	Master's	Ph.D.	PDF	Master's	Ph.D.	PDF
Nader Azad			1		1	2
Michael Bliemel	4	2				
Patrick Hung	6	1		13	3	
Salma Karray	2	1	2	1	2	
Fletcher Lu	4			1	1	
Carolyn McGregor	3	2	2	8	2	
Miguel V. Martin	38	6	1	4	1	
Karthik Sankaranarayanan	3	1		2	5	
Julie Thorpe	19	1		2	1	

Publication records at Ontario Tech by year and outlet (current and last 5 years)

Year	Faculty Members	Articles	Books	Book Chapters	Reports	Conference Presentations
2015	5	5			1	21
2016	4	4				10
2017	4	6		2		8
2018	4	2		3		10
2019	5	23			3	26
TOTAL	6	40		5	4	75

Publication records, regardless of affiliation, by year and outlet

Year	Faculty Members	Articles	Books	Book Chapters	Reports	Conference Presentations
2015	9	18	1	0	3	37
2016	7	8	1	0	0	18
2017	8	17	2	2	0	24
2018	10	23	0	3	0	27
2019	15	49	1	2	4	57
TOTAL	15	115	5	7	7	163

Research funding at Ontario Tech by source and year

Year	Faculty Members	Canadian Granting Councils	Canadian Government	International Government	Others
2015	7	\$68,500	\$175,000		\$132,200
2016	6	\$239,500	\$975,000		\$776,833
2017	6	\$211,218	\$876,000		\$790,023
2018	10	\$358,223	\$211,000	\$249,000	\$482,312
2019	11	\$474,120	\$194,501		\$288,437
TOTAL	11	1,351,561	\$2,341,501	\$249,000	\$2,469,805

Research funding, regardless of affiliation, by source and year

Year	Faculty Members	Canadian Granting Councils	Canadian Government	International Government	Others
2015	10	\$109,471	\$190,000		\$157,700
2016	8	\$376,706	\$975,000		\$790,330
2017	8	\$231,218	\$876,000		\$799,985
2018	11	\$411,552	\$211,000	\$249,000	\$482,312
2019	12	\$527,449	\$194,501		\$288,437
TOTAL	12	\$1,656,396	\$2,446,501	\$249,000	\$2,518,764

New Program Assessment: Master of Business Analytics & AI

Library Statement of Support Provided to Ontario Tech University

Prepared by: Fiona Munroe, Faculty of Business & IT Liaison Librarian, August 21 2020



Contents

Summary	3
Resource Requirements	3
Introduction	4
Library Collections.....	4
Consortial Licensing	4
Journals	5
Books & Ebooks.....	5
Search Tools	7
Other Library Resources.....	7
Data Resources	7
Multimedia Resources	8
Library Services	8
Research Support.....	8
Reference Service & Research Consultations	8
Open Access & Research Data Management	9
Theses & Dissertations.....	9
Teaching & Learning Support.....	9
Information Literacy Instruction	9
Online Research Guides	10
Copyright & Academic Integrity.....	10
Course Reserves.....	11
3D Printing & Equipment Loans.....	11
Library Staffing	11

Summary

Ontario Tech University Library's holdings in computer systems and computer programming are strong.

Library collections and services form a solid foundation of support for Ontario Tech's proposed new Master of Business Analytics & AI program. Existing collection strengths in computer systems and computer programming will provide a baseline of support for courses in the program.

The Library's research and special collections total more than 102,000 print volumes and 100,000 journal subscriptions. The Library provides access to more than 865,000 ebooks, and primary source materials. Collection strengths support the research and instructional programs at Ontario Tech University.

Resource Requirements

Given that this proposal is for a Master's degree in a new subject area without a current related undergraduate program, we will require the acquisition of additional resources. Based on current knowledge of the program, we estimate additional funding is required to build collections as outlined below.

Resource	Rationale	Budget Requirement	OTO or Ongoing
Library Collections	New acquisitions including select textbooks and masters-level resources to address subject gaps in Artificial Intelligence and Machine Learning	\$2500	One time, start up
Total		\$2500	

Introduction

The Library supports the teaching, learning and research missions of Ontario Tech University and Durham College. Ontario Tech students have access to a joint collection of more than 102,000 print books purchased by both Ontario Tech and Durham College. Additionally, the Library provides access to online resources including ebooks and online databases that are selected to meet the teaching and research needs of Ontario Tech programs. Students and faculty are served by a team of subject specialist librarians and trained library technicians who provide an array of research and teaching support services including information literacy instruction, workshops, research help and reference service.

Library Collections

The following section provides an overview of existing print and online resources available to support the Master of Business Analytics & AI (MBAI) program. A good Library resource base exists for the MBAI program, as there are curriculum connections between MBAI and a number of programs at Ontario Tech. These include Information Technology, Computer Science (with optional specialization in Data Science), and Commerce. However, more advanced and comprehensive resources are required to support this new Masters level program. Additional staff time will be required to develop resource guides, evaluate and manage collections to support curriculum and provide research support for students and faculty in the MBAI program.

The Library's collections expenditures for the 2019-20 fiscal year totaled \$ 1,664,480. Approximately 90% of this budget is allocated for the purchase of subscription online resources. The remainder of the budget is allocated for the acquisition of print and online resources to support the curriculum including journals, books and ebooks, multimedia and other specialized material.

The Library welcomes suggestions from members of the University community. Faculty and students may suggest material for purchase using an online form. All recommended purchases are evaluated according to the Collection Development Policy and with consideration to budget constraints.

Consortial Licensing

By virtue of our membership in two key consortia, Ontario Tech University Library is able to take advantage of the increased bargaining power of a collective through which we subscribe to a wide array of scholarly content. Canada Research Knowledge Network (CRKN) is a partnership of Canadian universities, dedicated to expanding digital content for the academic research and teaching enterprise in Canada. Through the coordinated leadership of librarians, researchers, administrators and other stakeholders in the research community, CRKN undertakes large-scale content acquisition and licensing initiatives in order to build knowledge infrastructure, research, and teaching capacity in Canada's universities.

The Ontario Council of University Libraries (OCUL) leads and participates in a number of initiatives with the goal of enhancing research supports and creating rich learning environments for Ontario's diverse and growing student population. These resources span an impressive array of information resources (content), digital infrastructure, data, and maps and geospatial resources.

Journals

The Library almost exclusively acquires online journals and provides access to more than 97,820 titles across all disciplines. The Library's collection of academic journals in disciplines related to the Master of Business Analytics & AI is strong.

Students and researchers can access nearly complete journal suites, in many cases including archives, from publishers such as:

- SpringerLink – Computer Science
- IEEE

Library holdings by subject category:

Subject Category	# of Journal Holdings
Computer Science	1037
Mathematics - General	298
Mathematical Statistics	115
Technology – General	410

The Library provides access, through subscription, to most of the relevant journals with the highest impact factors, according to Clarivate's Journal Citation Reports (JCR) database (2019).

JCR Subject Area	Holdings in Top 20	Key Titles
Computer Science – Artificial Intelligence	18/20	<ul style="list-style-type: none"> • IEEE transactions on pattern analysis and machine intelligence • Information Fusion • IEEE Computational Intelligence Magazine • Artificial Intelligence Review
Statistics & Probability	19/20	<ul style="list-style-type: none"> • Journal of Statistical Software • Applied Statistics • Statistics & Computing • Journal of Business & Economic Statistics
Mathematics, Applied	18/20	<ul style="list-style-type: none"> • Applied Mathematics & Computation • Computers & Mathematics with Applications • Informatica

Books & Ebooks

The Library at Ontario Tech University provides access to 102,131 print books and 840,921 ebooks that support teaching, learning and research across all programs and disciplines. Students and faculty have access to collections of books and ebooks from major academic publishers.

The following table highlights print holdings in relevant subjects. Collection strengths are evident in computer science and statistics. Gaps identified in the Library’s holdings in the following subjects will be areas of focus for collection development:

- Artificial Intelligence
- Ethics in Artificial Intelligence/Machine Learning

Subject	# Print Books
Artificial Intelligence	47 – area of growth
Computer Systems	312
Machine Learning	31 – area of growth
Statistics	1321

Ontario Tech users have access to 865,736 ebooks from a variety of academic publishers. The following collections have particular relevance to the MBAI program, with subject coverage that includes:

- Artificial intelligence

Library Statement for Master of Business Analytics & AI Program Proposal

- Software
- Computer Science
- Machine Learning
- Computer Systems
- Software Development
- Data Mining

Collection	# Titles
Scholar's Portal – Computer Science	17, 461 (including 2, 831 AI focused titles)
Springer Link – Computer Science	20, 964 (including 10, 649 AI focused titles)
Springer Link - Mathematics	7, 909
IEEE Xplore – Computing & Processing	2, 478

Search Tools

The Library subscribes to 737 research databases and indexes, many of which provide access to the literature in the fields of business analytics and artificial intelligence. Systematic searching of these resources enables students and faculty to access journals and other academic resources such as conference proceedings, theses and dissertations, trade publications and reports. In 2019-20, Ontario Tech students engaged in 91,338 electronic resource searches and accessed 179,080 full-text articles. The databases below are particularly relevant to the MBAI program.

Highly Relevant Databases:	Relevant Databases: Multidisciplinary
<ul style="list-style-type: none">• Computers & Applied Sciences Complete• IEEE Xplore Digital Library	<ul style="list-style-type: none">• Scopus• Web of Science

Following consultations with Michael Bliemel, Dean of the Faculty of Business & IT, the Library anticipates that students in the MBAI program will predominantly be using electronic resources licensed directly by the Faculty through the FBIT Finance Laboratory. Therefore additional subscription resources licensed through the Library are not necessary to support this new program.

Other Library Resources

Data Resources

To support research that requires statistics and datasets, the Library subscribes to three main resources:

- **Data Liberation Initiative (DLI):** Access to datasets from Statistics Canada surveys including public use microdata files (PUMF) and research data centre (RDC) master files.
- **Odesi:** A web-based data exploration, extraction and analysis tool that enables researchers to search for variables across thousands of datasets including Statistics Canada datasets and polling data.
- **Interuniversity Consortium for Political and Social Research (ICPSR):** Access to a data archive of more than 250,000 files of research in the social and behavioral sciences. Includes specialized collections of data in education, aging, criminal justice, substance abuse, terrorism, and other fields. Resources for teaching and learning include classroom exercises and materials to support data literacy in the classroom.

The Library also provides access to Dataverse, a repository that supports research data management and open access data requirements for Tri-Agency research funding compliance.

Multimedia Resources

The Library acquires DVD and streaming video resources that are relevant to the disciplines in the MBAI program. Multimedia resources are selected individually or as part of standing subscriptions.

The Library's collection includes 109,200 Streaming Video titles. Of these multimedia resources, the following are particularly relevant to the curriculum in the MBAI program.

Relevant Streaming Video Collections

Streaming Video Collection	Relevant Titles
Kanopy Streaming	Applied Science (497 titles), Computer Science and Technology (310 titles)
Films on Demand	Applied Mathematics (107 titles), Computer Science (34 titles), Ethics and Business Law (353 titles), Impact of Technology on Society (449 titles), Mathematics and Statistics (510 titles), Technology Applications (317 titles)

Library Services

A range of library services support teaching, learning and research at the University. Students and faculty in the MBAI program will have access to services in-person, online and via email or telephone.

Research Support

The Library plays a vital role in supporting student and faculty research at Ontario Tech.

Reference Service & Research Consultations

Students and faculty have access to research support in-person, via telephone, email and online chat help. In the 2019-20 academic year, library staff answered 14,630 research questions from the Ontario Tech community. Of these questions, 484 were from faculty or graduate students.

Librarians are available for individualized research consultations with students and faculty. These consultations are tailored to meet the needs of individual researchers and can cover a range of topics from basic introductions to more advanced search techniques and support for literature reviews.

Open Access & Research Data Management

The Library provides support to faculty and students in complying with the Tri-Agency Open Access Policy (SSHRC, NSERC, CIHR). Faculty and students can make their work open by publishing in an open access or hybrid journal, by depositing their work in a subject repository, or by depositing their work in Ontario Tech's institutional repository, e-scholar@UOIT (<https://ir.library.dc-uoit.ca>).

The Library provides direct support to Faculties through dedicated subject specialist/liaison librarians and online guidance with the Library's Open Access Guide (<http://guides.library.uoit.ca/openaccess>). The Library has a Research Data Management guide (<http://guides.library.uoit.ca/rdm>) to support faculty and students in creating data management plans and sharing research data.

During the 2018-19 academic year, these guides were viewed 831 times.

Research Metrics & Impact

The Library supports various departments on campus by fielding requests for reports on author, article, journal and institutional metrics. Subscribed tools include: Web of Science, Scopus, Journal Citation Reports (JCR) and InCites.

The Library's Research Metrics guide (<http://guides.library.uoit.ca/researchmetrics>) provides background information and support for these tools.

Theses & Dissertations

The Library ensures that the Ontario Tech community has access to national and international thesis and dissertation databases. Access to PQDT (ProQuest Dissertations and Theses) and the Theses Canada Portal is provided through the Library website. The Library plays a key role in the dissemination and preservation of Ontario Tech theses, managing copies in the institutional open-access digital repository, e-scholar@UOIT, as well as maintaining print copies in the Library archives.

Teaching & Learning Support

As partners in teaching and learning at Ontario Tech, the Library provides a range of instructional and curriculum supports, both in person and online.

Information Literacy Instruction

In collaboration with teaching faculty, Librarians deliver customized information literacy classes that support the development of students' 21st century skills to successfully search, evaluate and ethically use scholarly resources in their course requirements. These library services are aligned with the Association of College and Research Libraries (ACRL) Framework for Information Literacy for Higher Education. Information literacy sessions are tailored to the specific requirements of the course or assignment. In 2019-20, Librarians delivered 91 instructional sessions to over 2,700 Ontario Tech students.

Ideally, Information Literacy instruction is scaffolded across the required curriculum, enabling students to build increasingly sophisticated research skills throughout their program of study. The following

Library Statement for Master of Business Analytics & AI Program Proposal

courses have been identified as potential Information Literacy touchpoints, due to the research skills outcomes built into the curriculum:

- Ethical and Legal Issues in Analytics & AI
- Applied Integrative Analytics Project

Co-curricular Workshops

In addition to Information Literacy instruction that is integrated into the curriculum, the library offers a number of co-curricular workshops that help develop student and faculty skills. Some examples of workshops offered to Ontario Tech students in the past include:

- 3D Printing
- Managing Your Research Identity
- Citation Management
- Finding and Using Open Educational Resources

Workshop offerings are regularly updated in response to the changing needs of the community.

Online Research Guides

Subject specialist librarians create and maintain Research Guides, which provide an easy entry point for students to access resources relevant to specific programs, courses, and assignments. These resources include databases, journals and trade publications, codes, standards, and books. Research Guides include program and course guides that are directly related to the program and course curriculum, as well as topic guides that have cross-disciplinary relevance. Librarian-prepared quick citation guides are available to students and faculty for APA, MLA and other styles. Resources to assist students with issues of plagiarism and academic integrity are available through our Library's Citation guide.

The number of views for selected guides in 2019-20 is provided below:

Research Guide	Guide Views
Business	875
Citation	6260
Networking & IT Security	724
Data	412

Copyright & Academic Integrity

The Library provides copyright advice for faculty and students. Library staff advise on license terms and the integration of content into the Learning Management System (LMS). The Library also helps faculty find, evaluate and integrate Open Educational Resources into their courses.

The Library's research support services including our citation guides help students avoid plagiarism and comply with the University's Academic Conduct policy.

Course Reserves

Instructors can place material that is in high demand on course reserve in the library. Reserve material is available to students on shorter loan periods, ensuring equitable access to required textbooks and readings.

In addition to print material, instructors may also place material from the library's online holdings on electronic reserve. Electronic reserves are subject to copyright compliance and licensing restrictions. The Library provides access to reserve material via the Library's catalogue, and also through Leganto Course Readings, a tool that integrates with the Canvas LMS.

3D Printing & Equipment Loans

Students have access to 3D printers and 3D printing workshops and can borrow equipment such as laptops and device chargers.

Library Staffing

The anticipated intake for students in the MBAI program for years 1-5 is as follows:

Level of Study	Master's year 1
Academic Year 2021 – 2022	15
Academic Year 2022 – 2023	20
Academic Year 2023 – 2024	25
Academic Year 2024 – 2025	30
Academic Year 2025 – 2026	35
Academic Year 2026 – 2027	40

The library does not anticipate that additional staffing will be required in association with this new degree program. Any additional staffing requirements will be addressed as part of the regular budget planning process, based on a more fulsome and strategic analysis of Library staffing needs.

About the Library

Library Services

The Library supports the teaching, learning and research mission of the University. Students and faculty have access to a range of services provided by subject specialist librarians and trained library technicians.

Reference & Research Support

Students and faculty have access to research support in person, via telephone, email and online via our chat help service, Ask A Librarian.

Librarians support researchers across all stages of the scholarly communication cycle. Librarians have expertise in literature searches, data management, publishing, research dissemination, preservation, research metrics and impact evaluation.

Information Literacy Instruction

In collaboration with teaching faculty, Librarians deliver customized information literacy classes that support the development of students' 21st century skills to successfully search, evaluate and ethically use scholarly resources in their course requirements. These classes are aligned with the Association of College and Research Libraries (ACRL) Framework for Information Literacy for Higher Education and are tailored to the specific requirements of the course or assignment.

Online Research Guides

Subject specialist Librarians create custom Research Guides (guides.uoit.ca) for each subject area that is available from the Library website. These guides include program and course guides directly related to curriculum, and topic guides that have cross-disciplinary relevance.

Library Website

The Library's website (ontariotechu.ca/library) is a portal to our services, search tools and collections in all formats. Students and faculty have access to thousands of print and online resources through the Quick Search interface on our homepage, as well as specialized subject databases, datasets and search tools.

Library Statistics: 2019-20

Collections

Print Books	102,131
Ebooks	865,736
Online Journals	100,754
Streamed Media	109,200
Online Databases	737

Financials

Collections	\$1,664,480
Salaries & Benefits	\$2,035,036
Other Expenses	\$135,845
Total	\$3,835,361

Library Usage

Library visits*	400,420
Questions answered	14,630
Items borrowed*	21,108
Classes & Workshops	99
Study room bookings*	8,080

Online Resource Use

Website page views	218,607
Research Guide views	133,479
E-Resource searches	91,338
Full text articles accessed	179,080

*Impacted by COVID 19 Closure

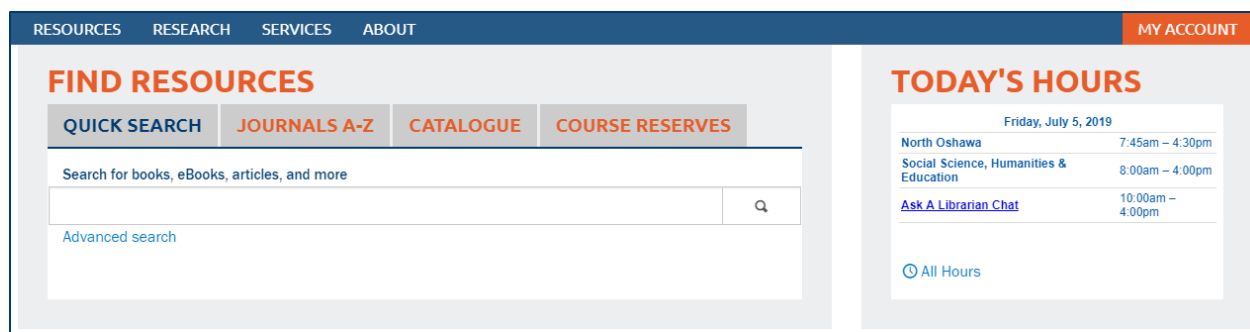


Figure 1 Ontario Tech Library Homepage

Library Resources

Our subject specialist librarians select and acquire scholarly resources to support the curricular and research needs of the University. By virtue of our membership in two key consortia, Canada Research Knowledge Network and the Ontario Council of University Libraries, Ontario Tech University Library is able to take advantage of the increased bargaining power of a collective through which we subscribe to a wide array of scholarly content.

Approximately 90% of the Library's collections budget is directed to subscription online resources, with the remainder for the acquisition of other formats to support the curriculum including books and e-books, multimedia and other specialized material.

Library Spaces

The Ontario Tech University Library has two campus locations:

North Oshawa Library: 2000 Simcoe St. North	Social Science, Humanities & Education Library: 61 Charles St.
77,500 square feet	7,517 square feet
560 seats	129 seats
92 computer workstations	7 computer workstations
195 accessible Ethernet ports	13 accessible Ethernet ports
10 bookable group study rooms	1 bookable group study room
Digital recording booth	Ellison die cut machine for student use
Adaptive technology area	Curriculum kits & manipulatives
Photocopiers, printers (including colour & 3D printer), scanners	Photocopiers, printers (including 3D printer), scanners
IT Services software support personnel	IT Services software support personnel
Silent study zones, 3 rd & 4 th floor	Silent study room
Fireside Reading Room, 2 nd floor	Lois Sleightholm Education Collection
Library Den collaborative study area, lower level	Curriculum documents and Children's Literature collection area
Archives & Special collections facilities	
Student day use lockers	

Appendix E – Orientation Bootcamp

Orientation Bootcamp MBAI

In response to suggestions from the External Review for the MBAI the following Orientation Bootcamp is proposed for the incoming students. The idea is a good one for all our professional graduate programs (MITS, MBAI, and MCF) and we intend to utilize some of these sessions for the other students in the Master of IT Security as well as the Master of Computational Finance. *To simplify the allocation of expenses all the costs of the Orientation Bootcamp are attributed to the MBAI proposal and are not replicated in the other proposals. The tentative Agenda is designed to demonstrate the broad objectives and content for us to estimate the costs to be added to the program proposal.*

The learning outcomes of the bootcamp feed into the courses in the program to ensure student readiness to succeed in the technical and theoretical courses in the program. Based on intake criteria for our program we want to be inclusive and adaptive to a broader range of undergraduate degree students that have expressed an interest in the program. In many instances students with a commerce degree might not have had programming, math or statistics courses in years 3 and 4 of their program and the bootcamp will serve to level the baseline knowledge and serve as a refresher for all.

Please note that these programs are professional degrees that are priced accordingly and students have a different value expectation than in other thesis degrees. The Bootcamp is the students' first impression of the university and sets the expectations. This type of event may be new to Ontario Tech, but is the standard way of welcoming business students in our competitor schools' graduate programs.

Dates: First 3 full days after Labour Day (9am-5pm)

Tentative Agenda

Day 1

9am-Noon: Intro for each course in the program – meet the professors

Noon-1:30: Lunch and seminar on Integrity and Professional Conduct

1:30-4PM: Workshop on Social Competencies

- Teamwork
- Business Communications (presentations, writing)
- Case Method

4:00-5:00PM Setting up your computer with ITS Staff

Day 2

9am-Noon: Functional Competencies

- Getting started with Programming in Python

Noon-1:30 Lunch and seminar with Invited speakers (employers, alumni, etc.)

1:30-5:00 Functional Competencies

- Calculus and Linear Algebra

Day 3

9am-Noon Functional Competencies

- Statistics

Noon-1:30 Lunch and seminar with Invited speakers (employers, alumni, CRC, etc.)

1:30-5:00 Cognitive Competencies

- Generic AI and its value in business
- Ethics and Fairness in Analytics and AI

Costs will scale with enrollment and future salary rates, for this proposal we include CFIN students for an assumed 50 total participants (40 students + speakers, TAs, staff) .

Workshops will be delivered by 5 TAs (one for each 8 students)

Orientation Bootcamp Budget

Item	Quantity	Cost	Total
Venue Rental 3 days	3	\$2,500 /day	\$7,500
Event Project Management (staff overtime)	40	\$50 /hr.	\$2,000
Honorarium / travel for speakers	6	\$500 ea.	\$3,000
TA delivery of workshops (5 TAs)	100 hours	\$40/hr.	\$4,000
Meals and catering (3 days, 50 people)	150	\$50/p.p.	\$7,500
ITS staff overtime (5 staff x 2 hours)	10	\$50/hr.	\$500
Miscellaneous workshop office supplies		\$500	\$500
Total			\$25,000



THE
POWER
TO KNOW.

November 11, 2019

Michael Bliemel, PhD

Dean & Professor of Information Systems
Faculty of Business and Information Technology
Ontario Tech University
2000 Simcoe St N, Oshawa, ON

Dear Michael,

Please accept this letter of support on behalf of SAS Canada indicating our intention to support Ontario Tech University's proposed Master of Business Analytics and AI program. This proposal fits well within SAS Canada's focus on academic innovation driven by big data analytics.

SAS is the leader in analytics. Through innovative analytics, business intelligence and data management software and services, SAS helps customers at more than 83,000 sites make better decisions faster. SAS recognizes the key role that academic institutions play in innovation and closing the skills gaps in schools. The Global Academic Program provides schools, universities and colleges with resources to help them address this gap. The program works with over 70 educational institutions across Canada, helping over 8,500 students learn analytics and become future data scientists.

SAS Canada has been providing Ontario Tech University with software and learning resources since 2004. We would like to further our collaboration with the university by providing \$187,490 of in-kind resources to the Faculty of Business and Information Technology. In-Kind resources include software, training, curriculum content and consulting. We see our participation in this program as a continued investment to help supply students with the building blocks to prepare them for the analytical workplace of the future.

This letter constitutes an expression of intent only. Neither the presentation of this letter or any preceding or subsequent discussions will result in the formation of any binding obligations on either party. Binding obligations will only be established in mutually agreeable definitive written agreements. SAS Canada will continually evaluate its position with respect to this initiative as discussions proceed. SAS Canada is under no obligation to enter into a definitive agreement and reserves the right to exit these discussions, without liability, as it sees fit. This paragraph supersedes any conflicting provision in this letter.

Sincerely,

Cameron Dow
President, SAS Canada

SAS INSTITUTE (CANADA) INC

280 King Street East, Suite 500, Toronto, Ontario M5A 1K7

TEL: 416-363-4424 FAX: 416-363-5399 WWW.SAS.COM/CANADA