Senate
Senate Chamber
Room E3-262 Engineering Building
WEDNESDAY, March 4, 2020
1:30 p.m.

A G E N D A

I   <u>MATTERS TO BE CONSIDERED IN CLOSED SESSION</u> - none

II   <u>ELECTION OF SENATE REPRESENTATIVES</u>

III   <u>MATTERS RECOMMENDED FOR CONCURRENCE WITHOUT DEBATE</u>

1.   <u>**Reports of the Senate Committee on Medical Qualifications**</u>

Curriculum vitae of Dr. Disma and Dr. Mameli will be available for inspection by members of Senate in the Office of the University Secretary and in the Dean's Office, Max Rady College of Medicine, prior to the March Senate meeting.

IV   <u>MATTERS FORWARDED FOR INFORMATION</u>

V   REPORT OF THE PRESIDENT

      1.   President's Report

      2.   Presentation by Vice-President (Indigenous)

VI   QUESTION PERIOD

Senators are reminded that questions shall normally be submitted in writing to the University Secretary no later than 10:00 a.m. on the Friday preceding the meeting.

VII   CONSIDERATION OF THE MINUTES OF THE MEETING OF FEBRUARY 5, 2020

VIII   BUSINESS ARISING FROM THE MINUTES

IX   REPORTS OF THE SENATE EXECUTIVE COMMITTEE AND THE SENATE PLANNING AND PRIORITIES COMMITTEE

      2.   Report of the Senate Planning and Priorities Committee

      The Chair will make an oral report of the Committee's activities.

X   REPORTS OF OTHER COMMITTEES OF SENATE, FACULTY AND SCHOOL COUNCILS

XI   **ADDITIONAL BUSINESS** - none

XII   **ADJOURNMENT**

Please call regrets to 204-474-6892 or send to shannon.coyston@umanitoba.ca.

Election of Senate Representative to the Senate Executive Committee

1.	Subsection 34(1) of *The University of Manitoba Act* provides that:

The senate has general charge of all matters of an academic character; and, without restricting the generality of the foregoing, the senate shall …

(y)	elect an executive committee, which shall include

(i)	the president, who shall be chairman of the committee;

(ii)	the member of the senate designated by the president to be vice-chairman of the committee;

(iii)	three members of senate from among the vice-presidents of the university, the deans of faculties and directors of schools;

(iv)	a member of the board who has been appointed to be a member of the senate;

(v)	a member elected by the students to be a member of senate;

(vi)	eight other members of the senate from those elected under section 27 [i.e., elected by faculty/school councils];

2.	One Senator is to be elected as a leave replacement for Professor Brenda Austin-Smith for a term ending June 30, 2020:

(a)	eligible for election are members of Senate elected by faculty/school councils;

(b)	presently serving:

Prof. Tina Chen	Arts	2020
Prof. Mark Gabbert	Arts	2020
Prof. Brenda Austin-Smith	Arts	2021
Prof. Robert Biscontri	Management	2021
Prof. Peter Blunden	Science	2021
Prof. Derek Oliver	Engineering	2021
Prof. Cary Miller	Arts	2022
Prof. Annette Schultz	Health Sciences	2022

3.	Procedures:

(a)	Nominations for the positions shall be received from the floor.

(b)	Senators shall vote for no more than one candidate on the ballot provided.

(c)	The candidate receiving the largest number of votes shall be elected.

(d)	In the event of a tie, the question shall be resolved by another ballot involving those candidates who have tied.

January 27, 2020

Ms. Shannon Coyston, Academic Specialist
Office of the University Secretary
314C Administration Building

Re: Application for Approval under Subsection 181 of the Regulated Health Professions Act – Dr. Nicola Disma

Dear Colleagues:

The Senate Committee on Medical Qualifications held a teleconference on January 22, 2020 to consider the application from the Department of Anesthesiology, Perioperative and Pain Medicine, Max Rady College of Medicine, Rady Faculty of Health Sciences, to grant Dr. Nicola Disma a certificate under the academic seal of the University. Dr. Disma's Curriculum Vitae and letters of support are enclosed.

Dr. Disma obtained his degree in Medicine and Surgery from the University of Catania, Sicily, Italy in 1997. He completed his postgraduate training in Anesthesia and Intensive Care in 2001, and in Pediatrics in 2014, both from the University of Catania. He holds a senior academic consultant position at the IRCCS Istituto G. Gaslini Children's Hospital (affiliated with the University of Genoa, since 2007). His particular areas of expertise are in neonatal anesthesia and cardiothoracic anesthesia. He has served in academic and clinical leadership roles in his institution. His record of scholarship, particularly in the organization of multi-centre clinical trial research, is internationally recognized. His scholarly publication record is noteworthy. His recruitment will help to alleviate the ongoing shortage of pediatric anesthesiologists at the Children's Hospital, and will enhance the academic mission of the Department in both the research and educational domains.

The Senate Committee on Medical Qualifications supports this application for the use of Subsection 181 of the Registered Health Professions Act pertaining to licensure for academic faculty. The Head of the Department of Anesthesiology, Perioperative and Pain Medicine, Dr. Christodoulou and the Senate Committee on Medical Qualifications agree, that Dr. Disma's expertise will be highly beneficial in the Section of Pediatric Anesthesiology, where he will practice.

The Senate Committee on Medical Qualifications would appreciate your support for this application to grant Dr. Disma a certificate under the academic seal of the University to the College of Physicians and Surgeons of Manitoba.

Sincerely,

Sara J. Israels, MD FRCPC
Vice Dean, Academic Affairs, Rady Faculty of Health Sciences
Chair, Senate Committee on Medical Qualifications

cc: Dr. Chris Christodoulou, Head, Department of Anesthesia
        Dr. Brian Postl, Dean, Max Rady College of Medicine, Vice Provost, Rady Faculty of Health
        Sciences
        Dr. Anna Ziomek, Registrar, College of Physicians & Surgeons of Manitoba

<u>Comments of the Senate Executive Committee</u>:
The Senate Executive Committee endorses the
Report to Senate.

December 2, 2019

Dr. Sara Israels
Vice-Dean, Academic Affairs
Rady Faculty of Health Sciences
S204 Medical Services Building, 750 Bannatyne Avenue
University of Manitoba
Winnipeg, MB R3E 0W2

Dear Dr. Sara Israels,

RE: Academic, Section 181. Faculty application - Dr. Nicola Disma

It is a privilege and pleasure to support the application of Dr. Nicola Disma for the Academic, Section 181, Faculty licensure position in the Provisional Registration category of the College of Physicians and Surgeons of Manitoba.

Dr. Nicola Disma is an Italian Pediatric Anesthesiologist who we are hoping to recruit as a clinician scientist to the Section of Pediatric Anesthesia in the Department of Anesthesiology, Perioperative and Pain Medicine, Max Rady College of Medicine, Rady Faculty of Health Sciences, University of Manitoba in the fall of 2020. His application is part of joint recruitment effort that includes Dr. Leila Mameli, his wife who is also an outstanding Pediatric Anesthesiologist clinician scientist.

Dr. Disma completed his medical school training at the University of Catania, Catania, Sicily in 1997. He completed postgraduate training in Anesthesia and Intensive Care (2001) and Pediatrics (2014) at the University of Catania. During his post-graduate training he spent two periods abroad: at the Manchester Children's Hospital (UK) and San Raffaele Hospital in Milan (IT).

His first position as Junior Locum Consultant Anesthesiologist was at Policlinico of Catania, followed by a substantive Consultant Anesthesiologist position in Pediatric Anesthesia at Istituto Giannina Gaslini, Genoa, Italy. In addition he completed a Clinical Fellowship in Pediatric/Cardiac/Neonatal Intensive (PICU/CICU/NICU) at Great Ormond Street Hospital in London, UK in 2011. Dr. Disma is currently a Consultant Pediatric Anesthetist at Istituto Giannina Gaslini. He also served as a Consultant Pediatric Anesthetist at Great Ormond Street Hospital, London, UK in 2017. He is currently appointed as Senior Lecturer at University College London

Dorothy Miller, Executive Assistant to Dr. Christodoulou, Department Head   dmiller@exchange.hsc.mb.ca
and Reid McMurchy, Administrative Director   T: 204-787-1125
Department of Anesthesiology, Perioperative and Pain Medicine   F: 204-787-4291
Room AE215, Harry Medovy House
671 William Avenue, Winnipeg, MB R3E 0Z2

and the Institute of Child Health (UCL-ICH), London (UK) and the University of Genoa (founded in 1481), Italy.

Dr. Nicola Disma has spent most of his career working with children, dealing with all the pediatric sub-specialties. Since 2014 he has held the position of Coordinator of Clinical Research at Istituto Giannina Gaslini (high specialist degree). In addition to his clinical Pediatric Anesthesiologist duties he also serves as member of the vascular access team at the Istituto Giannina Gaslini.

From the research point of view, he has obtained two significant research grants from the Italian Ministry of Health (about 500,000 Euro) for the GAS Trial: A multi-site international RCT comparing regional and general anesthesia in infants for effects on neurodevelopmental outcome at five year of age and a grant of 30,000 Euro from the European Society of Anesthesia (ESA) for the Nectarine Study: **NE**onate-**C**hildren s**T**udy of **A**naesthesia p**R**actice **IN E**urope, epidemiology of morbidity and mortality in neonatal anaesthesia: A European prospective multicentre observational study. He is currently Principal Investigator for a new grant award of 675,000 Euro from AIFA (Italian Agency of Medicines) for the T-REX Pilot Study: a Study to Investigate the Use of an Alternative Anaesthetic in Infants.

He has multiple research publications (70 in total to date) in premier peer reviewed journals, has authored 6 book chapters, has an H-Index of 23 and his listed research work citations are an impressive 1816. He is an outstanding educator of medical students, Anesthesia trainees and junior physicians. He is a sought after international speaker.

Dr. Disma has organized many international educational events as Director, and the most recent was on Pediatric Anesthesia and neurotoxicity in Genoa (13-14 May 2017), with 22 international speakers coming from 7 different countries. The summary of this recent meeting was published in Pediatric Anesthesia and the T-REX project was born from this event. This international conference followed a similar one organized in 2015. He is also involved in organizing the European Society of Anaesthesiology (ESA) and the European Society of Pediatric Anaesthesiology (ESPA) annual meetings. In addition he is the Chair of the Pediatric Sub-Committee at the ESA, Ex- Board Member of the ESPA, reviewer for many indexed journals (Anesthesiology, Ped Anesth, BJA, EJA, JNA).

His references (attached) are exemplary. He is an outstanding clinical Anesthesiologist/scientist, national and internationally recognized leader and research expert in Pediatric Anesthesia, enthusiastic, great communicator, professional, innovative thinker and team player.

The Pediatric patients at Children's Hospital, Winnipeg, the Department of Anesthesiology, Perioperative and Pain Medicine, Max Rady College of Medicine, Rady Faculty of Health Sciences, University of Manitoba would benefit greatly from the recruitment of Dr. Nicola Disma.

Dorothy Miller, Executive Assistant to Dr. Christodoulou, Department Head   dmiller@exchange.hsc.mb.ca
and Reid McMurchy, Administrative Director   T: 204-787-1125
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Respectfully submitted,

Dr. Chris Christodoulou, MBChB Cum Laude (US) DA (UK) FRCPC
Head, Department of Anesthesiology, Perioperative and Pain Medicine
Max Rady College of Medicine, Rady Faculty of Health Sciences
Medical Director, Winnipeg Regional Health Authority Anesthesia Program
Anesthesia Specialty Lead, Shared Health

CC/dm

Dorothy Miller, Executive Assistant to Dr. Christodoulou, Department Head   dmiller@exchange.hsc.mb.ca
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November 29, 2019

Dr. Sara Israels
Vice-Dean, Academic Affairs
Rady Faculty of Health Sciences
S204 Medical Services Building, 750 Bannatyne Avenue
University of Manitoba
Winnipeg, MB R3E 0W2

Dear Dr. Sara Israels,

RE: Academic, Section 181. Faculty applications for Drs. Nicola Disma and Leila Mameli

The Section of Pediatric Anesthesia, Department of Anesthesiology, Perioperative and Pain Medicine has been dealing with a significant human resource crisis, which has resulted in multiple elective slate cancellations for pediatric patients awaiting surgery at Children's Hospital, Winnipeg, Manitoba the past few years. Recruitment of local and international Faculty has been ongoing however shortages persist.

Dr. Nicola Disma and Dr. Leila Mameli are a couple from Genoa, Italy. They are both highly trained Pediatric Anesthesiologists currently practicing at the Istituto Giannina Gaslini, Genoa who are seeking to relocate to Winnipeg, Canada in order to pursue clinician/academician careers. After carefully reviewing all feasible College of Physician and Surgeons of Manitoba licensure pathways and in discussion with both individuals, I would like to seek formal approval for Academic, Section 181 Faculty licensure in the Provisional Registration category of the new Regulated Health Professions Act of Manitoba.

Dr. Hilary Grocott (Chair, Promotions Committee, Department of Anesthesiology, Perioperative and Pain Medicine) has reviewed the candidates' curriculum vitae to determine professorial status for recruitment purposes based on the University of Manitoba academic promotion guidelines. He advised the following:

Dr. Nicola Disma – Associate Professor rank
Dr. Leila Mameli – Assistant Professor rank

Dorothy Miller, Executive Assistant to Dr. Christodoulou, Department Head   dmiller@exchange.hsc.mb.ca
and Reid McMurchy, Administrative Director   T: 204-787-1125
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Supporting letters for each individual including curriculum vitae will be sent electronically. Please do not hesitate to contact me if you have any additional questions or require more information in support of the applications.

I look forward to hearing from you.

Respectfully submitted,

Dr. Chris Christodoulou, MBChB Cum Laude (US) DA (UK) FRCPC
Head, Department of Anesthesiology, Perioperative and Pain Medicine
Max Rady College of Medicine, Rady Faculty of Health Sciences
Medical Director, Winnipeg Regional Health Authority Anesthesia Program
Anesthesia Specialty Lead, Shared Health

CC/dm

Dorothy Miller, Executive Assistant to Dr. Christodoulou, Department Head   dmiller@exchange.hsc.mb.ca
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Department of Anaesthesia

Thomas Engelhardt, MD, PhD
Professor of Anaesthesia

Royal Aberdeen Children's Hospital
Department of Anaesthesia
Aberdeen
AB25 2ZN
Direct Line: 01224-550218
Fax: 01224-550499
Email : t.engelhardt@nhs.net

Dr Chris Christodoulou   1 August 2018
Department of Anesthesia
University of Manitoba
AE201, 671 William Avenue
R3E 0Z2
Winnipeg, MB

Dear Dr Christodoulou,

Re: Reference Dr Nicola Disma, Licensure recommendation, University of Manitoba

I am delighted to provide a reference letter in support of Dr Disma's application for licensure. I have known Dr Disma since he joined the European Society of Anaesthesioloy (ESA) Subcommittee 5 (Paediatric Anaesthesia). He was selected following a stringent selection process of outstanding European Paediatric Anaesthesiologists. He has since been elected chair of this committee.

Dr Disma is an established, well respected, very capable senior physician and at the IRCCS Istituto G. Gaslini, Genoa, Italy after having spent a year as a consultant paediatric anaesthetist at Great Ormond Street Hospital, London, UK.

Dr Disma has an outstanding national and international reputation in numerous aspects of paediatric anaesthesia as evident from his curriculum vitae. His particular professional interest and expertise lies in paediatric neurodevelopment and safety of paediatric anaesthesia. He is the Chief Investigator of the pan-European NECTARINE **(NE**onate-**C**hildren s**T**udy of **A**naesthesia p**R**actice **IN E**urope**)** study. He is also renowned for his expertise in paediatric vascular access. Dr Disma is actively involved in current research activities of the ESA reviewing and writing

research applications, coordinating research strategies and organizing European meetings. His national and international lectures, workshops and seminars at every level are well received and commended. He will bring new insights, techniques and international connections to any department.

I have learned Dr Disma to be enthusiastic, hard working and gifted. His attitude towards tackling complex and time consuming clinical and administrative problems has been excellent throughout and well above his peers. He is willing and able to listen and learn from his colleagues and always open to suggestions. However, he is also not afraid to voice concerns if applicable and capable to persuade colleagues if required. He approaches all situations with absolute professionalism and integrity.

Dr Disma is outgoing, friendly and easy to work with, an essential criterion for joining an ambitious and thriving department. I have thoroughly enjoyed his qualities as a host and friend at an earlier meeting: *Safetots: The Safe Anesthesia for Every Tots, Genoa, June 2016.*

In summary, I wholeheartedly support Dr Disma's application for a licensure and look forward to continue to collaborate with him if he was to relocate.

I would anticipate him to be an outstanding experienced colleague we would be more than happy to recruit if he ever considered Scotland as his home.
If you have any questions, please do not hesitate to get in touch.

Best wishes and kind regards

Thomas Engelhardt, MD, PhD, FRCA
Professor of Anaesthesia
Consultant Paediatric Anaesthetist

2 August 2018

Dr. Chris Christodoulou, Head
Department of Anesthesia
University of Manitoba
AE201, 671 William Avenue
Winnipeg, MB   R3E 0Z2
cchristodoulou@sbgh.mb.ca

cc Dorothy Miller
dmiller@exchange.hsc.mb.ca

cc Genevieve Krahn
Administrative Manager
WRHA/HSC Anesthesia Programs
UM Department of Anesthesia
AE211, Harry Medovy House
671 William Avenue   R3E 0Z2
Phone: (204)787-8980
Fax: (204)787-4291
Gkrahn2@wrha.mb.ca
 Warmest regards,

RE: Reference for Dr Nicola Disma

Dear Dr Christodoulou

I have collaborated extensively in research projects with Dr Nicola Disma since 2007. Nicola is extraordinarily conscientious and hard working. He has applied himself to numerous difficult challenges with determination and a refreshingly positive attitude. I have never known him to take on a project without bringing it to a successful completion.

He is very intelligent and an astute researcher with a wide range of interests and considerable experience in clinical research. He has numerous important and high impact publications. He has an exceptional record for obtaining research funding.

One of Nicola's greatest talents is his ability to work as part of a team and to provide leadership. He has exceptional interpersonal skills. Nicola has lead multidisciplinary research groups and organised significant research meetings. He has had significant leadership positions in the European Society of Anaesthesiologists, the European society of Paediatric Anaesthesiologists and the Italian Society of Paediatric Anaesthesiologists.

Nicola is an excellent clinician and he receives high praise wherever he works. He is known to be both skilled clinically and to be a tireless, generous and thorough worker.

Nicola is already a leader in anaesthesia in Europe and I expect he will continue to grow in anaesthesia leadership globally.

I have no hesitation whatsoever in providing a very positive reference for Nicola.

Yours Sincerely

Prof Andrew Davidson
Department of Paediatrics
University of Melbourne;
Medical Director, Melbourne Children's Trials Centre
& Head, Anaesthesia research
Murdoch Children's Research Institute;
Senior Staff Anaesthetist
Royal Children's Hospital

0402 271274
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DIPARTIMENTO ALTA INTENSITA' DI CURE E PERCORSO NASCITA

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Genova, 23 August 2018

Dr Chris Christodoulou
Department of Anesthesia
University of Manitoba
AE201, 671 William Avenue
R3E 0Z2
Winnipeg, MB

Re: Reference Dr. Nicola Disma, Licensure recommendation, University of Manitoba

Dear Dr Chris Christodoulou,

I am delighted to provide a reference letter in support of Dr. Nicola Disma's application.

I have known Dr Disma since 2007, when he started working in Gaslini Hospital where I am Head of Department of Pediatric Anesthesia and Intensive Care.

Since he moved to Gaslini, he immediately showed his clinical, scientific and organizational skills. He became coordinator of neonatal anesthesia in 2009 and clinical anesthesia research director in 2010. He was able to obtain two large grant for research from the Italian Ministry of Health, and several research grant from private and public institutions. Then he was able to implement and develop the overall research activity within the department.

Clinically, Dr Disma is an outstanding senior consultant, with large experience in all branches of pediatric anesthesia and intensive care. His special areas of interest are: neonatal anesthesia and cardio-thoracic anesthesia. He is also a clinical supervisor of junior physicians and trainees. He developed his clinical experience working in large pediatric anesthesia institutions, the he became senior consultant at Great Ormond Street Hospital London in 2017.

In regards to his skills in directing meetings, he organized several international conferences. "Hot topics in pediatric anesthesia", "pediatric anesthesia and neurotoxicity", "Safetots meeting" are just some examples. All these conferences were well attended with international faculty. He really brought prestige to the Hospital, enthusiasm and collaboration among the department.
He became Chairman of the European Society of Anaesthesioloy (ESA) (Pediatric Anesthesia) and member of the board of the European Society of Pediatric Anesthesia (ESA). He coordinated one of the largest neonatal anesthesia prospective database NECTARINE (NEonate-Children sTudy of

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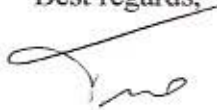
Anaesthesia pRactice IN Europe) study. He is also renowned for his expertise in pediatric vascular access.

Dr. Disma has also academic appointments at University of Genova and at the University College of London, where he provides teaching and lectures regularly. He is largely involved in international lectures almost every month or even more.

In summary Dr. Disma is an enthusiastic and hardworking colleague, able to bring new insights, techniques and international connections to any institution. Nevertheless, he is also able to listen and learn from his colleagues and always open to suggestions. He approaches clinical problems with professionalism and integrity. I am personally sure that Dr. Disma will be head of anesthesia department in a large institution and academic professor of pediatric anesthesia within the next few years. I support his application and look forward to continue to collaborate with him if he was to relocate.

If you have any questions, please do not hesitate to contact me again.

Best regards,

Pietro Tuo

Istituto di Ricovero e Cura a Carattere Scientifico "GIANNINA GASLINI"
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January 27, 2020

Ms. Shannon Coyston, Academic Specialist
Office of the University Secretary
314C Administration Building

Re: Application for Approval under Subsection 181 of the Regulated Health Professions Act – Dr. Leila Mameli

Dear Colleagues:

The Senate Committee on Medical Qualifications held a teleconference on January 22, 2020 to consider the application from the Department of Anesthesiology, Perioperative and Pain Medicine, Max Rady College of Medicine, Rady Faculty of Health Sciences, to grant Dr. Leila Mameli a certificate under the academic seal of the University. Dr. Mameli's Curriculum Vitae and letters of support are enclosed.

Dr. Mameli obtained her degree in Medicine and Surgery from the University of Cagliari in 2000 and completed postgraduate training at the School for Anesthesia in Intensive Care, and Pain Mana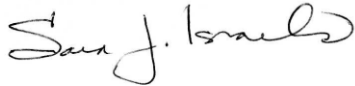gement in 2004, also from the University of Cagliari. In 2014 she undertook a post-specialization Master's degree in Acute, Chronic, Medical and Interventional Pain Therapy at the University of Milan. She has been a Consultant Pediatric Anesthesiologist in the Department of Anesthesia (since 2006), and the Director of the Pain Clinic (since 2014) at the IRCCS Istituto G. Gaslini Children's Hospital (affiliated with the University of Genoa). She is recognized for her expertise in pediatric pain management and is an active participant in relevant multi-centre clinical trials. Her recruitment will help alleviate the ongoing shortage of highly trained pediatric anesthesiologists at the Children's Hospital. In addition her expertise will complement and expand the nascent pediatric pain service in the Child Health Program. The expectation is that she will contribute to the academic mission of the Department in clinical research and education.

The Senate Committee on Medical Qualifications supports this application for the use of Subsection 181 of the Registered Health Professions Act pertaining to licensure for academic faculty. The Head of the Department of Anesthesia, The Head of the Department of Anesthesiology, Perioperative and Pain Medicine, Dr. Christodoulou and the Senate Committee on Medical Qualifications agree, that Dr. Mameli's expertise will be highly beneficial in the Section of Pediatric Anesthesiology, where she will practice.

The Senate Committee on Medical Qualifications would appreciate your support for this application to grant Dr. Mameli a certificate under the academic seal of the University to the College of Physicians and Surgeons of Manitoba.

Sincerely,

Sara J. Israels, MD FRCPC
Vice Dean, Academic Affairs, Rady Faculty of Health Sciences
Chair, Senate Committee on Medical Qualifications

cc: Dr. Chris Christodoulou, Head, Department of Anesthesia
        Dr. Brian Postl, Dean, Max Rady College of Medicine, Vice Provost, Rady Faculty of Health
        Sciences
        Dr. Anna Ziomek, Registrar, College of Physicians & Surgeons of Manitoba

Comments of the Senate Executive Committee:
The Senate Executive Committee endorses the
Report to Senate.

December 2, 2019

Dr. Sara Israels
Vice-Dean, Academic Affairs
Rady Faculty of Health Sciences
S204 Medical Services Building, 750 Bannatyne Avenue
University of Manitoba
Winnipeg, MB R3E 0W2

Dear Dr. Sara Israels,

RE: Academic, Section 181. Faculty application - Dr. Leila Mameli

It is a privilege and pleasure to support the application of Dr. Leila Mameli for the Academic, Section 181, Faculty licensure position in the Provisional Registration category of the College of Physicians and Surgeons of Manitoba.

Dr. Mameli is an Italian Pediatric Anesthesiologist who we are hoping to recruit as a clinician scientist to the Section of Pediatric Anesthesia in the Department of Anesthesiology, Perioperative and Pain Medicine, Max Rady College of Medicine, Rady Faculty of Health Sciences, University of Manitoba in the fall of 2020. Her application is part of joint recruitment effort that includes Dr. Nicola Disma, her husband who is also an outstanding Pediatric Anesthesiologist clinician scientist.

Dr. Leila Mameli completed her medical school (2001) and post-graduate training in the School of Anesthesia (2004) at the University of Cagliari, Cagliari, Sardinia, Italy. Her Medicine and Surgery medical school degree included the Cum Laude award with a perfect score in the final exams. During her Anesthesia educational training she spent periods at San Raffaele Hospital in Milan (IT), the Fatebenefratelli Hospital Rome and the Hospital Regina Margherita, Turin. Her first position as a junior locum consultant Anesthesiologist (2004) was in the Department of Anesthesia, Istituto Giannina Gaslini, Genoa, Italy. She was appointed a consultant Anesthesiologist in this department in 2006 as has remained in this position contributing to clinical patient care, teaching (medical students and Anesthesia trainees), academics and research.

Dr. Mameli has extensive clinical experience in Pediatric Anesthesia and Obstetric Anesthesia fields, with particular interest in Neuroanesthesia. She also has extensive experience in regional

Dorothy Miller, Executive Assistant to Dr. Christodoulou, Department Head
and Reid McMurchy, Administrative Director
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Anesthesia and vascular accesses procedures (she is part of the vascular access team). She successfully completed a two year Master's degree in Acute, Chronic and Interventional Pain Therapy at University of Milan in 2016. In 2014 she was appointed Director of the Pain Clinic at the Istituto Giannina Gaslini, Genoa, Italy. She is the supervisor of two full time pain clinic nurses and is currently running several sponsored patient trials in pain management. The volume of clinical activity at the Istituto Giannina Gaslini includes about 1,000 pain related referrals for in-patients and 100 long term therapy consultations on average per year. She is currently following approximately 100 new out-patients per year with chronic oncologic and non-oncologic pathologies in both Pediatric and adult populations.

Dr. Mameli has organized several educational courses in the field of pain as Director of the Pain Clinic at Istituto Giannina Gaslini. In 2017 she gained additional working experience at Great Ormond Street Hospital, and Guy's and St. Thomas' Hospital, London, as a clinical observer. She has a proven track record of publication success in peer reviewed journals in various subject areas within Pediatric Anesthesia. This includes participation in large scale clinical trials in Europe focused on neurodevelopmental outcomes in children receiving general vs. regional anesthesia and the study of severe Pediatric Anesthesia critical events in 261 European hospitals as part of a prospective, multicenter observational study (APRICOT).

Dr. Leila Mameli's references (attached) are exemplary. She is an excellent clinical Anesthesiologist and Pain physician, passionate and committed educator, great communicator, professional, innovative thinker and team player.

The Pediatric patients at Children's Hospital, Winnipeg, the Department of Anesthesiology, Perioperative and Pain Medicine, Max Rady College of Medicine, Rady Faculty of Health Sciences, University of Manitoba would benefit greatly from the recruitment of Dr. Leila Mameli.

Respectfully submitted,

Dr. Chris Christodoulou, MBChB Cum Laude (US) DA (UK) FRCPC
Head, Department of Anesthesiology, Perioperative and Pain Medicine
Max Rady College of Medicine, Rady Faculty of Health Sciences
Medical Director, Winnipeg Regional Health Authority Anesthesia Program
Anesthesia Specialty Lead, Shared Health

CC/dm

Dorothy Miller, Executive Assistant to Dr. Christodoulou, Department Head   dmiller@exchange.hsc.mb.ca
and Reid McMurchy, Administrative Director   T: 204-787-1125
Department of Anesthesiology, Perioperative and Pain Medicine   F: 204-787-4291
Room AE215, Harry Medovy House
671 William Avenue, Winnipeg, MB R3E 0Z2

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November 29, 2019

Dr. Sara Israels
Vice-Dean, Academic Affairs
Rady Faculty of Health Sciences
S204 Medical Services Building, 750 Bannatyne Avenue
University of Manitoba
Winnipeg, MB R3E 0W2

Dear Dr. Sara Israels,

RE: Academic, Section 181. Faculty applications for Drs. Nicola Disma and Leila Mameli

The Section of Pediatric Anesthesia, Department of Anesthesiology, Perioperative and Pain Medicine has been dealing with a significant human resource crisis, which has resulted in multiple elective slate cancellations for pediatric patients awaiting surgery at Children's Hospital, Winnipeg, Manitoba the past few years. Recruitment of local and international Faculty has been ongoing however shortages persist.

Dr. Nicola Disma and Dr. Leila Mameli are a couple from Genoa, Italy. They are both highly trained Pediatric Anesthesiologists currently practicing at the Istituto Giannina Gaslini, Genoa who are seeking to relocate to Winnipeg, Canada in order to pursue clinician/academician careers. After carefully reviewing all feasible College of Physician and Surgeons of Manitoba licensure pathways and in discussion with both individuals, I would like to seek formal approval for Academic, Section 181 Faculty licensure in the Provisional Registration category of the new Regulated Health Professions Act of Manitoba.

Dr. Hilary Grocott (Chair, Promotions Committee, Department of Anesthesiology, Perioperative and Pain Medicine) has reviewed the candidates' curriculum vitae to determine professorial status for recruitment purposes based on the University of Manitoba academic promotion guidelines. He advised the following:

Dr. Nicola Disma – Associate Professor rank
Dr. Leila Mameli – Assistant Professor rank

Dorothy Miller, Executive Assistant to Dr. Christodoulou, Department Head
and Reid McMurchy, Administrative Director
Department of Anesthesiology, Perioperative and Pain Medicine
Room AE215, Harry Medovy House
671 William Avenue, Winnipeg, MB R3E 0Z2

dmiller@exchange.hsc.mb.ca
T: 204-787-1125
F: 204-787-4291

Supporting letters for each individual including curriculum vitae will be sent electronically. Please do not hesitate to contact me if you have any additional questions or require more information in support of the applications.

I look forward to hearing from you.

Respectfully submitted,

Dr. Chris Christodoulou, MBChB Cum Laude (US) DA (UK) FRCPC
Head, Department of Anesthesiology, Perioperative and Pain Medicine
Max Rady College of Medicine, Rady Faculty of Health Sciences
Medical Director, Winnipeg Regional Health Authority Anesthesia Program
Anesthesia Specialty Lead, Shared Health

CC/dm

Dorothy Miller, Executive Assistant to Dr. Christodoulou, Department Head   dmiller@exchange.hsc.mb.ca
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Azienda Ospedaliera Nazionale
SS. Antonio e Biagio e Cesare Arrigo
Alessandria

Via Venezia, 16 – 15121 ALESSANDRIA
Tel. 0131 206111 – www.ospedale.al.it
info@ospedale.al.it

asoalessandria@pec.ospedale.al.it (solo certificata)

C.F. – P.I. 01640560064

Alessandria, 10/06/2019

To whom it may concern,

I personally worked with Dr Leila Mameli for nearly 10 years, between June 2008 and December 2016. I had the opportunity to appreciate Leila's commitment and passionate dedication to pediatric medicine. Her empathy with patients as well as her kindness with colleagues and nurses were impressive and made Leila amongst the most popular physician in Gaslini Institute.

During these decade Leila and me grew up professionally together and shared the management of complex pediatric patients, either preterms, newborns, infants or children. We shared successes and frustration, joy and sadness and she always did her best.

Her commitment was viral, contagious and stimulated introduction of new surgical techniques, new technologies, research. She never opposed innovation and improvement.

I had the opportunity to share with Leila both clinical and basic research. We presented papers at congresses, we published papers and proved always to chase a way to improve the overall outcome of our patients and the quality of our work.

She led the pain management service at the Gaslini Institute and proved to be definitely suitable for coordination and leadership. She started an activity which is now widely spread throughout the Institute.

Finally, I shared with Leila leisure time and vacation more than once and I was impressed by her pleasantness, altruism and fantastic soul. She is consistently the same at work and outside the hospital proving her deeply ingrained positivity.

All in all, I believe that Leila is a great person all round. Over and above I also believe she is the right person to confide and share doubts, perplexity, and fears. The right colleague and friend to rely on.

With my warmest regards,

Alessio Pini Prato, MD
Director of Pediatric Surgery
Umberto Bosio Center for Digestive Diseases
The Children Hospital
AO SS Antonio e Biagio e Cesare Arrigo

Department of Anaesthesia

Thomas Engelhardt, MD, PhD
Professor of Anaesthesia

Royal Aberdeen Children's Hospital
Department of Anaesthesia
Aberdeen
AB25 2ZN
Direct Line: 01224-550218
Fax: 01224-550499
Email : t.engelhardt@nhs.net

Dr Chris Christodoulou   2 June 2019
Department of Anesthesia, Perioperative and Pain Medicine
University of Manitoba
AE201, 671 William Avenue
R3E 0Z2
Winnipeg, MB

Dear Dr Christodoulou,

Re: Reference Dr Leila Mameli, Licensure recommendation, University of Manitoba

I am honoured to provide a reference letter in support of Dr Mameli's application for licensure.
I have known Dr Mameli for over 4 years. Dr Mameli is an established senior physician and at the IRCCS Istituto G. Gaslini, Genoa, Italy where she holds the position of Director of Pain Management and effectively manages a significant clinical and administrative workload. She is appropriately published in her area of interest of acute and chronic pain management and has successfully organized several educational courses at her home institution. Dr Mameli has also extensive experience in regional anaesthesia and difficult vascular access.

I have known Dr Mameli to be enthusiastic, hard working and gifted. Her attitude towards clinical and administrative problems are appreciated and she is well respected by her peers. She is working well within a team and willing to listen and learn from colleagues. She approaches all situations with absolute professionalism and integrity.

In summary, I wholeheartedly support Dr Mameli's application for a licensure. If you have any questions, please do not hesitate to get in touch.

Yours faithfully

Thomas Engelhardt, MD, PhD, FRCA
Professor of Anaesthesia
Consultant Paediatric Anaesthetist

From:	pietrotuo@gaslini.org
To:	Chris Christodoulou
Cc:	Dorothy Miller
Subject:	Rif: Reference Request - Dr. Leila Mameli
Date:	Tuesday, June 4, 2019 2:26:25 AM
Attachments:	ATT00001.jpg
	ATT00002.jpg
	ATT00003.gif
	ATT00004.gif
	ATT00005.gif
	ATT00006.gif

Dear Dr Christodoulou, and Dr Miller,

It is my pleasure to provide reference for Dr Mameli Leila. She was appointed as Consultant Anesthetist in Gaslini Hospital, Genova, in 2004, and I know her from that time.

She is on of the most competent Consultant of the Department of Anesthesia wher I am the Head. She was also appointed as Director of Pain Unit since 2013. She has clinical expertize in all pediatric anesthesia branches, including general, neonatal, neuro, cardiac and so on. In fact Gaslini is a tertiary level children's hospital in Italy where all subspecialities are performed, including transplants and fetal surgery. Dr Mameli is competent in all this branches. She also has expertize for US-guided vascular access, regional anesthesia and fiber-optic intubation.

Dr Mameli is also responsible for the pain team from 2013, supervising two full time nurses and one consultant anesthetist. She developed almost all protocols for acute pain and procedural sedation. She has also experience in chronic non-oncologic pain with a volume of around 150 new cases per year. She did a masterclass in "pain medicine" few years ago and she successfully graduated as PhD in pain.

In terms of teaching and education, she is educational supervisor for treinees and medical students and also responsible for continuos medical education for pain. She regularly gives lectures at University and in national congresses.

Finally, she is a reliable person, very social and respectful. I fully trust she can be a great consultant if appointed in your Institution.

Please do not hesitate to contact me for further information.

Best regards,

Pietro

_____
Pietro Tuo
Direttore Dipartimento Integrato Chirurgia e alta intensità cure
Direttore U.O.C. Anestesia e Rianimazione Neonatale Pediatrica
IRCCS Istituto Giannina Gaslini
Via Gerolamo Gaslini 5, 16147 Genova
Tel.: (+39) 010 56.362. 447-448 Mobile: 3357593920 Fax.: 010396202
Email: pietrotuo@gaslini.org

University of Manitoba | Office of the University Secretary

MEMORANDUM

Date: February 20, 2020

To: Senate

From: Jeff M. Leclerc, University Secretary

RE: **Reminder, Location of April 1, 2020 Senate Meeting at Bannatyne Campus**

On April 6, 2016, Senate approved the idea of holding one or two meetings of Senate each year at the Bannatyne Campus. Please note that the April Senate meeting will be held on the Bannatyne Campus, at the following time and location:

Wednesday, April 1, 2020, at 1:30 p.m.,
Frederic Gaspard Theatre, 2nd Floor Mezzanine Level, Basic Science Building

Access to the Theatre can be gained through the Brodie Centre entrance at 727 McDermot Avenue. Information regarding transportation from the Fort Garry Campus will be provided closer to the meeting date.

As public parking is limited at the Bannatyne Campus, the University Secretary's Office will arrange to transport Senators and Assessors to the meeting and back to the Fort Garry Campus. *Please contact the University Secretary's Office (Shannon.Coyston@umanitoba.ca) by March 6th at the latest, if you will require transportation to the meeting, so we can make appropriate arrangements.*

Other options for transportation include:

Personal vehicle (Please consider carpooling.) Information on public parking at the Bannatyne Campus, in Lot H, can be found at: http://www.umanitoba.ca/campus/parking/visitor/index.html. Public parking may also be available in one of the Health Science Centre parkades (http://www.hsc.mb.ca/mapsparking.html#parkades).

Winnipeg Transit - Route 36 – Northwest Super Express (Health Sciences Centre). See the Navigo Trip Planner to plan your trip if you choose this option: http://winnipegtransit.com/en/navigo.

/sc

REPORT OF THE SENATE COMMITTEE ON AWARDS

Preamble

Terms of reference for the Senate Committee on Awards include the following responsibility:

On behalf of Senate, to approve and inform Senate of all new offers and revised offers of awards that comply with the Student Awards Policy.

Observations

At its meeting of January 16, 2020, the Senate Committee on Awards approved 3 new offers, 1 revised offer, and the withdrawal of 2 awards as set out in the *Report of the Senate Committee on Awards (January 16, 2020)*.

Recommendations

On behalf of Senate, the Senate Committee on Awards recommends that the Board of Governors approve 3 new offers, 1 revised offer, and the withdrawal of 2 awards as set out in the *Report of the Senate Committee on Awards (January 16, 2020)*. These award decisions comply with the Student Awards Policy.

Respectfully submitted,

Dr Jared Carlberg

Chair, Senate Committee on Awards

1. NEW OFFERS

Drache Scholarship in Art History

In recognition of their commitment to outstanding scholarship in Fine Arts, Arthur Drache and Judy Young Drache have caused a gift of $20,000 to be made to the University of Manitoba in 2019. The purpose of this annual scholarship is to reward the academic achievements of students who are pursuing a Bachelor of Fine Arts degree in Art History (Honours). Each year, beginning in 2020-2021 and ending in 2023-2024, two scholarships of $2,500 each will be offered to undergraduate students who:

(1) are enrolled full-time (minimum 80% course load) in the second year of study or higher in the Bachelor of Fine Arts degree in Art History (Honours) at the University of Manitoba; and

(2) have achieved a minimum degree grade point average of 3.5.

A student may hold this award more than once.

The Director of the School of Art (or designate) will name the selection committee for this award.

This agreement may be amended by the mutual consent of the donor (or designate) and the University of Manitoba. All such amendments shall be in writing. In the absence of the donor (or designate), and providing all reasonable efforts have been made to consult, the Board of Governors of the University of Manitoba has the right to modify the terms of this award if, because of changed conditions, it becomes necessary to do so. Such modification shall conform as closely as possible to the expressed intention of the donor in establishing the award.

Bockstael Construction Ltd. Scholarship for Indigenous Students in Civil Engineering

Bockstael Construction Limited and the Bockstael Family have established an endowment fund at the University of Manitoba with a gift of $25,000 in 2019. The purpose of the fund is to reward the academic achievements of Indigenous students studying Civil Engineering. In years when the available annual income from the fund does not reach $1,000, Bockstael Construction will top up the scholarship value to $1,000. Each year, beginning in 2020-2021, the available annual income from the fund (plus any top-ups) will be used to offer one scholarship with a minimum value of $1,000 to an undergraduate student who:

(1) has self-declared as a First Nations, Métis or Inuit person from Canada;

(2) is enrolled full-time (minimum 80% course load) in the second, third or fourth year of study in the Civil Engineering program in the Faculty of Engineering;

(3) has achieved a minimum degree grade point average of 3.0; and

(4) has an interest in construction and plans to pursue a career in construction.

Applicants will be required to submit a written statement (maximum 250 words) that outlines how they meet criterion (4).

Recipients will be given the opportunity to apply for summer work placements at Bockstael Construction.

The selection committee will be the Scholarships, Bursaries, and Awards Committee of the Faculty of Engineering.

This agreement may be amended by the mutual consent of the donor (or designate) and the University of Manitoba. All such amendments shall be in writing. In the absence of the donor (or designate), and providing all reasonable efforts have been made to consult, the Board of Governors of the University of

Manitoba has the right to modify the terms of this award if, because of changed conditions, it becomes necessary to do so. Such modification shall conform as closely as possible to the expressed intention of the donor in establishing the award.

Bockstael Construction Ltd. Scholarship for Women in Civil Engineering

Bockstael Construction Limited and the Bockstael Family have established an endowment fund at the University of Manitoba with a gift of $25,000 in 2019. The purpose of the fund is to reward the academic achievements of women studying Civil Engineering. In years when the available annual income from the fund does not reach $1,000, Bockstael Construction will top up the scholarship value to $1,000. Each year, beginning in 2020-2021, the available annual income from the fund (plus any top-ups) will be used to offer one scholarship with a minimum value of $1,000 to an undergraduate student who:

> (1) identifies as female;
>
> (2) is enrolled full-time (minimum 80% course load) in the second, third or fourth year of study in the Civil Engineering program in the Faculty of Engineering;
>
> (3) has achieved a minimum degree grade point average of 3.0;
>
> (4) has demonstrated volunteerism and community service; and
>
> (5) has an interest in construction and plans to pursue a career in construction.

Applicants will be required to submit a written statement (maximum 250 words) that outlines how they meet criteria (4) and (5).

Recipients will be given the opportunity to apply for summer work placements at Bockstael Construction.

The selection committee will be the Scholarships, Bursaries, and Awards Committee of the Faculty of Engineering.

This agreement may be amended by the mutual consent of the donor (or designate) and the University of Manitoba. All such amendments shall be in writing. In the absence of the donor (or designate), and providing all reasonable efforts have been made to consult, the Board of Governors of the University of Manitoba has the right to modify the terms of this award if, because of changed conditions, it becomes necessary to do so. Such modification shall conform as closely as possible to the expressed intention of the donor in establishing the award.

(Attachment I)

2. AMENDMENTS

Arts Class of 1969 Scholarship

The following amendments were made to the terms of reference for the **Arts Class of 1969 Scholarship**:

- The preamble was revised to:

  The Arts Class of 1969 established a scholarship fund in 1997 at the University of Manitoba to reward the academic achievement of undergraduate students in the Faculty of Arts. The Manitoba Scholarship and Bursary Initiative made a contribution to this fund. Each year, the available annual income from the fund will be used to offer one scholarship to an undergraduate student who:

- The numbered criteria was revised to:

  (1) is enrolled full-time (minimum 80% course load) in the second year of study or higher with a declared major in any program offered by the Faculty of Arts;

(2) has completed 30-45 credit hours in the Faculty of Arts or University 1; and

(3) has achieved a minimum degree grade point average of 4.0.

- The selection committee paragraph revised to:

  The Dean of the Faculty of Arts will name the selection committee for this award.

- The standard Board of Governors statement was added.

3. WITHDRAWALS

Lily Gilmore Rosenberg Bursary in Management

At the request of the donor

Tradition Law LLP Wealth and Succession Prize

At the request of the donor

University of Manitoba | Faculty of Engineering

Office of the Dean
E2–290 EITC Building
75 Chancellors Circle
Winnipeg, Manitoba
Canada R3T 5V6
Telephone: 204-474-9828
www.umanitoba.ca/

December 19, 2019

Dr. Jared Carlberg
Chair, Senate Committee on Awards
University of Manitoba
Winnipeg, MB   R3T 2N2

Dear Dr. Carlberg,

RE: Bockstael Scholarship for Women

The Faculty of Engineering strongly supports the establishment of the Bockstael Scholarship for Women.

Increasing the gender balance within the Faculty of Engineering is written into the faculty's vision statement and continues to be a top priority for me.

Historically, women have faced barriers to pursue studies and careers in many areas of science, technology, engineering, and math (STEM). These barriers have created historical disadvantages, which have contributed to women being significantly underrepresented in STEM. While we are making progress, we have a long way to go to ensure gender equality in the Faculty of Engineering and the engineering profession.

Scholarships like the Bockstael Scholarship for Women address aspects of this historical disadvantage and encourage, inspire, and support women to pursue engineering.

Sincerely,

J. Beddoes .

Jonathan Beddoes, Ph.D., P.Eng.
Professor and Dean

Report of the Senate Committee on Academic Review RE: Undergraduate and Graduate Program Reviews (*for information*)

Preamble:

1. The terms of reference for the Senate Committee on Academic Review (SCAR) are found on the University Governance website.

2. At its meeting on January 14, 2020, the Committee considered summaries of two undergraduate program reviews. The committee also received follow-up reports on two undergraduate and three graduate program reviews.

Observations:

1. The Committee considered summaries of two undergraduate program reviews concerning the Global Political Economy program and the Interdisciplinary Health Program (Attachments I.a and I.b, respectively).

2. The Committee received follow-up reports on two undergraduate program reviews, for Anthropology and Music.

3. The Committee received follow-up reports on three graduate program reviews, for Fine Arts, Linguistics, and Native Studies.

Respectfully submitted,

Dr. Todd Mondor, Chair
Senate Committee on Academic Review

UNIVERSITY OF MANITOBA

| Provost & Vice-President (Academic)

208 Administration Building
Winnipeg, Manitoba
Canada R3T 2N2
Telephone (204) 480-1408
Fax (204) 275-1160

Date: June 25, 2019

To: Members of the Senate Committee on Academic Review (SCAR)

From: David Collins, Chair, Senate Committee on Academic Review and, Vice-Provost (Integrated Planning and Academic Programs)

Subject: Report on the Undergraduate Program Review, Global Political Economy

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1. **Preamble**

In May 2000, the Senate of the University of Manitoba endorsed a process for the periodic review of undergraduate programs to assess the quality of undergraduate programming presently provided at the University of Manitoba, and to stimulate strategic planning and actions for future enhancements. The purpose of this report is to summarize the highlights of the undergraduate program review team's evaluation of the Global Political Economy program, the responses to the report, recommendations, actions taken to date, and a disposition of the process from the perspective of the Provost.

2. **Chronology**

The review of undergraduate Global Political Economy (GPE) programs was initiated in 2017 and the Self-Evaluation Report (SER) was subsequently received in April, 2018—this was the first review of the undergraduate programs in GPE under the current policy and procedures. An external review team (the reviewers) comprised of two external members (Dr. Abigail Bakan, Ontario Institute for Studies in Education, University of Toronto, and Dr. William Carroll, Department of Sociology, University of Victoria), and one internal member (Dr. David Churchill, Department of History, University of Manitoba), undertook a site visit over October 15 and 16, 2018.

The reviewers met with relevant academic and administrative staff, and students in GPE, the Faculty of Arts, and the Office of the Provost and Vice-President (Academic). The resulting report of the reviewers was received in November, 2018. The responses to the report from Dr. Mark Hudson, GPE Program Coordinator, and from Dr. Jason Leboe-McGowan, Associate Dean (Undergraduate Studies), Faculty of Arts were received in March, 2019. All of the above documents are attached to this report.

On behalf of the Provost, I would like to thank everyone who contributed to this review.

1

3. Program Overview

Global Political Economy is an interdisciplinary program that integrates courses from five disciplines—Anthropology, Economics, History, Political studies, and Sociology; as well as offering four core courses specific to GPE program. Unlike most programs in the Faculty of Arts, there are no faculty members specifically appointed to the program; those associated with GPE are referred to as GPE-affiliates. The program is governed by a steering committee composed of representatives from each of the participating disciplines and is administered by a Program Coordinator.

The program is designed to prepare its graduates to understand complex, multi-dimensional social, political, economic, and environmental issues. In this regard, students benefit from the program's interdisciplinary approach, which facilitates their ability to grasp the complex interaction between global politico-economic forces and local cultures, practices, environments and histories.

The program offers the following degree options:

- B.A. (Gen.), Global Political Economy, and

- B.A. (Adv.), Global Political Economy.

Under the current program requirements, students who declare and complete a GPE major are not able to complete a separate minor for purposes of satisfying degree requirements.

4. Academic Program Review

The review report states that GPE 'be considered an asset to the Faculty of Arts and to the University of Manitoba as a whole, offering a rich and important undergraduate experience.' The report acknowledges the strength of the program's interdisciplinarity, which the reviewers view as having 'advanced a coherent curriculum which is situated across disciplines at a very high standard of academic excellence.' The report also notes that the 'central elements and goals of GPE are strongly consistent with the priorities of *Taking Our Place: University of Manitoba Strategic Plan, 2015-2020.'*

Based on the experience of the review team with comparable programs in other major Canadian universities, the GPE program was found to be 'consistent with, and at a comparable standard to, other interdisciplinary programs that address issues related to Global Political Economy in Canadian universities.' The report describes the GPE program as demanding and intensive and, 'the commitment and enthusiasm among GPE faculty and students are a testament to the relevance and quality of the program.' However, the reviewers also observe that the General and Advanced Majors are 'of a very modest size, and suggest some amendments to the curriculum architecture to advance modest, planned growth.'

In summary, the report concludes 'that the GPE is an exciting, innovative interdisciplinary program with considerable strengths and potential for growth'; and that the program meets the requirement of *Adequate, with minor revisions (2).*

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5. Recommendations and Responses

The review report offers a number of recommendations that might precede a more comprehensive program strategic planning process with a 5-year window, and building on an internal review conducted in 2016. The recommendations were separated into two categories, *Qualitative* and *Structural*.

Qualitative Recommendations: *Enhancing options and visibility within the current framework and structure of GPE.*

> (i)   *Enhancing Options and Credentials for GPE Majors.*

The reviewers encourage GPE to develop an Honours option as, in their view, students in the BA Advanced path complete a program that is considered comparable to that typically undertaken in a BA Honours degree.

Both the Dean 's Office and the GPE Steering Committee support this recommendation, subject to an appropriate assessment based on enrolments and the frequency of offering of additional options, and the availability of space for GPE students to register in 4000-level courses. I would recommend that GPE and the Faculty keep the Provost's Office appraised of these discussions should it be identified to move forward with the introduction of a new Honours program.

> (ii)   *Include an option for GPE students to pursue a minor outside the program.*

Both the Deans Office and the GPE Steering Committee express concerns about a required minor, given the number of required courses already required of GPE students. However, both favour an elective Minor option.

> (iii) *Move first to establish a co-op option, and consider a practicum course as a medium-term aspiration.*

The GPE Steering Committee and the Dean's Office both responded positively to this recommendation and, in the short-term, have agreed to a pilot for GPE students to complete the Labour Studies practicum placement course, in conjunction with a research seminar. However, given the nature of the practicum course, this pilot opportunity will only be available to a small subset of GPE students.

Further to the above, the GPE Program Coordinator has initiated conversations with the Faculty about the feasibility of bringing GPE into the Arts co-op program, in the event that the Labour Studies pilot does not prove to be a good fit. The Dean's Office also supports this initiative. The Faculty has implemented a co-op program for Arts students, developing the infrastructure to support Departments and Programs that wish to introduce this option.

> (iv)   *Consider, additionally or alternatively, a summer field school.*

GPE acknowledges the value of experiential learning, but has concerns about the amount of work entailed in developing and maintaining a field school. They also expressed concerns about achieving the critical mass of students needed to make this option viable. Regardless, they have committed to investigating the feasibility of an elective field school if appropriate resources are available.

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The Dean's Office has committed to discussing the financial and human resource supports that development of a field school would require.

(v)   Expand the options for the format of GPE 4700 projects

GPE has committed to maintaining the current thesis paper required for GPE 4700. However, additions to this course, related to knowledge translation skills, have been initiated that will provide students the opportunity to communicate their findings in a number of multimedia formats and in the development of online modes of research dissemination. The Dean's Office has committed to providing technical support for this initiative.

(vi)   Establishment of a student-edited journal for BA final research projects.

The GPE response notes concerns about the limited number of students available in GPE 4700 to support a student-edited journal. Notwithstanding, they noted this as an otherwise laudable recommendation, and will monitor enrolments over the next two years. If enrolments are subsequently deemed sufficient, the GPE Coordinator will approach the Students Association (GPE SA) to ascertain their interest to sustain the required work.

(vii)   Mentoring and Peer Support.

The GPE response notes that 'there is already a strong sense of community within the GPE program and an informal culture and practice of peer mentoring across cohorts.' GPE will continue to support this culture, in partnership with the GPE Students' Association, by encouraging upper-level students to volunteer to provide mentorship for lower-level students.

(viii)   Enhance program visibility at U of M by systematizing first-year outreach.

As noted in the response by the Dean's Office, the GPE Steering Committee has already developed a plan for implementing this recommendation. As well, the Dean's Office, through the Arts Communications Office, has committed to assist GPE in ensuring that undergraduates receive more timely information about the existence of the programs.

(ix)   Enhance the GPE Steering Committee.

GPE has already adopted this recommendation and, moving forward, will schedule regular meetings of the Steering Committee. An existing support-staff member will now provide support to the committee, and the GPE SA will be asked to elect a student representative to sit on the committee.

Structural Recommendations: *Curriculum Architecture, Outreach/Infrastructure, and Faculty Appointment.*

(x)   Growing GPE 1700.

The GPE response to this recommendation suggests facilitating accessibility to GPE 1700 by adding additional spaces to existing sections or creating larger sections with an additional tutorial/lab component. Both options would require additional resources and the Dean's Office 'is willing to explore

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either option to determine whether one or the other would be financially viable and whether student demand warrants the allocation of these resources.'

Additionally, the feasibility of a cost-sharing arrangement with the Clayton Riddell Faculty of Environment, Earth, and Resources will be explored, as the course is cross-listed with GEOG 1700.

(xi)   Accommodate growth through GPE 2700

The Reviewers suggested two possible options for expanding enrolments in GPE 2700; adding an additional section, or dividing GPE 2700 into two 3 credit hour courses and adding a module that would provide an opportunity to expose students to indigenous perspectives on political economy. GPE expressed a preference for the latter and the Dean's Office expressed willingness to discuss its financial feasibility; 'carefully considering whether the additional costs identified in the GPE response would be offset by higher student enrolment.'

(xii)   Outreach/Infrastructure

The review report notes that the space for GPE majors currently provided through an arrangement with the Department of Sociology is insufficient and that additional space for student gatherings, studying, and activity planning would benefit to the student experience. The Dean's Office has committed to working with GPE in seeking a solution to their space needs.

(xiii) Indigenous Studies in Global Political Economy: Inspiring Truth with a New Faculty Line

The review suggests a process of curriculum and strategic planning with a focus on enhancing student exposure to indigenous perspectives, noting that GPE is well situated to advance the UM's priority to recruit more indigenous scholars. The response of the Deans Office noted that 'plans to work with other units in recruiting a cross-appointed faculty member will be an important way to fulfill this recommendation.' Further, that the current curriculum review being undertaken by GPE will identify valuable new indigenous training opportunities for Arts undergraduates.

6. Conclusion

Consistent with the UM policy on Academic Program Reviews,[1] regular program reviews are conducted to maintain the academic integrity of academic programs at the University of Manitoba and, to ensure, through an exercise of self-reflection and external observation, that our academic programs maintain academic excellence. On behalf of the University, I would like to acknowledge the reviewers (Dr. Abigail Bakan, Dr. William Carroll, and Dr. David Churchill) for their efforts in support of the review of the undergraduate programs in Global Political Economy. I would also like to recognize the faculty, staff and students in Global Political Economy for their very positive engagement with this process.

In summary, the review identifies GPE as an innovative interdisciplinary program with considerable strengths, as well as potential for growth. The reviewers have provided a number of recommendations

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[1] http://umanitoba.ca/admin/governance/governing_documents/academic/364.html

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that warrant discussion, by both GPE and the Faculty, and I would encourage that these conversations, and the on-going internal review of the program, continue.

My congratulations to everyone on a very successful review.

7. Recommendations for Follow-up

I would ask that the GPE program provide a follow-up report to the Office of the Provost for no later than July 1, 2020. The report should address consideration of the following:

- Any proposed changes to the structure of the program, including but not limited to, the introduction of an Honours program, the consideration of an elective minor option, and the introduction of experiential learning opportunities, whether it be through cooperative, practicum and/or field school opportunities.

- Any proposed changes to course delivery, including but not limited to, expanding thesis requirement options within GPE 4700, and efforts to increase enrolments and expand offerings of GPE 1700 and GPE 2700.

- An update on discussions to enhance the student experience in the program, including but not limited to, the consideration of a student-edited journal, and the identification of new student space.

- The role of GPE in enhancing student exposure to Indigenous perspectives, and advancing Faculty priorities to recruit Indigenous scholars.

Cc: Janice Ristock, Provost and Vice-President (Academic)
        Jeff Taylor, Dean, Faculty of Arts
        Mark Hudson, Program Coordinator, Global Political Economy
        Jeff Leclerc, University Secretary
        Randy Roller, Executive Director, Office of Institutional Analysis
        Cassandra Davidson, Academic Programs Specialist

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UNIVERSITY OF MANITOBA | Provost & Vice-President (Academic)

Date: June 12, 2019

To: Members of the Senate Committee on Academic Review (SCAR)

From: David Collins, Chair, Senate Committee on Academic Review and Vice-Provost (Integrated Planning and Academic Programs)

Subject: **Report on the Undergraduate Program Review of the Interdisciplinary Health Program, Bachelor of Health Sciences and Bachelor of Health Studies**

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1. Preamble

In May 2000, the Senate of the University of Manitoba endorsed a process for the periodic review of undergraduate programs to assess the quality of undergraduate programming presently provided at the University of Manitoba, and to stimulate strategic planning and actions for future enhancements. The purpose of this report is to summarize the highlights of the undergraduate program review team's evaluation of the Interdisciplinary Health Program, Bachelor of Health Sciences and Bachelor of Health Studies ('IHP'), the responses to the report, recommendations, actions taken to date, and a disposition of the process from the perspective of the Provost.

2. Chronology

The Undergraduate Program Review of the IHP was initiated in 2017, and the Self-Evaluation Report (SER) for the review was received in March 2018—this was the first review of the IHP under the current policy and procedures. An external review team (the reviewers) comprised of two external members (Dr. Stacey Ritz, McMaster University, and Dr. Linda Jessop, University of Waterloo), and one internal member (Dr. Douglas Brown, FKRM, University of Manitoba), undertook a site visit over April 9-10, 2018.

The reviewers met with relevant academic and administrative staff, and students associated with the IHP, the Rady Faculty of Health Sciences (RFHS), and the Office of the Provost and Vice-President (Academic). The report of the reviewers (the review report) was subsequently submitted in May 2018. The IHP program response from Dr. Mark Nachtigal (Director, IHP), and the response from the RFHS, prepared by Dr. Christine Ateah (Vice Dean Education) were both received in September 2018. All of the above documents, which will be made available to Senate, are attached to this report.

On behalf of the Provost, I would like to thank everyone who worked so diligently on this review.

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3. Preamble

The IHP was introduced in 2007 as a joint program between the Faculties of Human Ecology, Arts, and Science. With the 2015 closure of Human Ecology as part of the University of Manitoba's Academic Structure Initiative, the Faculty was replaced by the RFHS. The program is governed by an IHP Council (IHPC), comprised of members of the partner faculties and Chaired by the Dean, RFHS or designate.

The IHP curriculum combines knowledge and learning experiences from both the physical and social sciences for two, 4-year (120 credits) programs, the Bachelor of Health Studies (BHSt), and the Bachelor of Health Sciences (BHSc).

4. Academic Program Review

The review report summarizes the IHP as being 'on the cusp' of a significant and exciting opportunity to provide a unique and innovative interdisciplinary program. The report notes that plans presented to the reviewers during the review represent a positive start; however, the reviewers also identified areas of concerns and put forward recommendations that will help ensure success and sustainability of the programs. While commending the program's commitment to interdisciplinary programming, the reviewers warn that the same interdisciplinarity can produce challenges, notably in identifying a common vision and goals, governance – particularly with respect to governance of both the BHSt and its Family Health Concentration – and in the current programs' atypical reliance on large numbers of elective courses, especially given plans for substantial growth.

The report places considerable emphasis on the need for a common vision for the IHP. It suggests, 'that the single most important determinant as to whether the IHP will realize its full potential has to do with the development of a compelling common vision of interdisciplinarity and buy-in of the various parties to that vision.' The reviewers emphasize that allowing the BHSc and BHSt programs to evolve without a common vision, would result in 'a major missed opportunity' for the IHP initiative. They also expressed concern about comments, evinced by some council representatives, as being 'at odds with this vision'.

Consistent with achieving a common vision, the review report contends that the 'governance for all aspects of the IHP must ultimately flow through the IHPC and report through to the IHP Director and RFHS Dean, and from a common vision for the IHP as a whole.' As there are no program specific faculty members, the IHP Director does not currently directly assign teaching duties for the program. Arising from this, the report identifies concerns about potential conflicts between the roles of the IHPC and the Community Health Sciences Undergraduate Studies Committee, which might be exacerbated with the suspension of intake to the Bachelor of Human Ecology, Family Social Sciences (FSS) and the anticipated growth of the BHSt program, as a result.

The reviewers perceive inconsistencies in the IHP program goals as presented in the SER. On the one hand speaking to the need to prepare for collaborative interdisciplinary careers in health delivery, community health, health care management, and health promotion and, on the other, suggesting differing student outcomes for the two degree programs; 'with the BHSc focusing upon educational preparation for clinical professions, and the BHSt focusing on population health and support roles in health.' They argue that '[i]t is unclear how such distinct outcomes are attained with the same core courses. Moreover, there is no reason to think that those graduating with a BHSt degree would not be excellent candidates for health professions, as Canadian medical schools have few degree or

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course requirements and value inter-professional and interdisciplinary degrees.'

The report further contends that the basic science component of the programs may not be ideal, and that the 'IHPC should evaluate where it might be more appropriate to develop new courses to focus on the foundational scientific knowledge that is necessary for developing an understanding of health.' The reviewers recommend the addition of HEAL courses to the program's core curriculum, including a required first-year HEAL course and the merging of HEAL 4610 and 4620, to 'reinforce interdisciplinarity, and create an atmosphere of inter-professional competency and respect.'

Associated with these recommendations the reviewers suggest reducing the number of restricted elective lists and courses. In conversations with students in this regard, the reviewers observed that the descriptor 'random' was used in reference to electives and courses and they suggest that borrowing so heavily from other programs may be perceived as diluting the degree, making it feel like a 'collection of courses rather than a cohesive program.' They also observe that 'students seem unclear about the relationships between FSS, nutrition, HMEC, and the IHP. This is primarily due to the number of courses, but also to questions of the use of the student lounge, and the appropriate student society associated with their program. This confusion has added to the lack of a sense of community around the program that students reported experiencing.' The reviewers also add that should this structure continue, it will be essential to monitor demand on student advising. During the review, advisors did indicate a slight increase in student demand and expressed concern about their ability to continue in an environment of increasing student enrolment. In addition to this, associated with the program's reliance on a large number of identified elective courses, is a significant amount of time and effort by administrative staff, as well as members the Senate Committee on Course and Curriculum Change, in keeping the elective lists current and up to date with changes introduced by the respective home faculties. The SER notes that the Director had recognized the above challenge, and has planned to increase support staff; however, their efforts would be better directed toward supporting students rather than, arguably unnecessary, paperwork.

Finally, the reviewers observe that the IHP has attracted (relative to other UM programs) a disproportionate number of international students and suggest 'it would be desirable for the IHP to identify an optimal ratio of international/domestic students, consistent with the University of Manitoba Strategic enrolment goal for international students.' Any increase to international enrolments would be expected to exacerbate the general strain on program advisors associated with relative needs of a larger student body, and would need to be carefully considered. International enrolments in the IHP have increased from 5 to 35 students since the program moved to the RFHS in 2015, with these students more heavily concentrated in the BHSc. Given the rapidity of this increase, it would be advisable to consult Enrolment Services about where the students are coming from, and why.

In summary, given the transitional state of the IHP, the reviewers report that none of the three program classification options proved acceptable for their evaluation. With respect to their final classification, they suggest the need for more attention and investment than would be warranted for a classification of *Adequate, with minor revisions*, but do not consider a classification of *Inadequate; requiring major revisions or restructuring* as appropriate or defensible.

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5. Recommendations and Responses

The review report documents twelve recommendations (summarized below). These are addressed in more detail in the response from the program and the Dean's Office.

Quality of undergraduate student advising.

a) *The External Review Committee encourages the IHP Director and staff to monitor student success (graduation rates, time to complete, and attrition) and student experience relative to student advising support. This will be particularly important with the anticipated growth in program enrollment.*

The program response notes that monitoring of student progression is standard practice. As well, anticipated challenges to this practice arising from increased enrolments has been addressed by the Director with the creation of a new position that combines the duties of the IHP Undergraduate Program Coordinator and Academic Advisor.

b) *The External Review Committee encourages the IHP Director and staff to monitor the accuracy and usefulness of the University Degree Planning Tool as a supplement to personal contact with an IHP academic advisor.*

The IHP Director has committed to monitoring UMAchieve, and supporting their students through its implementation.

c) *The External Review Committee feels that it is vital that planning for growth in student enrolment also continue to include planning for incremental increases in staff supporting those students.*

The program response acknowledges this recommendation; however, the impact of growth on supporting units, such as CHS, and the Faculties of Arts and Science has not been provided.

Excellence of the academic staff and breadth of experience.

d) *The External Review Committee recommends that the IHP Director and the IHP Council continue to clarify the nature of partnerships that constitute the IHP. This is the type of work that could be accomplished with a professionally facilitated retreat focusing specifically on partnerships and resourcing the IHP.*

A retreat to address this recommendation was conducted in December, 2018.

e) *The Director of IHP, the Vice-Dean Education for the RFHS, the Dean of the RFHS and Academic Administrators of IHP Partners will need to find ways to build a IHP culture that is meaningful to faculty members who contribute to the core curriculum regardless of their home faculty.*

The program response acknowledges the report's recommendation.

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f) The External Review Committee recommends that the core courses in each of the degrees and concentrations be taught by a diverse group of faculty, including those who are currently engaged in research related to the courses they are teaching, those with clinical appointments, and diverse disciplinary perspectives on health.

The review report observed that the majority of the core HEAL courses are being taught by a single instructor. While reviewers noted that the instructors had very good credentials and were committed to the program, they cautioned that 'it is not ideal to have one person teaching so many of the required courses' and that 'program integrity and student experience could be enhanced if the students are exposed to a variety of professors through delivery of the core courses.' The report also raised questions about the downstream impact of enrolment growth on this practice, specifically in relation to good pedagogical practices.

The program response acknowledges that the core HEAL courses are all taught by a single instructor, and that this may have been purposely done to facilitate consistency and laddering of concepts. However, the same approach has not been adopted for the core FMLY courses (FMLY 3750, 3780, 3790), which taught by different CHS faculty. The program response also acknowledges that the single-instructor model may not be feasible as enrolments increase. The response also notes a commitment to discuss how teaching needs may be addressed in future by RFHS faculty members.

Strengths and weaknesses of the programs.

g) We recommend that the IHP Council convene a series of administration retreats. First, a visioning retreat to articulate a common vision for the IHP program as a whole, including a common mission statement and educational goals, and commitment to the interdisciplinarity of the program. The material provided in the Compass brochure is an excellent start for this process. Once the common vision has been established, a strategic planning retreat around the governance structure and funding mechanisms should follow; finally, having discovered a common vision and governance structure, the Council should articulate an expansion plan using a fully detailed Logic Model addressing Physical and Human Resources, student recruitment targets (including demographic groups) with a clearly defined timeline and intermediate goals.

Further to the retreat identified in recommendation 5(d) above, the program response has committed to explore the development of an expansion plan.

h) To counteract the current tendency to orient toward the individual degrees rather than the IHP as a whole, it will be important to conceptualize and market the program identity principally as the IHP program, emphasizing the core common elements that unite the degrees, as opposed to the differences. For the sake of program culture, it would be desirable to orient student identity principally to the IHP Program as opposed to individual streams. In the conversation with the IHP Council there seemed to be a tendency to think of BHSc students and BHSt students as distinctive populations of students studying in parallel programs; this tendency threatens the interdisciplinarity of the IHP. Moreover, BOTH programs are suitable as a possible route to clinical health professional programs, and this should be emphasized, otherwise there is a danger that the BHSc degree will be seen as "pre-med" and in some sense more elite than the BHSt degree. Such a misperception could only damage the

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interdisciplinary culture of the IHP.

The program response reiterates that interdisciplinarity is built into the IHP's core curriculum, which is shared by both the BHSc and the BHSt. Further, the response notes that students in both degrees share all core classes, which certainly facilitates interaction between both students groups, and agreed that this feature of the program could be better communicated/ reinforced going forward. The response also acknowledges that both degrees provide a suitable pathway to clinical professional programs, and argued that students are not discouraged from thinking otherwise.

Extent to which programs' objectives are met.

i) *It is imperative that the IHP fully articulate graduate level outcomes and levels of achievement for students at the end of 2nd year (at a minimum, preferably at the end of each year of the program). This should avoid the assumption that only students of the BHSc will pursue careers in the clinical health professions and that only students of the BHSt will pursue careers in the population health professions. Once the IHP Council has completed a full articulation of the IHP Vision and conducted Strategic Planning (Section 9 Recommendations), we recommend that the group invite all instructors teaching core courses to a Retreat to establish learning outcomes and to review and revise the IHP curriculum consonant with those outcomes.*

The program response confirms that all new students receive a program plan that includes any transfer credits and recommended courses for the upcoming year, as a resource for registration. The records of all second through fourth-year students are also reviewed annually to ensure that they are on-track for graduation; as part of this process students are required to submit an annual program plan.

Again, this is an atypical feature of the IHP and it is not clear what this very labour intensive process gains as UMAchieve is available as an option. Further, as the response notes, 'students in the IHP have the ability to select from a large number of program and concentration electives for each year of the program in both degrees [and] it may not be feasible to identify yearly outcomes.' Supporting this process as enrolments increase will be difficult to sustain.

It may be more productive, as the review report suggests, reducing the number and range of electives offered and build a clearer curriculum pathway for students to follow. This would facilitate a reduction in the time and attention to administer by support staff and faculty alike to guide individual students.

j) *The IHP Council will need to implement a procedure for ongoing monitoring of the number and focus of courses taught by other academic units to ensure maintenance of the interdisciplinary vision of the program, as opposed to multidisciplinary.*

The reviewers report notes that the number of common mandatory courses completed in the program's BHSc and BHSt streams are comparable to those in similar programs with which they are familiar. However, the report also observes that the IHP has comparatively few HEAL courses that are specific to the program. The reviewers acknowledge the benefits of expanding the HEAL offerings to further support the program's identity, as well as to emphasize the health focus of the various disciplines to be included. They also suggest similar benefits might accrue from developing

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other health-focused course options, rather than relying on courses – both core and elective - taught by other units, in order that the 'content and educational philosophy can be customized for the needs of interdisciplinary health students, with the additional benefit of developing the cohort and program identity.'

The program response notes that the overall interdisciplinary curriculum is reviewed and discussed to ensure maintenance of interdisciplinary learning. Notwithstanding, this recommendation deserves further consideration

> k) *The IHP curriculum seems rigorous enough to warrant an Honours designation. We recommend that the IHP Council investigate whether the current Capstone requirement would meet Honours requirements.*

The program response notes that, once all planned program and curriculum changes have been implemented, an honours option will be considered for further discussion. While the response correctly recognizes that introducing an honours option would require the approval of Senate, the Board, and the Province, this should not be considered a deterrent should this recommendation be judged to have academic merit.

> l) *Consistent with the University of Manitoba strategic goal of fostering Indigenous achievement, and the strengths of the university the IHP Council should consider adding an Indigenous Health Concentration.*

The program response notes that the approach taken by the program has been to incorporate Indigenous focused courses and content for all students in the IHP; however, a concentration focusing exclusively on Indigenous health issues is a suggestion that is worthy of consideration. The program will pursue initial discussions with the Ongomiizwin Institute of Health and Healing in this regard, prior to discussions with the IHPC.

6. Conclusion

Consistent with the UM policy on Academic Program Reviews,[1] regular program reviews are conducted to maintain the academic integrity of academic programs at the UM and, to ensure, through an exercise of self-reflection and external observation, that our academic programs maintain academic excellence.

On behalf of the University, I would like to acknowledge the reviewers (Dr. Stacey Ritz, Dr. Linda Jessop, and Dr. Douglas Brown) for their enthusiastic efforts in support of the review of the IHP. Their report raised a number of questions and provided a number of detailed recommendations that will facilitate substantial improvements to the program, the majority of which the Faculty has committed to supporting. I would also like to recognize the faculty, staff and students who contributed to the review, for their very positive engagement with this process.

My congratulations to everyone on a successful review.

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[1] http://umanitoba.ca/admin/governance/governing_documents/academic/364.html

7. Recommendations for Follow-up

I would ask that the Interdisciplinary Health Program provide a follow-up report to the Office of the Provost on the following items for no later than July 1, 2020:

- A summary of discussions with the Faculties of Arts and Science and the Department of CHS about the impact of plans for enrolment growth by IHP (see recommendation 5(c)); please append response reports from the perspectives of the Deans of the Faculty of Arts and Faculty of Science, respectively.

- Outcomes arising from the 2018 retreat, specifically including discussions about the nature of partnerships that constitute the IHP and, approaches to building an IHP culture that is meaningful to faculty members who contribute to the core curriculum regardless of their home faculty (see Recommendations 5(d), (e) & (g)).

- Plans to maximize advisor resources, given anticipated increases in program enrolment.

- Any changes to the curriculum arising from review recommendations, e.g. new HEAL courses, review of core and elective structures, consideration of an honours designation) (see Recommendation 5(j),(f) & (k)).

Cc: Janice Ristock, Provost and Vice-President (Academic)
        Brian Postl, Dean, Rady Faculty of Health Sciences and Vice-Provost Health Sciences
        Stefi Baum, Dean, Faculty of Science
        Jeff Taylor, Dean, Faculty of Arts
        Mark Nachtigal, Director, Interdisciplinary Health Program
        Jeff Leclerc, University Secretary
        Randy Roller, Executive Director, Office of Institutional Analysis
        Cassandra Davidson, Academic Programs Specialist.

March 4, 2020

Report of the Senate Committee on Curriculum and Course Changes: Corrections to Previous Reports of October 22 and November 22, 2019 (*for information*)

Preamble:

1. The [terms of reference](#) for the Senate Committee on Curriculum and Course Changes (SCCCC) are available on the University Governance website. The SCCCC is "to recommend to Senate on the introduction, modification or abolition of undergraduate programs, curricula or courses".

2. The Senate Committee on Curriculum and Course Changes has not met since last reporting to Senate. The current report is provided as a record of typographical and other editorial corrections to the Reports listed below. The corrections have been made on the page numbers indicated and are highlighted in the December 4, 2019 Senate agenda.

    *   Report of the SCCCC Submitted to Senate for Concurrence Without Debate [dated November 22, 2019]
    *   Report of the SCCCC, Desautels Faculty of Music – Submitted to Senate for Ordinary Debate [dated October 22, 2019].

Corrections to Report of the SCCCC Submitted to Senate for Concurrence Without Debate [dated November 22, 2019]:

Faculty of Science

Biological Sciences

(Page 182)

BIOL 3318 Boreal Ecology Cr.Hrs. 3
*   In the description of the prerequisites, round brackets were changed to square brackets and a semi-colon and a semi-colon was added before the final phrase, as follows: Prerequisites: [one of BIOL 2300, BIOL 2301, or AGEC 2370] and [one of STAT 1150, STAT 1000, or STAT 1001]; or consent of department.

(Page 183)

BIOL 4220 Marine Biodiversity Cr.Hrs. 3
*   In the description of the prerequisites, round brackets were changed to square brackets and a semi-colon was added before the final phrase, as follows: Prerequisites: [one of BIOL 2300, BIOL 2301, or AGEC 2370] and [one of STAT 1150, STAT 1000, or STAT 1001]; or consent of department.

BIOL 4380 Environmental Toxicology Cr.Hrs. 3
*   Prerequisites: [one of CHEM 2370, CHEM 2371, MBIO 2370, MBIO 2371, CHEM 2780, or MBIO 2780] and [one of BIOL 2300, BIOL 2301, or AGEC 2370] and [one of STAT 1150, STAT 1000, or STAT 1001] and [one of BIOL 2410, BIOL 2411, BIOL 3470, BIOL 3472, the former BIOL 3460, the former BIOL 3462]; or consent of department.

BIOL 4480 Comparative Endocrinology Cr.Hrs. 3
- The description of the prerequisite was corrected, to reflect a change recommended by SCCCC, as follows: Prerequisites: one of BIOL 1030 or BIOL 1031 and successful completion of 60 credit hours of university coursework.

Statistics

(Page 232)

STAT 4700 Statistical Consulting Cr.Hrs. 3
- The second sentence was revised to more accurately reflect a change recommended by SCCCC, as follows: This course is restricted to ~~fourth year~~ students in the Honours, Joint Honours, or Major degree programs in Statistics.

(Page 247)

Bachelor of Science (Major) in Statistics, including the Co-operative Option
- In Year 3, in the revised course requirements, STAT 3470, which has been deleted, was replaced with STAT 3450.

Corrections to Report of the SCCCC, Desautels Faculty of Music – Submitted for Ordinary Debate [dated October 22, 2019]:

Program modifications, Bachelor of Music (Music Education)

(Pages 483, 487, 492, 494, 497, and 499)

RE: Early Years Concentration, Instrumental Concentration, Choral Concentration, Choral Concentration With "W" or "Math" Requirement as Teachable Minor, Guitar/Strings Concentration, and Guitar/Strings Concentration With "W" or "Math" Requirement as Teachable Minor

- In Year 2 (proposed), course numbers for two required courses were corrected, as follows:
    MUSC ~~1180~~ 2180 – Ensemble
    MUSC ~~1190~~ 2190 - Ensemble

(Pages 485, 490, 491)

RE: Early Years Concentration with "W" or "Math" Requirement as Teachable Minor and Instrumental Concentration with "W" or "Math" Requirement as Teachable Minor

- In Year 2 (proposed), course numbers for two required courses were corrected, as follows:
    MUSC ~~1180~~ 2180 – Ensemble
    MUSC ~~1190~~ 2190 – Ensemble
    MUSC ~~1384~~ 2384 – Musicianship 3
    MUSC ~~1394~~ 2394 – Musicianship 4

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- In Year 4 (proposed) of the second program noted above, the course number for one required course was corrected, as follows:

    MUSC ~~33690~~ 3690 – Percussion Techniques

Respectfully submitted,

Professor Greg Smith, Chair
Senate Committee on Curriculum and Course Changes

University of **Manitoba**

Office of Provost and Vice-President (Academic)

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Winnipeg, Manitoba
Canada R3T 2N2
Telephone (204) 480-1408
Fax (204) 275-1160

Date: January 13, 2020

To: Dr. Jeff Taylor, Dean, Faculty of Arts

From: Dr. Janice Ristock, Provost and Vice-President (Academic)

Re: Program Approval – Double Advanced Major in History

At its meeting of December 4, 2019, the University of Manitoba Senate approved the proposal by the Faculty of Arts to offer a 42 credit hour Double Advanced Major in History.

I hereby approve the implementation of the double advanced major effective the Fall 2020 term. The Faculty will budget for any resources required for implementation accordingly.

Cc: Todd Mondor, Deputy Provost (Academic Planning and Programs)
Jeff Adams, Executive Director, Enrolment Services
Jeff Leclerc, University Secretary
Neil Marnoch, Registrar
Randy Roller, Executive Director, OIA
Cassandra Davidson, Academic Programs Specialist

/cd

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University
of Manitoba

Date: January 13, 2020

To: Dr. Martin Scanlon, Dean, Faculty of Agricultural and Food Sciences

From: Dr. Janice Ristock, Provost and Vice-President (Academic)

Re: Program Implementation – Minor in Agronomy

At its meeting of December 4, 2019, the University of Manitoba Senate approved the proposal by the Faculty of Agricultural and Food Sciences to offer a Minor in Agronomy. The 18 credit hour Minor will be open to all undergraduate students registered in a program that permits a minor, with the exception of students enrolled in the B.Sc. Agriculture, Agronomy program.

I hereby approve the implementation of the minor effective the Fall 2020 term. As outlined in the proposal, no new resources are required for implementation.

On behalf of the University of Manitoba, I extend my congratulations to all those who have worked hard to design this program and look forward to its implementation.

Cc: Todd Mondor, Deputy Provost (Academic Planning and Programs)
Jeff Adams, Executive Director, Enrolment Services
Jeff Leclerc, University Secretary
Neil Marnoch, Registrar
Randy Roller, Executive Director, OIA
Cassandra Davidson, Academic Programs Specialist

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Date: January 13, 2020

To: Dr. Gady Jacoby, Dean, I.H. Asper School of Business, Faculty of Management

From: Dr. Janice Ristock, Provost and Vice-President (Academic)

Re: Program Implementation – Minor in Leadership for Business and Organizations

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At its meeting of December 4, 2019, the University of Manitoba Senate approved the proposal by the I.H. Asper School of Business, Faculty of Management to offer a Minor in Leadership for Business and Organizations. The 18 credit hour Minor will be open to undergraduate students in other faculties and schools who are both registered in a program that permits a minor and who meet the minimum entrance requirements, as approved by Senate.

I hereby approve the implementation of the minor effective the Fall 2020 term. As outlined in the proposal, the Faculty anticipates that the projected demand for the Minor may require the addition of seats and/or sections in some courses. Any costs associated with additional sections of courses will be budgeted for within the Faculty.

I note that space in the minor is limited, and as such, enrolment may be restricted. Accordingly, I would encourage the Faculty to continue to engage with the other academic units to monitor demand and access to the program, as appropriate.

On behalf of the University of Manitoba, I extend my congratulations to all those who have worked hard to design this program and look forward to its implementation.

Cc: Todd Mondor, Deputy Provost (Academic Planning and Programs)
     Jeff Adams, Executive Director, Enrolment Services
     Jeff Leclerc, University Secretary
     Neil Marnoch, Registrar
     Randy Roller, Executive Director, OIA
     Cassandra Davidson, Academic Programs Specialist

/cd

University of Manitoba

Date: January 13, 2020

To: Dr. Jonathan Beddoes, Dean, Faculty of Engineering

From: Dr. Todd Mondor, Deputy Provost (Academic Planning and Programs)

Re: Program Approval – Manufacturing Stream (Concentration)

At its meeting of December 4, 2019, the University of Manitoba Senate approved the proposal by the Faculty of Engineering to offer a 12 credit hour Manufacturing Stream (Concentration) in the Bachelor of Science in Engineering (Mechanical).

I hereby approve the implementation of the concentration effective the Fall 2020 term. As outlined in the proposal, no new resources are required for implementation.

Cc: Janice Ristock, Provost and Vice-President (Academic)
    Jeff Adams, Executive Director, Enrolment Services
    Jeff Leclerc, University Secretary
    Neil Marnoch, Registrar
    Randy Roller, Executive Director, OIA
    Cassandra Davidson, Academic Programs Specialist

/cd

University of Manitoba

Date: January 13, 2020

To: Dr. Martin Scanlon, Dean, Faculty of Agricultural and Food Sciences

From: Dr. Todd Mondor, Deputy Provost (Academic Planning and Programs)

Re: Program Closures – Options in the Bachelor of Science in Agribusiness

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At its meeting of December 4, 2019, the University of Manitoba Senate approved the proposal by the Faculty of Agricultural and Food Sciences to close the following options (concentrations) in the Bachelor of Science in Agribusiness:

- Agricultural Economics Option
- Agribusiness Management Option
- International Agribusiness Option

These concentrations will no longer be made available to new students effective the 2020-2021 academic year and will be formally closed once any remaining students have completed the listed requirements.

Cc: Janice Ristock, Provost and Vice-President (Academic)
      Jeff Adams, Executive Director, Enrolment Services
      Jeff Leclerc, University Secretary
      Neil Marnoch, Registrar
      Randy Roller, Executive Director, OIA
      Cassandra Davidson, Academic Programs Specialist

/cd

Senate Statement

The mandate of the University of Manitoba is to create, preserve, communicate, and apply knowledge. In doing so, the University contributes to the cultural, social and economic well-being of the people of Manitoba, Canada, and the world. The university serves the common good, through searching for, and disseminating, knowledge and understanding, and through fostering independent thinking and expression. We undertake basic, applied, and inquiry-based research and teaching. We are organized by core principles of autonomy, academic freedom and collegial governance.

The University of Manitoba believes that education has a transformative power for students, their families and communities. We are committed to inspiring minds through innovative and quality teaching. We drive discovery and insight through excellence in research, scholarly work and other creative activities. We create pathways to Indigenous achievement. We promote equity, inclusion, and excellence. We forge connections to foster high impact community engagement that build on the advantages of a diverse and inclusive workplace.

The University of Manitoba is the province's only research-intensive university, and all assessments of our contributions to the dynamic social and economic life of our province must recognize our broad mandate and inclusive mission, which has short-term, mid-term, and long-term effects and implications. Our 30,000-plus full and part-time undergraduate and graduate students and our 5,000-plus faculty members undertaking teaching and research are part of a complex institution, one that does much more than simply train students for today's labour market. Higher education generates social, as well as individual, benefits. We provide a public good that helps to promote wisdom and to build a just, inclusive and prosperous province for all people.

Report of the Senate Executive Committee

Preamble

The Executive Committee of Senate held its regular monthly meeting on the above date.

Observations

1.   Speaker for the Executive Committee of Senate

Professor Tina Chen will be the Speaker for the Executive Committee for the March meeting of Senate.

2.   Vacancies on the Senate Committee on Nominations

The report of the University Secretary on the Senate Committee on Nominations is attached (Appendix A). Members of the Senate Committee of Nominations are nominated by the Senate Executive Committee and elected by Senate (see recommendation below). Senate Executive has made one recommendation regarding a vacancy for an academic staff member.

4.   Comments of the Executive Committee of Senate

Other comments of the Executive Committee accompany the report on which they are made.

Recommendation

The Senate Executive Committee recommends:

THAT the nomination of Dean Reg Urbanowski to the Senate Committee on Nominations, for the balance of a term ending May 31, 2020, be approved by Senate.

Respectfully submitted,

Dr. David Barnard, Chair
Senate Executive Committee
Terms of Reference:
http://umanitoba.ca/admin/governance/governing_documents/governance/sen_committees/477.htm

December 18, 2019

Vacancies on the Senate Committee on Nominations

At the July 1977 meeting of Senate, Senate approved, without debate, area representations for the Senate Committee on Nominations. The representation was amended in July 1991 to include the Libraries, in June 2005 to include the Clayton H. Riddell Faculty of Environment, Earth and Resources, and in October 2014 to take into account the Faculty of Health Sciences.

Members of the Senate Committee on Nominations are nominated by the Senate Executive Committee, and are elected by Senate.

The current membership is as follows:

Agricultural and Food Sciences & Environment, Earth and Resources	Jitendra Paliwal*	2021
Architecture & Engineering	Witold Kinsner*	2022
Arts	Pam Perkins	2020
Education, Kinesiology and Recreation Management & Extended Education	Steven Passmore*	2021
Health Sciences (2)	Barbara Shay*	2020
	Marie Edwards	2022
Libraries & Student Affairs	Lori Giles-Smith	2022
Management, Law & Social Work	Robert Biscontri*	2020
Music & School of Art	Oliver Botar*	2021
Science	Helen Cameron	2021
Students (2)	Katelyn Casalla*	2020
	Cody Ross	2020

*   denotes member of Senate presently or at time of appointment

As Professor Barbara Shay (Health Sciences) will be on leave as of January 1, 2020, a representative for Health Sciences is required for the balance of her term ending May 31, 2020.

The composition of the Senate Committee on Nominations calls for ten members of the academic staff, the majority of whom are to be members of Senate. Since six of the academic members currently on the Committee are Senators (or were Senators at the time of appointment), including Professor Shay, the candidate must be a member of Senate at the time of election to the Senate Committee on Nominations.

Report of the Senate Committee on Admissions concerning a proposal from the School of Dental Hygiene to modify the admission requirements for the Dental Hygiene Diploma program (2020.01.24)

Preamble:

1.   The terms of reference for this committee can be found at: *http://umanitoba.ca/admin/ governance/governing_documents/governance/sen_committees/490.htm.*

2.   The School of Dental Hygiene is proposing a modification to the advanced entry admission requirements for the Dental Hygiene Diploma program. The proposal calls for an amendment to the English prerequisite that is part of the admission requirement.

3.   The proposal was approved by the Dental College Council of the Dr. Gerald Niznick College of Dentistry on January 28th, 2019 and was endorsed by SCADM on January 24th, 2020.

Observations:

1.   The existing English course requirement does not provide a great deal of flexibility and meeting the requirement could be a challenge for students who are applying to the program using prerequisite courses from an institution other than the University of Manitoba.

2.   This proposed requirement is in alignment with the requirements for the Doctor of Dental (DMD) Medicine program which will benefit students who are interested in eventually pursuing the DMD program.

Recommendation:

The Senate Committee on Admissions recommends that the proposal to modify the advanced entry admission requirements for the Dental Hygiene Diploma program be approved effective for the Fall 2021 intake.

Respectfully submitted
Laurie Schnarr, Chair, Senate Committee on Admissions

Comments of the Senate Executive Committee:
The Senate Executive Committee endorses the
Report to Senate.

Approved English Prerequisite Proposal From The School of Dental Hygiene,
The Dr. Gerald Niznick College of Dentistry
Senate Committee on Admissions
Rady Faculty of Health Sciences

Section I - Description of Change:

The English course requirements for admission to Dental Hygiene were ENGL 1310 or ENGL 1340. In 2014, the English department made changes to their courses which include replacing ENGL 1310 with ENGL 1400. Since that time, the School of Dental Hygiene has been accepting ENGL 1340 or ENGL 1400 for admission. In addition, the School of Dental Hygiene would accept ENGL 1200 and ENGL 1300 to fulfill the requirement. It has been bought to our attention that the acceptance of any other English courses that does not transfer as directly equivalent to ENGL 1340 or ENGL 1400 is not permitted.

The current requirement does not make it flexible for students who are transferring from other institution or for students who selected to complete a six credit hour introductory course. We also need to align with the Dentistry English prerequisite requirements, in that, some of our students move on to apply to the Dentistry program after the completion of Dental Hygiene program or choose Dental Hygiene if they are unsuccessful with gaining admission to Dentistry.

Effective Date: Fall 2021 admission intake.

Section II - Consultation With Other Faculties

Not applicable as will not impact other faculties

Section III - Recommendation:

That the English prerequisite requirement for The School of Dental Hygiene, be amended to read that we would accept any 3 credit hour English course at the 1000 level or higher to satisfy admission requirements.

This recommendation was presented at our DCC meeting of January 28, 2019 and was fully approved.

This recommendation was also approved by the SCCCC on October 25, 2019.

Report of the Senate Committee on Academic Review RE: Review of Centre for Engineering Professional Practice and Engineering Education

Preamble:

1. The terms of reference for the Senate Committee on Academic Review (SCAR) are found on the University Governance website.

2. The University's procedure on *Academic Centres and Institutes* specifies in section 3.0 that:

    > In order to ensure that all academic activities are consistent with the goals of the University and that academic centres/institutes reflect positively on the general reputation of the University, all academic centres/institutes shall be reviewed by SCAR on a periodic basis but not less often than every five years.

3. The Centre for Engineering Professional Practice and Engineering Education, in the Faculty of Engineering, was established in 2014, for an initial term of five-years. The inaugural and current Director is Dr. Marcia Friesen, Associate Dean (Design Education), Faculty of Engineering.

4. At its meeting on June 26, 2019, Senate approved a recommendation from SCAR that the Centre be granted a twelve-month extension, to June 23, 2020 (Senate, June 26, 2019), to facilitate a review that would seek clarity on the role of the Centre within the Faculty of Engineering and the Centre's five-year plan.

5. A Review Committee was struck to carry out the review. Members of the Review Committee included Professor Czubryt (Health Sciences), Professor Duhamel (Kinesiology and Recreation Management), and Professor Paliwal (Agricultural and Food Sciences). Professor Paliwal recused himself from the committee prior to the conclusion of the review.

6. At its meeting on January 14, 2020, SCAR received the report of the Review Committee, for its consideration.

Comments of the Review Committee

1. Regarding the role of the Centre within the Faculty of Engineering, particularly with respect to the delivery of core undergraduate courses, the Review Committee ascertained that the Centre delivers courses with the subject code ENG that have content relevant to all engineering disciplines. Discipline-specific courses (CIVL, MECH, ECE, BIOE) are sometimes taught by faculty who are members of the Centre, if the course content falls within their area of expertise. The position of the Review Committee was that the practice of offering ENG courses through the Centre does not contravene the policy on *Academic Centres and Institutes* (section 2.1.1), which specifies that, "[academic] centres/institutes normally provide for the strengthening, coordination or facilitation of educational activities not readily undertaken within the University's department structure..." It did note, however, that it is not clear whether delivery of the ENG courses could not be accomplished within the University's department structure.

2.   The Review Committee identified a concern related to the assignment of teaching duties, which arises from the Centre's increasing role in the delivery of core undergraduate courses. Specifically, that the Associate Dean (Design Education), who is also the Director of the Centre, makes decisions on annual teaching assignments for ENG courses, sometimes in collaboration with the Dean where anomalies or questions arise. The Review Committee was concerned that this practice, which effectively makes teaching assignments a Faculty, rather than a department, responsibility, might weaken the academic mandate of departments and may not be congruous with the spirt of the policy on *Academic Centres and Institutes*.

3.   Regarding the five-year plan for the Centre, which had been provided to SCAR (May 13, 2019) in the *Periodic Report on the Centre for Engineering Professional Practice and Engineering Education*, the Review Committee considered it to be insufficient, as it was not specifically aligned to any of the Centre's original mission and objectives established in 2014, the revised mission, values, and goals, endorsed within the Centre in 2017, or the University's Strategic Plan. In response to the Review Committee, the Director provided the attached document (Appendix I), which describes how the Centre's scope and plans for the next five-years align with these things.

4.   The Review Committee reported to SCAR on three issues identified during the review. The first being mission drift, including the development and adoption of new mission, vision, and value statements in 2017, which have not been approved by Senate. Second, that some academic roles of the Faculty may eventually be supplanted by the Centre, which is suggested by the mission drift that has occurred, the appointment of academic staff to the Centre, the delivery of core undergraduate degree courses through the Centre, and inquiries into the possibility of forming an academic department. Third, a lack of external oversight on the advisory board, which does not include individuals at arm's length from either the Faculty or the engineering profession (i.e., members who are not engineers).

5.   The Review Committee expressed their appreciation for Dr. Friesen's comprehensive, forthright, and timely responses to requests for information during the course of the review.

Observations:

1.   The Senate Committee on Academic Review recognizes the positive contributions that the Centre and its members have made to the Faculty of Engineering and the broader engineering community, particularly with respect to the numerous outreach activities and educational supports for engineering students identified in the *Periodic Report*, which the committee had received in May 2019. Committee members commented on the strength of the letters of support, which reflect the connections with, and impact on, the engineering community locally and nationally.

2.   Notwithstanding the significant contributions of the Centre, SCAR observed that the policy on *Academic Centres and Institutes* does not envision that academic appointments will normally be made to a centre/institute or that these entities will be involved in the delivery of academic programs. The committee was concerned

that the Centre for Engineering Professional Practice and Engineering Education was functioning in a way not envisioned under the policy.

3. The committee raised a concern that the revised planning document provided to the Review Committee (Attachment I) appeared to expand on some teaching activities that SCAR had previously raised with the Centre as being problematic, on the basis of information in Annual Reports, particularly with respect to the delivery of undergraduate degree courses and plans to lead role the development of proposals for new graduate courses and programming.

4. It was noted that the Centre's current mission, vision, and value statements, which had been established in 2017 and endorsed within the Centre had not been forwarded to Senate for approval. This presents a risk that the Centre will design its academic activities and strategies around a mission and vision that could lead the Centre in a direction that Senate would not support. The committee suggested that, when changes are made to the mission or scope for an academic centre/institute, it would be useful to have Senate approve these.

5. With respect to the Centre's inquiries into the possibility of forming an academic department, the committee was informed by the Chair, Dr. Mondor, Deputy Provost, that it was his understanding that academic appointments made to the Centre had been approved by the Office of the Provost with the understanding that the Dean of the Faculty of Engineering and the Director of the Centre intended to pursue this end.

6. The committee is recommending that the Centre be renewed for a period of three years, with the understanding that the Centre and the Faculty of Engineering would use this period to take the steps required to either seek Senate and Board approval of its mission, to transition and establish the Centre an academic department, or to bring the activities of the Centre, including teaching activities, into alignment with the policy on *Academic Centres and Institutes.* During this three-year period, the Centre will be asked to provide periodic updates on its progress toward one of these ends in its Annual Reports to SCAR.

Recommendation:

THAT Senate approve the continuation of the Centre for Engineering Professional Practice and Engineering Education for a period of three years, ending June 23, 2023.

Respectfully submitted,

Dr. Todd Mondor, Chair
Senate Committee on Academic Review

Comments of the Senate Executive Committee:
The Senate Executive Committee endorses the Report to Senate.

Mapping of the Centre's Mission, Goals, and Scope

2014 Mission	2017 *Mission* & Goals	UManitoba Strategic Priorities[2]	How goals will be met:
To ensure that graduating students, both at the undergraduate and graduate levels, have not only the academic knowledge but also the professional skills to pursue careers in the Profession of Engineering.	*The Centre views student learning in professional skills and design abilities as core technical and leadership competencies essential for their diverse future roles in the engineering profession and the community. Accordingly, the Centre collaborates with departments in the Faculty of Engineering and develops and delivers professional practice and design curricula [...]* To serve as a focal point in the Faculty of Engineering in the ongoing innovation of professional practice teaching & learning, and to enhance the capacity of the departments in design teaching & learning. To partner with the departments and programs in the Faculty of Engineering toward mutual goals in design and professional practice learning, including innovation through new opportunities and support for interdisciplinary or interdepartmental efforts.	• IM(h): Ensure every student graduates with a basic understanding of the importance and contributions of Indigenous peoples in Manitoba and Canada. • CP(a): Foster a greater understanding of Indigenous knowledge, cultures and traditions among students, faculty and staff. • BC(i): Enhance and support meaningful connections between faculties and units within the University. • BC(d): Develop a culture of leadership and teamwork among our students, staff and faculty through professional development programs. • FC(d): Enhance engagement, and build and strengthen relationships with Indigenous communities in urban, rural and northern settings.	Develop & deliver professional practice curricula • Develop & deliver professional practice courses required of all undergraduate Engineering students (ENG 2030, ENG 2040, ENG 3000, ENG 3020, ENG 4100, ENG 7010) • Develop and offer professional development opportunities to the Faculty of Engineering related to engineering professional skills in the curriculum. • Planned activity (underway): In collaboration with the Engineering Access Program (ENGAP) and other campus units, continue to develop knowledge and understanding of Indigenous Knowledge, perspectives, and design principles among faculty members (capacity-building) alongside developing resources to assist faculty members to integrate this into their individual courses and collaborate across courses. Develop & deliver design curricula: • Develop and support delivery of design courses across the Faculty (ENG 2022, CIVL 2830, MECH 2112, Capstone design in all departments, managing a fabrication lab space) • Host the NSERC Chair in Design Engineering and serve as a focus point for the Chair's efforts. • Oversee the IDEAS program which recruits industry-based projects for capstone design courses in all Departments. • Develop and offer professional development opportunities to the Faculty of Engineering related to engineering design in the curriculum. • Planned activity (underway): Develop a design spine of courses in each of the five undergraduate engineering programs.

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[2] IM – Inspiring Minds; DD&I – Driving Discover & Insight; CP – Creating Pathways; BC – Building Community; FC - Forging Connections

2014 Mission	2017 *Mission* & Goals	UManitoba Strategic Priorities[2]	How goals will be met:
To provide a support system whereby academics can both improve their skills as engineering educators and further the scholarship of engineering education and engineering practice.	*[…] drawing on the scholarship of teaching & learning in engineering […]* To develop opportunities for graduate-level study in engineering education in the Faculty of Engineering and produce rigorous engineering education research that drives the scholarship of engineering teaching & learning in Canada.	• DD&I(b): Foster meaningful and sustained collaborative research, scholarly work and other creative activities within the institution and with provincial, Canadian and global partners. • DD&I(d): Foster the inclusion of Indigenous perspectives in research, scholarly work and other creative activities. • BC(i): Enhance and support meaningful connections between faculties and units within the University.	Advance the scholarship of teaching and learning in engineering: • Host the Canadian Engineering Education Association (CEEA-ACEG) administrative office. • Develop and offer professional development opportunities to the Faculty of Engineering related to engineering pedagogy and engineering education research. • Planned activity (underway): Develop graduate courses in engineering education toward the advancement of a formal proposal for a graduate option in Engineering Education in the Faculty of Engineering. Although the Centre cannot deliver a stand-alone academic program, the Centre will create and shepherd the program proposal through the approvals process for a graduate specialization in engineering education in at least one Engineering Department.
	[…] and educational collaboration with industry partners. To nurture existing and grow new industry partnerships to enhance the undergraduate educational experience.	• FC(a): Establish, strengthen and support meaningful connections between the University community and key stakeholders.	Advance educational collaboration with industry partners: • Host and administer the Engineer-in-Residence program, including delivering technical electives led by Engineers-in-Residence (ENG 4110/ENG 7510, MECH 4322, MECH 4310). • Build and nurture relationships with multiple sector-specific liaison groups on behalf of the Faculty of Engineering. • Develop and offer professional development opportunities and events that engage industry partners with the Faculty.

Report of the Senate Committee on University Research Re: Proposal to Establish a Professorship in Diabetes Research

Preamble:

1. The terms of reference for the Senate Committee on University Research (SCUR) can be found at:
http://umanitoba.ca/admin/governance/governing_documents/governance/sen_committees/510.html

2. At its meeting on January 23, 2020, SCUR received for review, a proposal to establish a Professorship in Diabetes Research.

3. The University of Manitoba Policy for Chairs and Professorships specifies (section 2.14) "In the case of proposals for Chairs and Professorships that are primarily intended to enhance the University's research programs, the Senate Committee on University Research shall recommend to Senate."
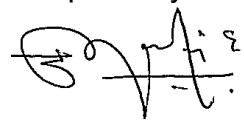
Observations:

1. The Rady Faculty of Health Sciences has proposed a Professorship in Diabetes Research.

2. The purpose of the Professorship is to "support a Clinician-Scientist for research in endocrinology" and to "provide leadership, scholarship, and mentorship in the area of diabetes research".

3. The Chair will be funded through the former Diabetes Foundation of Manitoba / John A. Moorhouse Fellowship, which will transition to the Professorship in Diabetes Research in the Endocrine Section of the Department of Internal Medicine.

Recommendation:

The Senate Committee on University Research recommends THAT: the Professorship in Diabetes Research be approved by Senate.

Respectfully submitted,

Digvir Jayas, Chair
Senate Committee on University Research.

> <u>Comments of the Senate Executive Committee</u>:
> The Senate Executive Committee endorses the Report to Senate.

University of Manitoba Office of Provost and Vice-President (Academic)

208 Administration Building
Winnipeg, Manitoba
Canada R3T 2N2
Telephone (204) 480-1408
Fax (204) 275-1160

Date: December 16, 2019

To: Digvir Jayas, Vice-President (Research and International)

From: Janice Ristock, Provost and Vice-President (Academic) *Janice Ristock*

Re: Proposal to Create a Professorship in Diabetes Research

On behalf of the Max Rady College of Medicine, Rady Faculty of Health Sciences, Dr. Brian Postl has submitted a proposal to create a Professorship in Diabetes Research. This Professorship aligns with the priorities of the College, the Faculty, and the University and will support research in the area of diabetes, with a focus on finding a cure and improving the healthcare of those suffering from diabetes and diseases related to diabetes.

The policy on Chairs and Professorships specifies that:

(1)   Professorships are established to advance the University's academic goals and objectives;

(2)   Professorships be funded by way of an endowment or through annual expendable gifts for at least five years, or by a combination of endowment and annual expendable gifts;

(3)   Professorships shall normally be attached to a department, faculty, school, college, centre or institute and the goals of the Professorship shall be consistent with that unit;

(4)   The establishment of a Professorship normally shall not be tied to the appointment of a particular person;

(5)   Individuals appointed to the Professorship shall normally have the academic qualifications commensurate with an appointment at the rank of Assistant Professor, Associate Professor, or Professor; and

(6)   The initial term of the appointment of the Professorship shall be 3 to 5 years, and if renewal is permitted, such renewal shall be subject to a successful performance review and the availability of funds.

The proposed Professorship satisfies the above requirements. Funding will be derived from an endowment from the Diabetes Foundation of Manitoba, which exceeds $1,000,000.

I support this proposal from the Rady Faculty of Health Sciences and request that you present it to the Senate Committee on University Research for consideration and recommendation to Senate and, in turn, the Board of Governors.

If you have any questions or concerns, I would be pleased to meet with you.

PROPOSAL TO ESTABLISH A
PROFESSORSHIP IN DIABETES RESEARCH
AT THE UNIVERSITY OF MANITOBA

EXECUTIVE SUMMARY:

In accordance with the procedures and mechanisms for establishing Chairs and Professorships at the University of Manitoba the following is presented:

TYPE OF APPOINTMENT: Professorship

AREA/NAME OF PROFESSORSHIP: Professorship in Diabetes Research (name subject to change should donor(s) request name recognition).

PURPOSE AND OBJECTIVES OF PROFESSORSHIP:

To support a Clinician-Scientist in the Endocrine Section, Department of Internal Medicine, Max Rady College of Medicine, Rady Faculty of Health Sciences, University of Manitoba, for research in endocrinology, and in particular diabetes research; with the goal to finding a cure and improving the healthcare of those suffering from diabetes and diseases related to diabetes.

The Professorship in Diabetes Research will provide leadership, scholarship, and mentorship in the area of diabetes care. Establishment of the Professorship will allow the Department of Internal Medicine, Max Rady College of Medicine to:
- promote translational, clinical, and epidemiologic research in areas relevant to diabetes care;
- recruit an early to mid-career Endocrinologist with demonstrated expertise in diabetes related research;
- establish and sustain intramural and extramural collaborations, to promote research at the University;
- enhance the University's competitiveness in national and international peer-reviewed competitions for funding for research relevant to diabetes care;
- provide mentorship and opportunities for trainees and new researchers who will pursue careers focused on areas relevant to diabetes;
- pursue research that will lead to improved health for individuals with diabetes and will ensure that high quality care is available for these individuals in Manitoba.

RELATIONSHIP TO THE PROPOSING UNIT

The Department of Internal Medicine in the Max Rady College of Medicine, Rady Faculty of Health Sciences houses the academic and research activity relating to adult endocrinology, diabetes and metabolism care.

The Department of Internal Medicine values research and the contribution it can make to our students, patients, community and the University – to the point where the Department has contributed more than $10 million over the past 15 years to various endowed Chairs and

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Professorships. The area of focus for the Professorship in Diabetes Research complements our existing chairs and professorships and continues to build on our strong research focus specifically in the area of endocrinology, diabetes and metabolism research.

THE METHOD BY WHICH THE PROFESSORSHIP WILL BE FUNDED:

The Diabetes Foundation of Manitoba was established in 1984 by Dr John A. Moorhouse to further research in the field of Diabetes. The University of Manitoba received $475,000 on September 3, 2008, from the Diabetes Foundation of Manitoba to establish the Diabetes Foundation of Manitoba/ John A. Moorhouse Fellowship. A further $50,000 was received in September, 2009 and $150,000 was received in September, 2010.

At present the Diabetes Foundation of Manitoba no longer exists, Dr. Moorhouse has since passed, and the value of the endowment exceeds the $1,000,0000 required to establish a Professorship. The University of Manitoba in discussions with Dr. Moorhouse's surviving relatives has been approved to transition the endowment from a Fellowship to a Professorship in Diabetes Research in the Endocrine Section of the Department of Internal Medicine (Dr. Moorhouse's home Department when he was a faculty member of the University of Manitoba).

The Professorship will fund at least 20% of the salary plus research support.

GENERAL AND SPECIFIC REQUIREMENTS FOR THE PROFESSORSHIP

In accordance with the policy and procedures for establishing chairs at the University of Manitoba, individuals appointed to the Professorship shall have the following qualifications:

- Canadian Citizen or permanent resident;
- M.D. (Royal College certified in Internal Medicine and Endocrinology);
- Holding a current academic appointment at the rank of Assistant, Associate or Full Professor;
- History of excellence in research as evidenced in high quality research output, successful and promising research projects and programs, and significant contributions to the academic and clinical community at the local, national and/or international level;
- History of mentoring junior colleagues and investigators;
- History of effective and productive collaboration with intramural and extramural investigators and institutions.

TERM OF APPOINTMENT:

- The term of the appointment will be for five years.
- The renewal of the appointment for additional terms, conditional upon available funds, will occur in the final year of the term subject to a successful review of the incumbent's performance within the context of the Department of Internal Medicine's Research Review policy; the process of review will be initiated and coordinated by the Head of the Department of Internal Medicine.

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- The initial term of the appointment will be for five years, with no limit predetermined for the Professorship;
- The incumbent will provide an annual progress report in accordance with the University Policy on Chairs and Professorships. In addition to the reporting requirements stipulated in this policy, the incumbent shall provide an annual report of teaching and research activities to the Dean of the Max Rady College of Medicine and the Head of the Department of Internal Medicine. In turn, the Dean shall provide a copy of the said report to individuals that have specifically requested this information, or it may be used for reporting to donors in university communications.
- Consistent with the Department of Internal Medicine policies, the incumbent will participate in a research review by the department's Research and Faculty Development Committee, chaired by the Department's Associate Head – Research in year two.

A successful performance review will provide evidence of the following:

Program of Research, Scholarly Work and Creative Activities
The Professorship holder is developing or has an established program either individually and/or as a team. There is evidence of leadership.

Knowledge Generation/Communication
1. **Publications** – There is evidence of sustained dissemination of new knowledge that is directed towards the academic and/or healthcare community.
2. **Presentations** – There is evidence of communication of research findings to the academic, professional, or stakeholder community on a regular basis.

Funding
1. **Operating** – There is evidence that the Professorship holder plays a leading role in successful applications to competitive funding organizations individually or as a member of a team.
2. **Student Funding** – The Professorship holder is expected to assist research trainees under their supervision with funding applications.

Student Supervision
The Professorship holder is expected to be involved in successful supervision of research trainees.

OTHER PROVISIONS:

1) The selection and appointment of an individual to the proposed Professorship shall be conducted in accordance with the University Policy and Procedures on Chairs and Professorships.
2) The duties and responsibilities of the individual appointed to the proposed Professorship will be in accordance with the University Policy and Procedures on Chairs and Professorships.
3) The incumbent will acknowledge that she or he holds the Professorship at the University of Manitoba in all publications, lectures, and any other activity supported by the fund.

3

4) The incumbent may have a cross appointment to an applicable Department for the purpose of graduate training. The incumbent will participate in an appropriate amount of teaching activity, including for undergraduate and post-graduate trainees and graduate students, where appropriate.

Report of the Executive Committee of the Faculty of Graduate Studies on Course and Curriculum Changes

<u>**Preamble**</u>

1.   The Faculty of Graduate Studies (FGS) has responsibility for all matters relating to the submission of graduate course, curriculum, program and regulation changes. Recommendations for such are submitted by the Faculty Council of Graduate Studies for the approval of Senate.

2.   In October 2007, the Faculty of Graduate Studies approved a process of *Streamlining Course Introductions, Modifications, & Deletions* which allows the Executive Committee to approve these changes in lieu of Faculty Council when the courses are not associated with a new program or program stream changes.

3.   The Faculty of Graduate Studies Executive Committee met on the above date to consider a proposal from the Faculty of Education.

<u>**Observations**</u>

1.   The **Faculty of Education** M.Ed. program proposes the deletion of two (2) courses, EDUA 7600 and EDUA 7650, the introduction of two (2) courses, EDUA 7602 and EDUA 7652, and the modification of three (3) courses, EDUA 7610, EDUA 7630, and EDUB 7500. The minor curricular changes primarily entail updating the words "special education" to "inclusive education" or "inclusion" as preferred by the inclusive education area group in Educational Administration, Foundations & Psychology. Other changes involve updates to pre-requisites.

<u>Course Deletions</u>

EDUA 7600 Seminar in Inclusive Special Education   **-3**

EDUA 7650 Field Experience in Inclusive Special Education   **-3**

<u>Course Introductions</u>

EDUA 7602 Seminar in Inclusive Education   **+3**

A forum for the discussion of topics related to inclusive educational issues. The overall goal of the course is to challenge students thinking about inclusive education, reflect on their own practices in light of the topics covered in class, and to encourage growth in their inclusive pedagogic practices. Opportunities will be provided for students to examine issues related to their particular professional and scholarly needs.

EDUA 7652 Field Experience in Inclusive Education   **+3**

A minimum of 200 hours of supervised placement in an inclusive education setting. Scheduled seminars

facilitate directed study and discussion.

Course Modifications

EDUA 7610 Behavioural Issues in Educational Settings **3**

This course is designed to give teachers and school counsellors the necessary theoretical background as well as the practical tools to implement programs for children in conflict. Not to be held with EDUA 7611. Pre- or co-requisite: EDUA 5602 (or the former EDUA 5600) or EDUA 5601 or EDUA 5680 or EDUA 5681 (C+).

EDUA 7630 Advanced Assessment and Instruction in Inclusive Education **3**

This advanced-level course addresses diagnostic/prescriptive techniques used to ameliorate learning and behavioural problems in inclusive education. Emphasis is on the development and analysis of related instructional delivery systems. Pre- or co-requisite: EDUA 5632 (or the former EDUA 5630) or EDUA 5631 (C+).

EDUB 7500 Seminar in Science Education **3**

A review of current research in science education, and critical appraisal of current curriculum, pedagogy, and learning developments in science education.

NET CREDIT HOUR CHANGE **0**

Recommendations

The Executive Committee recommends THAT: the course changes from the unit(s) listed below be approved by Senate:

Faculty of Education

Respectfully submitted,

Dr. Louise Simard, Chair
Faculty of Graduate Studies Executive Committee

/ak

Comments of the Senate Executive Committee:
The Senate Executive Committee endorses the
Report to Senate.

Faculty of Graduate Studies Regulation 2019/20	Supplemental Regulation
- Course-based; - Comprehensive Exam; - Project; - Accredited Professional.	- Cross-Cultural, Sociological and Philosophical Foundations in Education Counselling Psychology - Inclusive Education
4.2 Diploma Programs The regulations for the Master's program shall also prevail for diploma programs. All students should consult the department/unit supplemental regulations regarding diploma programs.	
4.3 Admission **4.3.1 General Criteria** Students who are eligible to be considered for direct admission to a program of study leading to the Master's degree include: - Graduates of four (4)-year undergraduate degree programs (or equivalent as deemed by the Faculty of Graduate Studies) from: - Canadian institutions empowered by law to grant degrees; or - Colleges and universities outside Canada which are officially recognized by the Faculty of Graduate Studies. - Graduates from first-cycle Bologna compliant degrees. - Students who have completed a Pre-Master's program from: - The University of Manitoba; or - Canadian institutions empowered by law to grant degrees; or - Colleges and universities outside Canada which are officially recognized by The Faculty of Graduate Studies. All students applying for a Master's degree program must have attained a minimum GPA of 3.0 in the last two (2) full years (60 credit hours) of study. This includes those applying for direct admission and those entering from a Pre-Master's program. Students who meet the minimum requirements for admission to the Faculty of Graduate Studies are not guaranteed admission. **Note:** This is the minimum requirement of the Faculty of Graduate Studies and departments/units may have higher standards and additional criteria.	**Applicants must possess:** - a four-year Bachelor of Education degree, or two-year After Degree Bachelor of Education, or a four-year bachelor's degree (or academically equivalent degree/program) from an academic institution recognized by the Faculty of Graduate Studies, or a three-year undergraduate degree, plus a Post Baccalaureate Diploma in Education (PBDE) with a minimum of eighteen (18) credit hours at the 5000 level. - A grade point average of 3.0 in the last sixty (60) credit hours of university coursework; - Normally two years of relevant work experience; and - Appropriate academic and/or professional background for the program area and concentration. Individuals who graduate from the Certificate in Adult and Continuing Education (CACE), University of Manitoba, must complete the following courses: - EDUA 1560 Adult Learning and Development (3 credit hours); - EDUA 1570 Foundations of Adult Education (3 credit hours); - EDUA 1580 Program Planning in Adult Education (3 credit hours); - EDUA 1590 Facilitating Adult Education (3 credit hours); - plus an additional one hundred (100) hours of elective credit through courses, seminars, and workshops. The Faculty of Graduate Studies recognizes a complete CACE program as fifteen (15) credit hours towards the admission requirements for the M.Ed.; that is, giving twelve (12) credit hours for the four core courses completed with a grade of 'B' or better and three (3) credit hours (non-assessable) for the one hundred (100) hours of elective study.

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	Individuals with a three-year undergraduate degree and the four courses listed above (EDUA 1560, EDUA 1570, EDUA 1580 and EDUA 1590) must complete an additional 12 credit hours of senior level courses (i.e.: 5000 level PBDE courses, 1000 or 2000 level B.Ed. courses, or courses at the 3000 level or above in other faculties) to have the 24 credit hours that are the minimal requirements for satisfying the "honours degree or equivalent" admission requirement. Those with the completed CACE require an additional nine (9) credit hours of senior level courses. **Pre-requisite Coursework:** The following program areas require pre-requisite coursework that must be completed prior to the start of the M.Ed. program (may be taken in the Post-Baccalaureate Diploma in Education (PBDE) program of the Faculty of Education, or its equivalent). *Counselling Psychology:* A minimum of nine (9) credit hours of university coursework at the 5000 level consisting of (or their equivalent): • EDUA 5480 Counseling Skills (3 credit hours); • EDUA 5500 Theories and Issues in School Counseling (3 credit hours); • EDUA 5540 Groups in Guidance (3 credit hours). *Inclusive Education:* A minimum of eighteen (18) credit hours of university level coursework at the 5000 level or equivalent with a GPA of 3.0 (B) or better, consisting of: • EDUA 5602̶0̶ Introduction to Inclusive ~~Special~~ Education (6 credit hours); • EDUA 5632̶0̶ Assessment and Instruction in Inclusive ~~Special~~ Education (6 credit hours); And; 6 credit hours from: o EDUA 5612̶0̶ Field Experience in Inclusive ~~S~~Education (6 credit hours)

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	o EDUA 5620 Teaching Children through Alternative and Augmented Communication (3 credit hours) o EDUA 564~~20~~ I~~S~~E: <u>Transition from School to Adult Life</u>~~Early and Middle Years~~ (3~~6~~ credit hours) ~~o EDUA 5650 ISE: High School and Transition to Adult Life (3 credit hours)~~ o EDUA 5660 Organization and Delivery of Resource Program and Support Services (3 credit hours) ~~o EDUA 5670 Strategies for Organizing Inclusive Classrooms and Schools (3 credit hours)~~ o EDUA 5680 Promoting Responsible Behaviour in Educational Settings (3 credit hours) o EDUA 573/4 Recent Developments in Educational Psychology (3 credit hours) [NB. Where content is specific to ISE.] o Or equivalent courses from other universities.
4.3.2 Pre-Master's Programs In specific cases where the academic background of the student is judged to be insufficient for the given program in a department/unit, the department/unit may recommend that the student be admitted to a Pre-Master's program of study (Section 3). The Pre-Master's program of study is intended to bring a student's background up to the equivalent of the required 4-year degree in the major department/unit, and to provide the student with any necessary prerequisites for courses to be taken in the Master's program.	
4.4 Program Requirements In general, students must complete one of the programs of study described below for the Master's degree. However, the program of study is determined by the department/unit and may follow the department/unit's supplemental regulations. Any single course cannot be used for credit toward more than one program.	
4.4.1 Thesis/Practicum Route A minimum of twelve (12) credit hours of coursework, unless otherwise stated in the department/unit's supplemental regulations, plus a thesis or practicum is required.	**The Coursework and Thesis Route (Thesis-Based):** Typically students complete a set of *core* courses,

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The minimum must include at least six (6) credit hours at the 7000 level or above, with the balance of the coursework at the 3000 level or above. A maximum of twenty-four (24) credit hours of coursework is allowed unless the department/unit's supplemental regulations indicate otherwise. The student must complete the thesis/practicum at The University of Manitoba.	*research* courses, and some courses that, along with the thesis constitute a *concentration*. *Coursework:* All programs consist of a minimum of eighteen (18) credit hours of coursework. At least twelve (12) credit hours must be at the 7000 level or equivalent. The remaining six (6) credit hours may be at the 5000 level or above in the Faculty of Education, and/or at the 3000 level or above in other Faculties. *Required Research Courses:* • EDUA 5800 Introduction to Educational Research (3 credit hours), or its equivalent, is a requirement of all M.Ed. programs in the Faculty of Education. • In addition, thesis students must take three (3) credit hours of research methods at the 7000 level. In special circumstances research courses at the 3000 level or above in other Faculties may be approved as an appropriate alternative to this requirement. *Specific Course Requirements:* In addition to the two three (3) credit hour research courses, specific course requirements for each program area/specialization are as follows: Adult and Post-Secondary Education *Core Courses:* • EDUA 7402 Development of Adult and Post-Secondary Education (institutional) (3 credit hours); • EDUA 7404 Lifelong Learning in Educational Settings (3 credit hours). *Concentration:* Students select six (6) credit hours of coursework from EDUA 7406, EDUA 7412, EDUA 7414, EDUB 7416, EDUA 7420, EDUA 7810, EDUB 7390, EDUB 7420, EDUB 7430, EDUB 7450, EDUB 7460, EDUB 7560, or other courses approved by the advisor and department head. Counselling Psychology *Core Courses:* • EDUA 7520 Practicum Seminar in Counseling (6 credit hours). *A 3-hour weekly seminar offered over fall and winter terms taken concurrently with a minimum of 180 hours of supervised practicum experience in a selected placement. Students are required to be available September to April during the day for a minimum of one to one-and-a-half days per week for the practicum component; • EDUA 7550 Theories in Counseling (3 credit hours). *Concentration:*

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	Students select three (3) credit hours from, EDUA 7510, EDUA 7530, EDUA 7540, EDUA 7750, EDUA 7760 or other courses approved by the program advisor and department head. Cross-Cultural, Sociological and Philosophical Foundations in Education *Core Courses:* Six credit hours of coursework selected from EDUA 7200, EDUA 7210, EDUA 7270. *Concentration:* Students select six (6) credit hours from EDUA 7230, EDUA 7240, EDUA 7250, EDUA 7270, EDUA 7280, EDUA 7300, EDUA 7340, or other courses selected from the Curriculum, Teaching and Learning Department, the Faculty of Arts at the University of Manitoba or other universities, and approved by the advisor and department head. Educational Administration *Core Courses:* • EDUA 7010 Educational Administration as a Field of Study and Practice (3 Credit hours); • EDUA 7050 Theoretical Perspectives in Educational Administration (3 credit hours) *Concentration:* Students select six (6) credit hours of coursework in consultation with the advisor, at least 3 credit hours of which must be at the 7000 level. The courses are normally selected from EDUA 5040, EDUA 5100, EDUA 7020, EDUA 7030, EDUA 7040, EDUA 7060, EDUA 7070, or other courses approved by the advisor and department head. Inclusive Education *Core Courses:* • EDUA 7602~~0~~ Seminar in Inclusive ~~Special~~ Education (6 credit hours). *Concentration:* Students select six (6) credit hours, with a minimum of 3 credit hours at the 7000 level, from EDUA 7610, EDUA 7630, EDUA 765~~20~~, EDUA 7740, EDUA 7750, EDUA 561~~20~~, EDUA 5620, EDUA 564~~20~~, ~~EDUA 5650,~~ EDUA 5660, ~~EDUA 5670,~~ EDUA 5680, or other courses approved by the advisor and department head.
4.4.2 Course-based/Comprehensive Examination Route A minimum of twenty-four (24) credit hours of coursework and comprehensive examination(s) is required. The minimum must include at least eighteen (18) credit hours at the 7000 level or above with the balance of the coursework at the 3000 level	**Coursework and Comprehensive Examination Route (Course-Based)** This program route consists of four elements:

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or above. A maximum of forty-eight (48) credit hours of coursework is allowed unless a department/unit's supplemental regulations indicate otherwise.	1. *core* (or specific required) courses; 2. *concentration* (or courses related closely to the core); 3. a *research methods* course; and 4. approved *elective* courses.

The culminating activity is a comprehensive examination.

Coursework:
The coursework and comprehensive examination route to the M.Ed. in the Department of Educational Administration, Foundations and Psychology involves a minimum of thirty (30) credit hours of approved courses. At least eighteen (18) credit hours must be at the 7000 level; the remaining twelve (12) credits may be at the 5000 level or above in the Faculty of Education and/or at the 3000 level or above in other Faculties.

Required Research Course:
EDUA 5800 *Introduction to Educational Research* (3 credit hours), or equivalent, is a requirement of all M.Ed. programs in the department.

Specific course requirements for each program area/specialization are as follows:

Adult and Post-Secondary Education
Core Courses:
• EDUA 7402 Development of Adult and Post-Secondary Education (institutional) (3 credit hours*);*
• EDUA 7404 Lifelong Learning in Educational Settings (3 credit hours); and
• EDUA 7408 Seminar in Adult and Post-Secondary Education (3 credit hours)

Concentration:
Students select nine (9) credit hours of coursework from EDUA 7406, EDUA 7412, EDUA 7414, EDUB 7416, EDUA 7420, EDUA 7810, EDUB 7390, EDUB 7420, EDUB 7430, EDUB 7450, EDUB 7460, EDUB 7560, or other courses approved by the advisor and department head.

Electives:
Students are required to take nine (*9)* credit hours of approved elective courses.

Counselling Psychology
Core Courses:
• EDUA 7520 Practicum Seminar in Counseling (6 *credit hours*). *A 3-hour weekly seminar offered over fall and winter terms taken concurrently with a minimum of 180 hours of supervised practicum experience in a selected placement. Students are required to be available September to April during the day for

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	a minimum of one to one-and-a-half days per week for the practicum component; and
	• EDUA 7550 Theories in Counseling (3 *credit hours*)
	
	Concentration:
	Students select eighteen (18) credit hours from EDUA 7510, EDUA 7530, EDUA 7540, EDUA 7750, EDUA 7760 or other courses, such as 5000 level Guidance and Counseling courses or courses from other Faculties, approved by the program advisor and department head.
	
	Cross Cultural, Sociological, and Philosophical Foundations in Education
	Core Courses:
	• EDUA 7200 Philosophy of Education (3 *credit hours);*
	• EDUA 7210 Educational Sociology (3 *credit hours);*
	• EDUA 7270 Seminar in Cross Cultural (3 *credit hours); and*
	• Education 1 (3 credit hours)
	
	Concentration:
	Students select eighteen (18) credit hours from EDUA 7230 Social Criticism in Education (3 *credit hours)*, EDUA 7240 Values in Education (3 *credit hours)*, EDUA 7250 Comparative Education (3 *credit hours)*, EDUA 7280 Seminar in Cross Cultural Education 2 (3 *credit hours)*, EDUA 7300 History of Canadian Education since 1867 (3 *credit hours)*, EDUA 7340 Seminar in Educational Thought (3 *credit hours)*, or other courses selected from the Department of Curriculum, Teaching and Learning, Faculty of Arts at the University of Manitoba, or elsewhere, and approved by the program advisor and the department head.
	
	Educational Administration
	Core Courses:
	• EDUA 7010 Educational Administration as a Field of Study and Practice (3 credit hours*);*
	• EDUA 7050 Theoretical Perspectives in Educational Administration (3 credit hours*);*
	  and one of:
	   o EDUA 7200 Philosophy of Education (3 credit hours)
	   o EDUA 7210 Education Sociology (3 credit hours)
	   o EDUA 7270 Seminar in Cross Cultural Education 1 (3 credit hours).
	
	Concentration:
	Students select twelve (12) credit hours of coursework in consultation with the advisor. The courses are normally selected from EDUA 5040, EDUA 5100, EDUA 7020, EDUA 7030, EDUA 7040, EDUA 7060, EDUA 7070, or other courses approved by the program advisor and department

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	head. *Electives:* Students are required to take six (*6)* credit hours of approved elective courses. <u>Inclusive Education</u> *Core Courses:* EDUA 760~~20~~ Seminar in Inclusive ~~Special~~ Education (6 *credit hours*) *Concentration:* Students select twenty one (21) credit hours with a minimum of (12) credit hours at the 7000 level from EDUA 7610, EDUA 7630, EDUA 765~~20~~, EDUA 7740, EDUA 7750, EDUA 561~~20~~, EDUA 5620, EDUA 564~~20~~, ~~EDUA 5650,~~ EDUA 5660, ~~EDUA 5670,~~ EDUA 5680, or other courses approved by the program advisor and department head. **Please note that all of the courses listed in the concentration are not regularly offered by the department. Check the future graduate course offerings posted on the Faculty website http://wwwapps.cc.umanitoba.ca/faculties/education/grad/rotation/**
4.4.3 Accredited Professional Route The credit hours and course requirements shall reflect the requirements of the department/unit's external accrediting body.	
4.4.4 Language Reading Requirements Some department/units specify a language requirement for the Master's degree. Students should check department/unit supplemental regulations regarding this requirement.	None required.
4.4.5 Advanced Credit Advance credit for courses completed prior to admission to a Master's program will be considered on a case-by-case basis. The student's department/unit must make a request to the Faculty of Graduate Studies by completing the "Advance Credit-Transfer of Courses" form (http://umanitoba.ca/faculties/graduate_studies/forms/index.html). • Application for advance credit must be made within the first year of the program (see section 4.7.2 Lapse of Credit of Courses) • No more than 50% of the required coursework for the program can be achieved using advance credit. • A course may not be used for credit toward more than one (1) degree, diploma, or certificate. • The student must register at The University of Manitoba for at least two (2) terms within a single academic year and must also complete the thesis/practicum/project/comprehensive exam at The University of Manitoba.	The granting of advanced credit is subject to the regulations of the Faculty of Graduate Studies and to the approval of the Department Head.

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Report of the Executive Committee of the Faculty of Graduate Studies on Course and Curriculum Changes

<u>**Preamble**</u>

1. The Faculty of Graduate Studies (FGS) has responsibility for all matters relating to the submission of graduate course, curriculum, program and regulation changes. Recommendations for such are submitted by the Faculty Council of Graduate Studies for the approval of Senate.

2. In October 2007, the Faculty of Graduate Studies approved a process of *Streamlining Course Introductions, Modifications, & Deletions* which allows the Executive Committee to approve these changes in lieu of Faculty Council when the courses are not associated with a new program or program stream changes.

3. The Faculty of Graduate Studies Executive Committee met on the above date to consider a proposal from the Dept. of Occupational Therapy.

<u>**Observations**</u>

1. The **College of Rehabilitation Sciences (M.OT.)** proposes the deletion of five (5) courses, OT 6120, OT 6140, OT 6350, OT 7540, and OT 7740, the introduction of five (5) courses, OT 6122, OT 6142, OT 6352, OT 7542, and OT 7742, and the modification of one (1) course, OT 6110. The MOT curriculum committee and the Occupational Therapy faculty request these curricular changes to ensure that course names and descriptions accurately reflect the content delivered in the MOT program.

Course Deletions

OT 6120 Health and Disability   **-3**

OT 6140 Enabling and Professional Development Skills   **-7**

OT 6350 Research Methods for Evidence-based Practice   **-4**

OT 7540 Advanced Enabling and Professional Development Skills 1   **-4**

OT 7740 Advanced Enabling and Professional Development Skills 2   **-4**

Course Introductions

OT 6122 Foundations of Health and Well-being   **+3**

This course explores foundational knowledge in topics essential for understanding the concepts of and influences on health and well-being. Students engage in theory based and practical activities to understand models of disability, concepts of health, social determinants of health, cultural competence and safety, power and privilege.

OT 6142 Professionalism and Enabling Occupation   **+7**

This course introduces the principles of professionalism and therapeutic strategies to promote enabling occupations, collaborative partnerships and client-centred practice. Guided by professional documents, emphasis is placed on reflective practice, communication, and ethical and legal dimensions of practice.

OT 6352 Foundations of Evidence-informed Occupational Therapy   +4

Students are introduced to research principles and methods used to support evidence-informed occupational therapy. Students learn to critically appraise qualitative and quantitative research to answer clinical questions and apply evidence to occupational therapy.

OT 7542 Professionalism & Leadership in Enabling Occupation 1   +4

Building on the Professionalism and Enabling Occupation course, emphasis is placed on leadership using a client-centred, culturally safe and equity based approach. Integrated topics are addressed: advanced communication skills; leadership in practice and in the profession; and program development and evaluation.

OT 7742 Professionalism & Leadership in Enabling Occupation 2   +4

This course builds upon previous Professionalism courses and emphasizes leadership in practice using a client-centred, culturally safe and equity based approach. Integrated sections are addressed: Leadership in Program Development and Evaluation, Client-centred Practice in Macro Environments, Leadership in Team Knowledge Translation, and Transition to Practice.

Course Modifications

OT 6110 Fundamentals of Occupational Therapy   3

Students study the foundational values and beliefs of occupational therapy, the fundamentals of occupational therapy theory, and the relationship between occupation, health and well-being. Processes and approaches that guide practice with clients of various ages and in a variety of settings are introduced.

NET CREDIT HOUR CHANGE   0

Recommendations

The Executive Committee recommends THAT: the course changes from the unit(s) listed below be approved by Senate:

Dept. of Occupational Therapy

Respectfully submitted,

Comments of the Senate Executive Committee:
The Senate Executive Committee endorses the Report to Senate.

Dr. Louise Simard, Chair
Faculty of Graduate Studies Executive Committee

/ak

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4.4.1 Thesis/Practicum Route A minimum of twelve (12) credit hours of coursework, unless otherwise stated in the department/unit's supplemental regulations, plus a thesis or practicum is required. The minimum must include at least six (6) credit hours at the 7000 level or above, with the balance of the coursework at the 3000 level or above. A maximum of twenty-four (24) credit hours of coursework is allowed unless the department/unit's supplemental regulations indicate otherwise. The student must complete the thesis/practicum at The University of Manitoba.	Not applicable for MOT program.
4.4.2 Course-based/Comprehensive Examination Route A minimum of twenty-four (24) credit hours of coursework and comprehensive examination(s) is required. The minimum must include at least eighteen (18) credit hours at the 7000 level or above with the balance of the coursework at the 3000 level or above. A maximum of forty-eight (48) credit hours of coursework is allowed unless a department/unit's supplemental regulations indicate otherwise.	Regular Program ➢ minimum of two calendar years of course work and fieldwork experience (107 credit hours)** ➢ preparation of a professional portfolio **Required courses: Year 1 OT 6100 Human Determinants of Occupational Performance - 6 cr OT 6110 ~~Theoretical and Philosophical Foundations of Occupational Therapy~~Fundamentals of Occupational Therapy Theory - 3 cr OT ~~6120~~ 6122 ~~Health and Disability~~Foundations of Health and Well-being - 3 cr OT 6130 Occupational Therapy Practice Skills 1 - 3 cr OT ~~6140~~ 6142 ~~Enabling and Professional Development Skills~~Professionalism and Enabling Occupation - 7 cr OT 6190 Fieldwork Preparation – 1 cr OT 6200 Basic Fieldwork - 4 cr OT 6300 Analysis of Occupation - 4 cr OT 6310 The Environment and Occupational Performance - 4 cr OT 6320 Health Conditions and Occupational Performance - 4 cr OT 6330 Occupational Therapy Practice Skills 2 - 4 cr OT ~~6350~~ 6352 ~~Research Methods for Evidence Based Practice~~Foundations of Evidence-informed Occupational Therapy - 4 cr OT 6400 Intermediate Fieldwork 1 - 8 cr Year 2 OT ~~7540~~ 7542 ~~Advanced Enabling and Professional Development Skills 1~~Professionalism & Leadership in Enabling Occupation 1 - 4 cr OT 7560 Occupational Therapy Process 1 - 6 cr OT 7572 Occupational Therapy Practice Skills 3 - 6 cr OT 7600 Intermediate Fieldwork 2 - 8 cr OT ~~7740~~ 7742 ~~Advanced Enabling and Professional Development Skills 2~~Professionalism & Leadership in Enabling Occupation 2 - 4 cr OT 7752 Critical Inquiry Research Project - 6 cr OT 7760 Occupational Therapy Process 2 - 6 cr OT 7772 Occupational Therapy Practice Skills 4 - 6 cr OT 7800 Advanced Fieldwork - 6 cr Accelerated Program 12 credit hours of academic course work from the MOT program or equivalent. Six of these credit hours are to be OT 7752 Critical Inquiry Research Project or equivalent.
4.4.3 Accredited Professional Route	

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Report of the Executive Committee of the Faculty of Graduate Studies on Course and Curriculum Changes

Preamble

1. The Faculty of Graduate Studies (FGS) has responsibility for all matters relating to the submission of graduate course, curriculum, program and regulation changes. Recommendations for such are submitted by the Faculty Council of Graduate Studies for the approval of Senate.

2. In October 2007, the Faculty of Graduate Studies approved a process of *Streamlining Course Introductions, Modifications, & Deletions* which allows the Executive Committee to approve these changes in lieu of Faculty Council when the courses are not associated with a new program or program stream changes.

3. The Faculty of Graduate Studies Executive Committee met on the above date to consider a proposal from the Dept. of Psychology.

Observations

1. The **Dept. of Psychology** proposes the introduction of one (1) course, PSYC 7082, to meet a number of needs at the University of Manitoba, none of which were currently being met by courses offered in the department, nor similar areas, such as Social Work or Education. In particular, this course is needed to fulfill the Canadian Psychological Association accreditation requirement for a course in social psychology for the accredited Clinical Psychology doctoral program. Moreover, it was needed to ensure these students had formal training in working with more complex systems. This course is also intended to provide school psychology students with formal training in therapy. The department has consulted with its colleagues in outside departments, as well as the libraries, all of whom support the proposal.

Course Introduction

PSYC 7082 Intervening with Children and Social Systems   **+3**

Examines psychotherapy with social systems, including children, families, and groups. A lifespan perspective will be employed. Diversity issues within each relevant social grouping will be highlighted. Restricted to students in clinical or school psychology.

NET CREDIT HOUR CHANGE   +3

Recommendations

The Executive Committee recommends THAT: the course change(s) from the unit(s) listed below be approved by Senate:

Dept. of Psychology

Respectfully submitted,

Dr. Louise Simard, Chair
Faculty of Graduate Studies Executive Committee

/ak

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required if two or more committee members are in a personal relationship. The advisor/co-advisor is the Chair of the advisory committee. Advisory committee meetings must be held at least annually, and are not intended to take the place of meetings between the student and advisor/co-advisor which should occur with much greater frequency than the advisory committee meetings.	The Advisory Committee must be fully constituted no later than January 31 of the first Ph.D. year.

5.3 Program of Study

As soon as possible, but no later than 24 months after a student has commenced their program, the student's program of study should be registered with the Faculty of Graduate Studies on the "Program of Study and Appointment of Advisory Committee" form (http://umanitoba.ca/faculties/graduate_studies/forms/index.html) and should include:

- information about the minimum or expected time for completion of the degree;
- coursework to be taken along with course classification ("S", "X", "A" or "O");
- any foreign language requirement;
- the research area in which the thesis will be written.

The approval of the student's advisor/co-advisor and the Head of the department/unit are sufficient for registration. The program of study, including withdrawal from individual courses and any subsequent changes, must be approved by the student's advisor/co-advisor, the advisory committee, and the Head of the department/unit. Withdrawal from courses or changes of course category without such approval may result in the student being required to withdraw from the Faculty of Graduate Studies.

5.4 Program Requirements

All students must complete one of the following programs of study for the Ph.D. degree, unless otherwise specified in the approved department/unit supplemental regulations:

- Where admission to the Ph.D. is directly from a Master's degree, a <u>minimum</u> of 12 credit hours at the 7000 level or higher plus a thesis is required. Any further coursework beyond the minimum 12 credit hours at the 7000 level must be at the 3000 level or above. For those students who hold a Master's degree, a maximum of 24 credit hours of coursework is allowed toward the Ph.D. program.*
- Where admission to the Ph.D. is directly from an Honours Bachelor degree or equivalent, a <u>minimum</u> of 24 credit hours plus a thesis is required. The coursework must include a <u>minimum</u> of 18 credit hours at the 7000 level or higher with the balance of the coursework at the 3000 level or higher. For those students who do not hold a Master's degree, a maximum of 48 credit hours of coursework is allowed toward the Ph.D. program.*

*Unless professional accreditation requirements and/or the department/unit's supplemental regulations indicate otherwise.

Supplemental Regulation for 5.4:

PhD Program

Students in Applied Behaviour Analysis (ABA), Brain and Cognitive Sciences, Developmental Psychology and Social/Personality Psychology are required to complete:

- Major - Two half-courses at the 7000 level or above in psychology; (6 credit hours).Ancillary - One half course; (3 credit hours). If the ancillary is taken in psychology, the course must be at the 7000 level or above and must be in an area clearly apart from the major. The Head or designate may request a written rationale from the Advisor justifying the distinctiveness from the major of a student's proposed ancillary. If the ancillary is taken outside of psychology, the course will normally be at the 4000 level or above. No course taken during the student's undergraduate program may be applied toward this requirement. If a course below the 7000 level is taken to satisfy the ancillary requirement, another course at the 7000 level or higher will be needed in order to meet a separate

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	requirement by the Faculty of Graduate Studies to include a minimum of 12 credit hours at the 7000 level or higher to complete a Ph.D. program of study. • One half course (3 credit hours) in research design research methodology, or quantitative methods over and above the basic statistics requirement in the M.A. program. The head or designate may request a written rationale from the Advisor justifying the extent to which the course chosen will satisfy this requirement. The course taken to satisfy this requirement may not count for any of the courses in a) or b), above. • All PhD students are required to complete PSYC 7790 PhD Proposal Development (0 credit hours). Students will be required to pass the course in any one of their first eight terms of full-time study in the program (including the summer session). This course will normally be supervised by the Advisor. **Quantitative students are required to complete:** • at least 2 half courses (3 credit hours each) in research methods/design and/or quantitative methods • at least one ancillary half course (3 credit hours) that does not have a focus in quantitative research methods or design. • The remaining half course (3 credit hours) will be coursework taken within the psychology department at the 7000 level or higher, and will provide the student with additional breadth in psychology and depth in their research area of interest. This courses may or may not have a specifically quantitative or methodology focus. **Clinical psychology students are required to take the following courses:** Cognitive and Behaviour Therapy PSYC 8430 (3) Social and Community Intervention PSYC 8100 (3) Social Bases of Behaviour Elective 3 : Intervening with Children and Social Systems PSYC 7082 (3) OR Social Psychology and Health PSYC 7190 (3) OR Person X Situation Interactionism PSYC 7620 (3) OR Alternative approved by the Director of Clinical Training & Associate Head (Graduate) Program Evaluation & Consultation PSYC 8110 (3) (strongly recommended) OR School Psychology Research Design and Program Evaluation PSYC 7130 (3) If approved by DCT & Associate Head (Graduate) PSC Practicum III PSYC 7930 (0) Senior Practicum 4 PSYC 7940 (0)

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	Case Conceptualization and Communication 3 PSYC 8080 (3) Ph.D. Thesis Proposal and Development PSYC 7790 (0) Doctoral Ancillary: History and Systems of Psychology PSYC 7280 (3) Cognitive-Affective Bases Elective Cognitive Development PSYC 7330 (3) OR Alternative approved by the Director of Clinical Training & Associate Head (Graduate) Senior Practicum PSYC 7950 (0) Senior Practicum PSYC 7952 (0) Clinical Supervision in Psychology PSYC 8090 (3) Optional Senior Practicum PSYC 7954 (0) Optional Senior Practicum PSYC 7956 (0) Internship PSYC 7980 (0) In addition, the following provisos regarding clinical students' coursework apply: • Students may take an optional elective course at any point in their graduate program under the advisement of their advisor and/or advisory committee. • The Social Bases of Behaviour and/or Cognitive-Affective Bases electives can be waived by the Director of Clinical Training if students have taken 6 credit of suitable undergraduate course work meeting this basic requirement. • Three Senior Practica, also known as specialty practica, are required, for a total of 6 required practica. Students, with the consent of their advisory committee, may take more than the required six practica to be competitive for internship applications. Senior practica are typically completed in the community, but may also be completed with a specific focus by clinical faculty at the PSC. • The PhD oral proposal must occur and receive either an outright, or provisional, pass by May 15th of the year internship applications are due. If the pass is provisional, any required revisions to the written proposal must be fully completed and approved by the Department of Psychology in order for the student to receive approval to apply for internship. For all program areas, the student, the Advisor, and all members of the Thesis Examining Committee will be required to sign the appropriate "Proposal Development Registration Form" to indicate that everyone involved in the student's research program is aware of, and has agreed to, the student registering in the course. The course must culminate in the submission of an acceptable, comprehensive draft of the research proposal to all

Psychology (M.A. & Ph.D.) Supplemental Regulations approved & effective Sept.1, 2019
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UNIVERSITY
OF MANITOBA

September 9, 2019

Dr. Greg Smith
Chair of SCCCC
Attention: Shannon Coyston, Academic Specialist

Re: Faculty of Science SCCCC submission, September 2019

Dear Dr. Smith;

Please find attached the Faculty of Science's proposed course and program modifications to be considered at the Fall 2019 meetings of the SCCCC. The course deletions, introductions, and modifications presented were approved at the Faculty of Science Executive meeting on September 3, 2019. The program introduction and modifications presented were approved at the Faculty of Science Council meeting on September 6, 2019.

Please contact me if you have any questions or concerns.

Sincerely,

Dr. Stefi Baum
Dean, Faculty of Science

Comments of the Senate Executive Committee:
The Senate Executive Committee endorses the Report to Senate.

Universities and colleges requesting approval for a **new** program of study from Education and Training must apply using this application form. This form reflects the requirements set out in the Programs of Study Regulation (MR 134/2015) under The Advanced Education Administration Act.

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UM INTERNAL REQUIREMENTS:

1. Following unit approval* please submit the complete proposal electronically (.pdf single file) to both the Office of the Provost & Vice-President (Academic) and, for:
   Undergraduate Programs*:* Office of the University Secretary (for Senate submission deadlines visit http://umanitoba.ca/admin/governance/meetings/index.html. Please also submit a **hard copy** version to the Office of the Secretary to their office as well.
   Graduate Programs: Faculty of Graduate Studies (for timelines visit http://umanitoba.ca/faculties/graduate_studies/admin/program_approval_timeline.html.
   ALL Programs: as preparation for submission to ALD, please submit a .docx file of the proposal, an .xlsx file of the Financial Support Form and a .pdf file of all other supporting documents (letters of support, external reviews, etc.). Please date stamp these files for ease of tracking should any changes result from the Senate approval process and submit directly to the Provost's Office.

2. Along with the information requested in the proposal template, please **append** details on the following:
   a) **ALD /SPPC Financial Support Form** [*available through the Office of the Provost &Vice-President (Academic)*]
      This form requires the signature of the Financial Planning Office. Please contact Kathleen Sobie, Executive Director, Financial Planning, for direction on completion of the form. Approval of the financial support form does not signify approval of any funding requests, either internally or from the province. Confirmation of resource availability and allocation of any new funds will be determined by the Provost at time of implementation.
   b) **Admission and/or transfer criteria** for the proposed program.
   c) **Course details** for required coursework, including title, course number, credit hours and calendar description. Highlight any proposed new courses and attach:
      Undergraduate Programs: for SCCCC Program and Course Change forms, as applicable, visit
      http://umanitoba.ca/admin/governance/forms/index.html
      Graduate Programs: for course change forms visit
      http://umanitoba.ca/faculties/graduate_studies/admin/course_changes.html
   d) Any **new academic regulations** for the program that are not currently addressed in existing faculty/college/school requirements.
   e) **Letters of support** from internal units that may be impacted by the proposed new program and any external letters of support as outlined below.
   f) **Library statement** of support.
   g) Where applicable, a **transition plan** for current students entering the new program.

3. Please direct questions to Cassandra Davidson, Academic Programs Specialist, at Cassandra.Davidson@umanitoba.ca in the Office of the Provost and Vice-President (Academic).

*Note: the complete proposal, including all appendices, and associated program and course forms, should be submitted to departmental (as appropriate) and faculty/college/school approving bodies for review and approval, prior to submission to the Office of the University Secretary.

Revised December 10, 2017

Revised October 18, 2017.

</div>

Institution**: UNIVERSITY OF MANITOBA**

Applicable faculties/department with responsibility for the program:

Faculty of Science

If program is a joint program, list all participating institutions and the roles of each in delivering the proposed program:

Not a joint program.

Program name: Data Science

Credential awarded: B.Sc. Major

Funding request: None

Office Use Only

One-time funding: _____

On-going funding: _____

Proposed start date: Fall 2020

List any critical issues that may impact the start date of the program: None

<u>**UM INTERNAL REQUIREMENT**</u>: Name of Person(s) responsible for the Program internally (please include contact information):

Dr. Pak Ching (Ben) Li, Associate Dean Undergraduate Programs

B-1 Provide a general description of the program and its objectives*: (Include intended purpose, curriculum design, and highlight distinctive attributes)*

The proposed B.Sc. Major in Data Science is **a 4-year, 120 credit hour program,** in the **Faculty of Science** with a **Co-op** option. The objective of this program is to provide knowledge and training in the field of Data Science, an emerging field and one in need of skills to meet labor demands. This program will be interdisciplinary and will be composed of courses from the departments of Computer Science, Mathematics and Statistics. We will also introduce several new courses focused on data science and provide hands on training using real-world data sets.

To the best of our knowledge, this would be the first undergraduate Data Science program in Manitoba.

What is Data Science?
Data science is an emerging discipline that incorporates elements of data engineering, statistics, mathematical modeling, data mining and machine learning to provide insights hidden in complex, structured or unstructured data. A Data Scientist is a well-established career title defined by those who solve complex data analysis problems using computationally and mathematically-rich approaches.

How is Data Science different from Big Data?
Data science refers to a field of study. Big data is a term used to refer to possessing or having access to vast amounts of data, either from one or multiple data sources. Big data is one component of data science, but not all data science involves big data. Big data refers to large data repositories.

Why should the University of Manitoba have a Data Science program?
There is significant evidence suggesting that major advances in the 21st century will involve having an understanding of how we collect, manage and analyze vast amounts of data. Data Science will be an integral component whether the task consists of developing the next generation autonomous vehicle, understanding complex socio-economic problems, or mitigating the next financial crisis. According to Forbes, The Economist and other popular press outlets, the Data Scientist will be one of the "hottest" jobs of the 21st Century. LinkedIn, a critical repository of available skills nationally and internationally, published a 2018 report indicating that the demand for Data Scientists is "off the charts". The same report suggested a shortage of 150,000 skilled data scientists in 2018 [12].

The University of Manitoba has strong programs in Computer Science, Mathematics, and Statistics, and therefore is well positioned to offer Manitobans excellent training in this burgeoning field. Furthermore, there is strong indication of the value of having skilled data scientists for advancing research in numerous disciplines within the Faculty of Science and across the University, from Business to applied sciences, such as Agriculture, Engineering, Health Sciences, and in the Humanities. The unique training offered through the Faculty of Science, will provide the necessary skills in machine learning, data modeling, data visualization, and statistical techniques that will bolster and support the activities across application areas within the University.

The purpose of the Data Science program at the U of M is to allow citizens of Manitoba and students at the University of Manitoba to obtain the necessary education that will enable them to be proficient data scientists, a field that has a critically increasing need for skilled experts. While progress has been made within the individual disciplines of computer science, mathematics and statistics, Data Science as a field of study unites education from all three disciplines to move the field forward, with a common goal of providing knowledge to students to develop tools and methods to enable understanding to be derived from complex data.

How is the Faculty of Science prepared to support Data Science?
The Faculty of Science currently has approximately 1100 majors or honours students in Computer Science, Mathematics, and Statistics, as well as in programs that include either of these three disciplines. The significant need, in industry, government, and academia for technical capabilities in data science is clear (please see **Appendix G – External Support**).

The required capabilities can only be offered through an interdisciplinary program as proposed by the Faculty of Science and indeed we are fortunate to have strong programs that can contribute to its development and execution. We expect many students in the existing mathematical/computational programs will opt to enroll into the Data Science program and in fact we are already fielding many inquiries from students, as well as from industry and government. The Faculty of Science already includes a cohort of **over 22 research active Faculty members, 4 of whom were recently hired to specifically coordinate and advance Data Science** within the Faculty. The recent recruits are cross appointed between Computer Science/Statistics/ and/or Mathematics, and are dedicated to offering courses relevant to this program, including machine learning, data mining, data visualization, regression analysis and data modeling. Additionally, **we have 2 Canada Research Chairs who directly research and teach in the field of Data Science**. Between these members we count over 80 MSc and PhD students in any given year, with a significant number of undergraduates already engaged in Data Science, in an informal manner. We provide this data to inform the reader that Data Science has been part of our core teaching, but only in a fragmented manner, and without giving students the privilege to be comprehensively educated in all the aspects that optimize their education as data scientists. On a whole, as a Faculty, we are very well positioned to deliver the program, and we are aware of the growing interest and need for such skills in our city, province and nationally.

In addition to the above, we would like to anecdotally share the recent events that provide strong indication of the keen interest by students in having access to Data Science training. The Faculty of Science organized a one-day international conference, on November 14th at the University of Manitoba (more details are available here: https://mailchi.mp/umanitoba.ca/data-science-conference). **Within four days of opening registration to the Faculty's Big Data Challenge, 146 students had registered to participate in the competition**. Overall more than 340 registered for the conference. This is significant given that (a) the organization of the conference only begun 3 months prior to it being held; (b) students quickly jumped at the opportunity within such a short span; and (c) we have yet to fully develop our program in Data Science.

Students have been inquiring about the program which suggests there is a need.

B-2 Length of Program: *(Define the length of the proposed program using measures appropriate to the schedule and delivery format. This will include total course credits and weeks/months, and, where relevant, hours and semesters of instruction)*

The Data Science program will be **a 4-year Major Degree** consisting of **120 credit hours**.

B-3 Intended outcomes of the program:

B-3.1 Describe how this program serves and advances the academic, cultural, social and economic needs and interests of students and the province:

Data Science is an increasingly growing area of importance to Manitoba, nationally and internationally (**please see attached letters of reference**). The institution of such a program will enable the University of Manitoba to remain competitive globally, while retaining students from Manitoba within the province and providing them a world-class foundation in this emerging discipline.

This program will provide graduates with the skills and knowledge to work in environments where data plays an important role.

B-3.2 Describe the existing and anticipated post-secondary learning needs of students in Manitoba that this program addresses and responds to:

We live in a digital world where vast amounts of data are being generated and collected at an unprecedented pace in all fields and sectors: economy, public health, social media, insurance, finance, government agencies, life and social sciences. Data science helps in extracting insightful information from these data for making evidence

based decisions in day-to-day problems. This process utilizes statistical methods, applied mathematics, information technology, machine learning, artificial intelligence and domain knowledge as well. There is a high demand for data scientists world-wide, and particularly in Manitoba. Job opportunities for these highly skilled professionals are plentiful. For instance, **a recent search for Data Science on indeed.com, for the City of Winnipeg, resulted in 118 unfilled job positions**. There is an increasing demand for Data Science undergraduates in Manitoba (please see **Appendix G**). Without a formal data science training, the labor shortages that we are currently witnessing both nationally and internationally, in this area will only worsen. The program is designed to develop highly skilled individuals to cover this multi-disciplinary and evolving field. Furthermore, this program is designed to allow our students to remain globally competitive in this emerging field of study.

B-4 Mode of Delivery

B-4.1 Provide the total program length through **one** of the following measures:

        120 Total credit hours

             Total contact hours

             Total courses

B-4.2 What proportion of the total program length (as indicated above) can be completed through the two following modes of delivery? *(Note that one or both selections can be offered up to the total program length.)*

        120 credit hours can be currently completed In-person

        15+ credit hours can be currently completed Online

There will be no limit on the number of credit hours that can be completed online. Students will be able to complete as many online course offerings (including required and elective courses) as are available. Currently, at least 15 credit hours of the required courses are available with an online option. Furthermore, students can complete an additional 21-42 credit hours online depending on their choice of Faculty of Arts course, and electives. We anticipate that more online offerings will be made available for program and elective requirements.

B-5 Provide an overview of the suggested progression of courses on a year-by-year basis for the program from start to maturity. *(Course level detail is not necessary, however, please include credit hours/contract hours, proportion of upper level courses, clinical placements or practicums, or subject area requirements where applicable)*

The Faculty of Science is proposing to offer a B.Sc. Major degree in Data Science with a co-op option. Consistent with other B.Sc. Major degrees, the degree requires 120 credit hours, or 4 years of study when a student completes a full course load each year. The Data Science Major is proposed to be an interdisciplinary program, and will include required courses in Data Science, Computer Science, Mathematics, and Statistics. Students will also be given optional course choices, and significant choice in electives to allow them to design a program for their individual interests.

Students will be able to declare the Data Science Major upon completion of a minimum of 24 credit hours, including specific required courses. These courses can be completed as a Faculty of Science student, or as a student in another unit at the University of Manitoba, such as University 1. The courses a student would take include introductory courses in Computer Science, Linear Algebra, Calculus, Discrete Mathematics, and Statistics; additionally, the required Arts requirement, the university "written English" requirement, and electives could be completed. As these are common

courses offered at many post-secondary institutions, students may have the opportunity to complete these requirements elsewhere and transfer to the U of M and declare the Major after their first year.

Year 2 builds on the foundational introductory courses taken in Year 1; it consists of second year Computer Science, Mathematics, and Statistics courses, and the first of the required Data Science courses. Year 2 also includes elective courses. Upon completion of the required Year 1 and 2 courses students may apply for entry to the Co-op option, if they wish.

In Year 3 students will complete a required Data Science course that will build on the knowledge they gained in the Year 2 Data Science courses, and allow them to gain experience with real-world data sets. In their final year, students will complete a capstone project course in Data Science where they will apply the knowledge and skills acquired in earlier coursework to a substantial data science problem.

Years 3 and 4 will also require students to complete advanced level courses in Computer Science, Mathematics, and Statistics. In addition to the specific required courses in Years 3 and 4, students will complete at least one additional course from a list of options in each of Computer Science, Mathematics, and Statistics. This will allow students to choose a course from these areas that is of particular interest to them. Additionally students must complete a number of electives which can include Computer Science, Mathematics, and Statistics courses, but do not need to, and they must include at least some advanced-level Faculty of Science courses.

Many of the required courses in Year 1 of the proposed Data Science Major overlap with courses in Year 1 of the existing Computer Science, Mathematics, and Statistics programs (including Honours programs and Joint Honours programs). This will allow for a student, who when starting their studies, is not sure if they are interested in one of the existing Computer Science, Mathematics, and Statistics programs, or the proposed Data Science program, to take courses in Year 1 and qualify for any number of programs, without falling behind the proposed timeline. Additionally, Year 2 includes courses that are core to specific programs in Computer Science, Mathematics, and Statistics, as do the optional course lists in Years 3 and 4. The proposed Data Science program also provides a number of electives, meaning if a student had chosen one of the existing programs in Computer Science, Mathematics, or Statistics, and decided after Year 2 to move to Data Science they may have some of the Year 2, 3 and 4 required courses and optional courses completed. They also could use some, if not all required or optional courses to fulfill the elective components of the degree.

The program will also offer a Cooperative Option, please see section **B-7** for details.

The calendar entry with specifics is found below. Additionally, a list of the required and optional course titles and descriptions can be found in **Appendix B.**

Data Science Major Program (with co-op option)

    Program Information

    The Faculty of Science will offer an interdisciplinary 4-year Major program in Data Science (see **Appendix D – Co-op Support**). Data Science is an emerging field of study that combines computer science, mathematics and statistics to collect, analyze, visualize and interpret data.

    Data Science Entry, Continuation, and Graduation requirements

    To enter the Major Degree program in Data Science, a student must have completed at least 24 credit hours with a minimum DGPA of 2.00, and also obtained a minimum grade of "C+" in each of COMP 1020, MATH 1232 (or MATH 1700 or 1710), and STAT 1150.

    To continue in the Data Science Major Degree program, students must maintain a minimum DGPA of 2.00.

To graduate with the Bachelor of Science (Major) in Data Science, a student must obtain passing grades on all courses, obtain a minimum DGPA of 2.00, and a minimum grade of C in all required and optional courses that contribute to the Major.

Major Co-op Option

A co-op education option is available. The course and minimum grade requirements for entry and continuation in the Co-op Option are the same as those required for the regular Major program. However, the entry and continuation DGPA requirement is set at a minimum of 2.5.

Before beginning their first co-op work term, students are required to complete the first and second year requirements of the program.

YEAR 1	YEAR 2	YEAR 3	YEAR 4
DATA SCIENCE MAJOR (Including Co-op Option if selected) 120 CREDIT HOURS			
COMP 1012[1], COMP 1020 (C+), MATH 1220[1], MATH 1230[1], MATH 1232[1] (C+), MATH 1240, STAT 1150 (C+). 6 credit hours from the Faculty of Arts, which should include the required "W" course. 3 credit hours of electives	COMP 2140, MATH 2740, DATA 2010, MATH 2720[1], STAT 2150, STAT 2400	COMP 3380, COMP 4360, MATH 3490, DATA 3010, DATA 4010[2] (6), STAT 3100, STAT 3150, STAT 3450.	
	12 credit hours of electives	3 credit hours from: COMP 2080, COMP 2150, COMP 4510, COMP 4710 3 credit hours from: MATH 2070, MATH 2090, MATH 2080, MATH 2180, MATH 4370 3 credit hours from: STAT 2300, STAT 2800, STAT 3030, STAT 3550, STAT 3690, STAT 4100, STAT 4150, STAT 4250 3 additional credit hours from the Faculty of Science[3] 21 credit hours of electives[3] The above 33 credit hours must include at least 12 credit hours of Faculty of Science courses taken at the 3000 or 4000 level.	
		Co-op Requirements (if selected): SCI 3980, SCI 3990, SCI 4980, and SCI 4990 (if a 4th work term is selected)	
30 Hours	30 Hours	30 Hours	30 Hours

NOTES:

[1]The following substitutions are allowed: COMP 1010 in place of COMP 1012; MATH 1300 in place of MATH 1220; MATH 1500 or MATH 1510 in place of MATH 1230; MATH 1700 (C+) or MATH 1710 (C+) in place of MATH 1232; MATH 2150 in place of MATH 2720.

[2] Must be taken in graduating year.

[3] Courses may be chosen from COMP, MATH, or STAT courses included in the course lists in the program chart provided the courses have not been used toward another program requirement.

(Letters in brackets indicate minimum prerequisite standing for further study. The number 6 in brackets indicates a 6 credit hour course.)

B-6 Will the program be available for part-time study?

Yes.

B-7 Indicate if this program will have a cooperative education, work placement, internship or practicum component and provide any relevant details:

The Cooperative option will follow the same model that is used within the Faculty of Science. Students will be eligible to apply after the completion of the first and second year requirements of the program. They will be provided the opportunity to carry out 3 co-op terms in a relevant data science work placement. Such placements will be those that include a Data Science component, which may involve using Machine Learning techniques, Statistical and Data Modeling approaches, Data Visualization, Software Development, Data Analysis, Mathematical Modeling, or any related techniques. Our support letters speak to the breadth of such opportunities in Winnipeg and many more positions exist (and will open) both within the province and elsewhere. The Faculty of Science Co-op office is fully committed to seeking such placements (see **Appendix D**).

B-8 Intake Information

    B-8.1 Projected enrolment for the first intake: 50

    B-8.2 Maximum seat capacity *(Defined as first-year enrolment capacity)*: 100

    B-8.3 Anticipated date of maturity: 09/2025

UM INTERNAL REQUIREMENT: please indicate the projected enrolment and graduates for the first 5 years of the program.

Our enrollments are based on all the external indicators suggesting that interest from this program will be significant. Please see support letters (Appendix G) as well as market analysis below.

	Year 1	Year 2	Year 3	Year 4	Year 5
New Enrollments	50	60	75	90	100
Graduates	0	0	0	20	55

C-1 Describe how this new program aligns with the strategic plans of your institution:

The proposed program aligns and advances the following strategic goals of the Faculty of Science:

We will increase student opportunities for experiential and interdisciplinary learning in the classroom (e.g., by incorporating project-based learning in classes) and out of the classroom (e.g., through co-op and research opportunities), so that students make, see, do, and realize the connection between scientific inquiry, research, discovery, innovation, "soft skills" such as communication, teamwork, project management, and leadership, and the opportunities opened through interdisciplinary collaboration.

AND

We will explore new interdisciplinary general science courses and educational streams that introduce the university student population to science, highlighting achievements, limitations, potential, and importance of science for life in the 21st century.

The proposed program aligns and advances the following strategic goals of the University:

Increase opportunities for community service-learning, cooperative education, undergraduate research, and student exchanges.

C-2 Outline the internal approval process (i.e. committees, governing bodies) for approving this new program of study within your institution and indicate any dates of decision. *(Governing Council, Board of Governors, Board of Regents, Senate, other)*

UM INTERNAL REQUIREMENTS: Please note date(s) of Faculty/College/School Approval. Approval dates through the governing bodies will be inserted by the Provost's Office prior to submission to government.

UM Undergraduate Programs:

Decision-Making Body	Date of Approval
Faculty/College/School	Summer 2019
SCCCC	Fall 2019
SPPC	Fall 2019
SCADM (*if applicable*)	_____
SCIE (*if applicable*)	_____
Senate Executive	_____
Senate	_____
Board of Governors	_____

UM Graduate Programs:

Decision-Making Body	Date of Approval
APC (*preliminary review*)	_____
External Review	_____
APC	_____
FGS Executive	_____
FGS Faculty Council	_____
SPPC	_____
Senate Executive	_____
Senate	_____
Board of Governors	_____

C-3 Responsibility to consult

C-3.1 If this program subject to mandatory review or approval by organizations external to the institution *(such as regulatory bodies, Apprenticeship Manitoba, etc.)*, please describe any consultation processes and provide copies of reports or letter from these organizations providing support:

Not Applicable.

C-3.2 What agencies, groups, or institutions have been consulted regarding the development of this program? *Note: this includes any consultation with internal UM units, academic or otherwise.*

We have an external advisory board in the Faculty of Science consisting of members from industry and academia. We have presented the data science program to the board and their feedback in terms of specific needs have been incorporated and taken into account while designing the program. The Faculty of Science also consulted key stakeholders (i.e. research faculty) at the University of Manitoba and recently formed an Executive committee for ensuring the successful delivery of such a program.

The following faculties and departments at the University of Manitoba have provided letters of support for the development of this new program (please see **Appendix C**):

- I.H. Asper School of Business
- Faculty of Agricultural and Food Sciences
- Faculty of Engineering
- Faculty of Arts
- Department of Community Health Sciences

C-3.3 How have students and faculty been informed of the intent to establish this program?

Students have been notified through town halls that the Faculty holds at least twice a year. In addition, student representatives on the Faculty of Science Committee on Courses and Programs (COCAP) have been briefed about this program. Furthermore, all units within the Faculty of Science were consulted over a 2-year period, and feedback from unit members was incorporated into the design of our program.

More specifically, the development of the Data Science program involved stakeholders from all seven units within the Faculty of Science. We soon recognized the divergent needs of all members, and were able to group these needs from either an Application or Fundamental stand-point. The application of Data Science principles is far reaching and touches almost every discipline in Science, and will affect many disciplines outside of Science in the future. The units that have more of an applied need, within the Faculty of Science, includes Biological Sciences, Microbiology, Chemistry, and Physics & Astronomy. Cognizant of these needs, the program has incorporated applied elements through the establishment of the new DATA courses (please see program chart above). In particular, the capstone project taken through DATA 4010 will allow students to choose areas of application beyond the disciplines offering the core training (Computer Science, Mathematics, and Statistics). The Fundamentals of Data Science is needed to train individuals with skills required by our local and national agencies

and industries. This resulted in a core group of members from Computer Science, Mathematics and Statistics who themselves either teach or do research in core Data Science disciplines. These members consulted over a 2-year period with their respective units. The Faculty as a whole has been informed through Faculty Council and through informal discussions with members and students.

C-4 List any similar programs offered in Manitoba: *(Provide such information as institution, programs, and credentials offered in addition to any impacts on these programs, explain rationale for duplication.)*
Note: this includes any programs currently offered at UM.

Currently, there are no similar University level programs offered in Manitoba. Red River College (RRC) offers programs in Computer and Information Systems Technology, in Business Information Technology and online programs in Information Technology and Professional Studies. RRC does not offer an advanced degree in Data Science, which offers a training in the fundamentals and applications of data science principles. It also does not offer the breadth of courses in data modeling, machine learning, statistical inferences, as well as the many other courses that are key to a sound training in Data Science.

C-4.1 Describe any specific laddering, articulation and/or credit transfer options for students that are anticipated in this program in Manitoba.

Students in college and universities in the province would be considered for credit transfers as they currently are for any other program in the Faculty of Science. Individual courses are assessed by departments for transferability.

C-5 List any similar programs offered in Canada: *(Provide such information as institution, programs, and credentials offered in addition to any impacts on these programs, explain rationale for duplication.)*

University of British Columbia, Okanagan, has a 4-year undergraduate degree in Data Science.
McGill University, Montreal, has a 4-year undergraduate degree in Data Science.
Wilfrid Laurier University, Waterloo, has a 4-year undergraduate degree in Data Science.

This would be the first Data Science degree conferring program in the Province, increasing the potential for retention of Manitoba students while possibly drawing out of province students, particularly from the Prairie Provinces.

C-5.1 Describe any specific laddering, articulation and/or credit transfer options for students that are anticipated in this program in Canada.

Students in Canadian universities or colleges would be considered for credit transfers as they currently are for any other program in the Faculty of Science. Individual courses are assessed by departments for transferability.

C-6 Describe the current and projected labour market demands in Manitoba for graduates of this Program:

(Provide such information as probable employment destinations or further educational opportunities available to graduates of this new program of study. Attach any formal reports such as those from Associations, Statistics Canada, Sector Councils, Industry or Regulators.)

We provide supporting information on market needs based on (a) support letters from local industry; (b) a survey of existing market knowledge from reputable sources.

(A) Summary of support letters

All industry support letters are available in **Appendix G – External Support**. We have however extracted some of the key elements from these letters. We emphasize the diversity of organizations that have responded, including local and federal government agencies and major well-established corporations as well as emerging high-tech startups within our region. The following extracts give a strong sense for the critical need for trained data scientists.

> *One of the biggest challenges we are currently facing is to attract, train and retain data science talent. Data science requires a range of skills such as domain expertise, statistics, machine learning, operations research, ethics, data visualization, and communication. None of the existing educational programs in Manitoba offer a program to prepare data science professionals. We strongly support expanding Data Science capabilities at the University of Manitoba including the establishment of research and collaboration center Data Science Nexus and the development of new undergraduate and master's programs. These initiatives will help us to address increasing demands in the Manitoba data science employment market and will provide easier access to the talent required for the understanding and adoption of new cutting-edge technology in our industry.*

Vice President, Wawanesa Insurance, Mr. Struck

> *The National Microbiology Laboratory (NML) represents Canada's main infectious disease public health lab with responsibility for reference microbiology and quality assurance, lab-based surveillance for infectious diseases, emergency outbreak preparedness and response, training, and research and development. The NML is spearheading an effort to overhaul Canada's public health system to incorporate genomics technologies across all of its science programs. Genomics is among the biggest of the big data sciences, and the NML will require dedicated data scientists as well as domain experts with data science competencies to realize this effort. Yet qualified personnel with the requisite training and skills in data science are in very short supply, both in Canada and more broadly. Indeed, a 2015 study conducted by Canada's Big Data Consortium estimated Canada's big data talent gap is ~19,000 professionals shy of what is needed, with demands expected to grow with ever increasing open access data sets and increased applicability of big data to new market segments*

Chief, Bioinformatics, National Microbiology Lab, Dr. van Domeselaar

> *As you know, innovation and data science are inextricably linked. As organizations look to do more with less, data scientists will be called on to capitalize on the ever increasing amount of data generated worldwide. Innovation and data science are driving factors in the many different Smart City initiatives that are leading the way for cities and other levels of government to significantly improve service delivery and outcomes for their citizens.*
>
> *…*
>
> *As the innovation capability grows, it will certainly benefit from the availability of data science graduates, as well as cooperative education students at both the graduate and undergraduate*

levels, to work with us on innovative projects across all service areas. These data scientists in training will become valuable employees in all levels of government, non-profit organizations, Winnipeg's innovative technology sector, and beyond.

Chief Innovation Officer (Interim), City of Winnipeg, Mr. Cottick

With the advancements in technology we are seeing an increasing amount of machine learning and artificial intelligence being incorporated into innovative solutions. This means there is a growing demand for people to think about data science into their existing solutions and in the design of new solutions. There is an obvious talent gap in the local market. Companies are competing to acquire the talent to keep their operations running and those who want to start incorporating data capacity into their companies are also struggling. By introducing these programs entrepreneurs will have the talent necessary to enable them to stay competitive and to scale up in Manitoba.

President, North Forge, Ms. Dukes

A critical component to the evolution of data science at Canada Life is the availability of a talented resource pool of data scientists. Data Science Nexus aims to train and supply such individuals to industries such as ours. A source of data science graduates and/or cooperative education data science students will be influential to Canada Life's success in our data science journey.

Manager & Senior Vice-President, CanadaLife, Ms. Guenther and Mr. Turpie

One reason that we were excited to expand our company to the Innovation Hub at the University of Manitoba SmartPark is that it would make it easier to collaborate with faculty at the University of Manitoba. Aside from the direct benefit a Data Science program would have for us at Bold Commerce, we wholly support the initiative to build a program directed at training students to better acquire the skills necessary to succeed in an increasingly data-driven world.

CEO, Bold, Mr. Boisjoli

(B) Nationwide and global trends and needs

1. The Global Datasphere

Worldwide global data generation is increasing at an exponential pace. Consider a single zettabyte, which is equivalent to one trillion gigabytes. In 2010, the global "datasphere", or total amount of digital data, clocked in at a whopping 2 zettabytes [1]. Nine years later, the total amount of digital data in the world has grown by over 2000%, to reach 41 zettabytes. It is projected that the amount of digital data is set to grow to 175 zettabytes by 2025 [2] [3] (Figure 1).
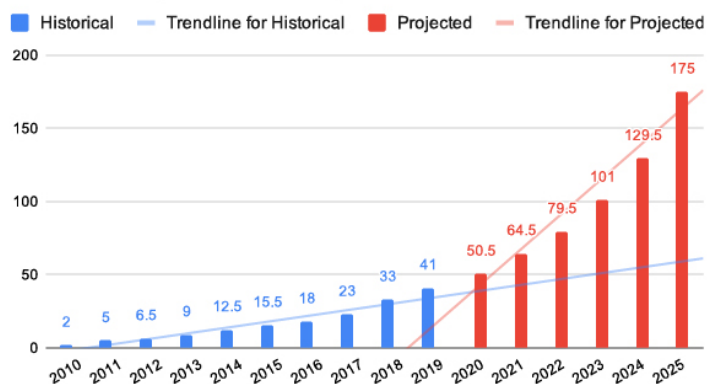

Fig. 1: Volume of data/information created worldwide from 2010 to 2025 (in zetabytes). Chart from Data created worldwide 2010-2025. (n.d.). Retrieved November 6, 2019, from - https://www.statista.com/statistics/871513/worlwide-data-created/.

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This phenomenon, known as "data deluge" or "data exhaustion", simultaneously represents both an enormous challenge and fantastic opportunity. Driven by rapid declines in storage costs, the increasing connectivity of the world, advancements in telecommunications and infrastructure, and the proliferation of new technologies which produce ever larger sets of data, the data deluge is a wave calling to be surfed. In short, new data is being generated faster than we can make sense of it, derive value from it, or even use it in the most basic of ways.
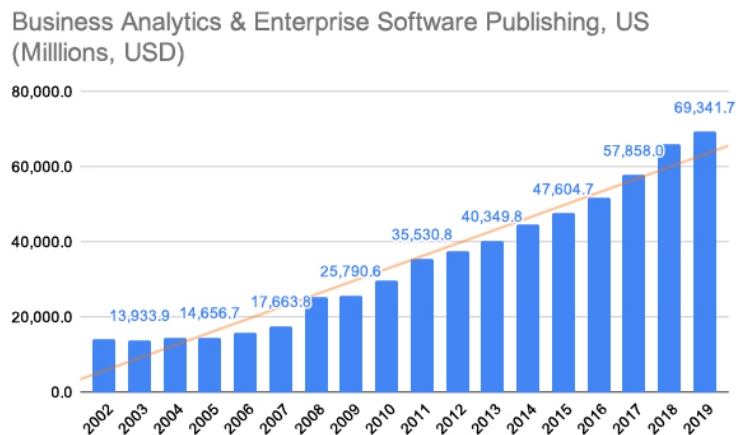

Fig. 2: Business Analytics & Enterprise Software Publishing, US. Chart from IBISWorld Industry Report 51121 c July 2019 | Dan Cook Business Analytics & Enterprise Software Publishing in the US. (n.d.). Retrieved November 6, 2019, from https://clients1-ibis-world-com.uml.idm.oclc.org/reports/us/industry/default.aspx?entid=1989..

Data analysis, business analytics, genomic sequencing, and enterprise software platforms are increasingly being utilized by both the private and public sectors. Advancements in the processes used and technologies available for data science and analysis have contributed to rapid growth in the revenues generated by key players in this industry. Google, Microsoft, SAP, IBM, Oracle, Tableau, Periscope, and many other software companies have invested heavily in developing tools to help make sense of the globe's increasingly massive data sets. Currently, the Business Analytics and Enterprise Software Publishing market generates yearly revenues approaching $70 billion USD [4] (Figure 2). Although many of these key players have consolidated market share in their respective core industries (web search, enterprise software, data visualization, etc.), the data science industry is only moderately consolidated. As such, existing firms and new entrants are investing heavily in developing new tools to assist with data science activities, each seeking vigorously for their share of the market. Market databases and research institutes estimate compound annual growth rates (CAGR) between 29% [4] and 39% (for comparison, a CAGR of 5% - 10% is considered good for large-cap companies).

2. The Value of Data Analysis and Synthesis

A common phrase in technology circles is that "data is the new oil". This may be so, but most data in existence today is either unstructured, or poorly structured. Improved data science and analytics make it easier to achieve organizational goals and improve nearly every functional area of an organization. A recent report from Springboard, a thought leader in the data science space, lists eight key benefits of investing in data science, most of which are immediately apparent [5]:

i.   Empower management to make smarter decisions;
ii. Improve ability to achieve business goals;
iii. Improve recruitment;
iv. Challenge the workforce to embrace data in their day-to-day work;
v.   Refine target audiences;
vi. Improve ease of testing multiple ideas;
vii. Identify new revenue opportunities; and
viii. Reduce the occurrence and volume of major risks and losses.

However, identifying that improved data science and analytics can improve operations and organizational value, is far from half the battle. Businesses in nearly every industry have begun to recognize the value that can be derived from data analytics. It is predicted that nearly 90% of large organizations will have appointed a Chief Data Officer, or CDO, by 2019 [6]. Large organizations have proven to themselves that expertly derived data science, analysis, and synthesis, can help empower senior executives to make smarter, better-informed decisions. For example, IBM has recently invested over $12

billion dollars, opening six new analytics centres and hiring 4,000 new employees to staff them [7]. In healthcare alone, it is estimated that adequate and sophisticated analytics tools for healthcare could yield over $300 billion in savings, in North America, let alone the lives saved along the way [8].

Globally, it is estimated that over 95% of network data is *never accessed* after 90 days of being created [9]. Essentially, our efforts to derive value and insight from large datasets are only beginning to scratch the surface – but data science is quickly moving from the edge to the core of modern business operations.

The Harvard Business School recently established the "Competing on Business Analytics and Big Data Executive Education Program". John A. Deighton, the Baker Foundation Professor of Business Administration at Harvard Business School states that, "used well, it [data science] changes the basis of competition in industry after industry" [10].

3. Barriers to Effective Data Science

Although the power, sophistication, and ease of use that modern data science and data analytics software is substantial, there is a massive, industry-wide skills gap when it comes to data science. A recent LinkedIn study found that US-based businesses alone require over 150,000 data scientist jobs filled – at the same time, it is predicted that by 2020 there will be 2.7 million job postings for data science and analytics roles [11]. As attested by our local industry (see support letters **Appendix G**), staying competitive will demand filling positions across all roles involving Data Science.

4. Business Analytics & Enterprise Software, and IT Consulting Market

The Business Analytics, Enterprise Software, and IT Consulting market is a primary driver of demand for data science education. These markets are in growth stages, with high levels of competition. There are approximately 500,000 competitors in the space, distributing over $260 billion USD in annual wages, in North America alone. Barriers to entry in these spaces are low, along with low capital intensity, but revenue volatility is high [12] [13].

There are very low levels of consolidation in the IT Consulting market, but very few players control the Enterprise Software space, with SAP controlling 22.9% of the market, followed closely by Salesforce.com (15.1%), and IBM (11.7%) [13].

Data Analytics, Data Mining, and Predictive Analytics continue to drive research and development in this industry, all three of which require highly skilled Data Science talent. Between these industries, over 410,000 professionals are employed, with this figure projected to grow at an annualized rate of 11.4% [13]. Within these markets, the fastest-growing roles are Data Scientists and Advanced Analysts, which are projected to see a spike in demand of 28% by 2020, growing to nearly 700,000 openings by 2020, totalling 2,720,000 employed data professionals, in the US alone [14]. **Data Science and Analytics jobs remain open an average of 45 days**. 59% of demand for Data Science and Analytics professionals is generated by the Finance and Insurance, Professional Services, and IT industries. Data Scientists in the US earn an average annual salary of $94,576 USD [14].

Similar trends exist in Canada. On key job search sites, we find significant number of positions as we search for Data Science 1,141 (Workopolis.com), 1,224 (indeed.com), 1,090 (glassdoor.ca), 977 (LinkedIn), as of November 8th 2019.

5. Internal and External Analysis

Strengths	Weaknesses
• Well established programs in Computer Science, Mathematics, Statistics • 22 faculty members, including 2 CRCs in the field of Data Science	• Behind the curve

• Strong links to local industry • Reputable co-op program (enabling students to gain job-ready skills) • Significant funding for Data Science initiatives led by Faculty of Science members • Relatively low tuition in Manitoba compared to U15	
Opportunities	**Threats**
• Incredible growth in demand for Data Science and Analytics skills • Leverage local, national, and international research relationships • Leverage growth in Manitoba tech sector • Leverage growth in machine learning and A.I. (drives demand for improved data science and data visualization)	• Ramp up time • Marketing challenges • Established programs elsewhere

6. References

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[13] IBIS World (2019), Industry at a Glance, https://clients1-ibisworld-com.uml.idm.oclc.org/reports/ca/industry/ataglance.aspx?entid=1415, last accessed November 6th 2019.

[14] Miller, S. and Hughes, D. (2017). The Quant Crunch: How the Demand for Data Science Skills is Disrupting the Job Market, https://www.ibm.com/downloads/cas/3RL3VXGA, last accessed November 6th 2019.

C-7 If copies of any internal or peer evaluations with respect to this new program of study are being provided with this proposal, please indicated how any issues identified by these evaluations have been addressed and attach any relevant documents as available:

Not Applicable

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D-1 If one-time or pilot funding are being requested to support this new program of study, please identify the amount of funding being requested:

We are not asking for any funding for this program. Please see budget spreadsheet for details.

D-2 If ongoing funding being requested to support this new program of study, please identify the amount of funding being requested:

We are not asking for any funding for this program.

D-3 If new funding is not being requested, how will the program be funded?

The Faculty of Science will use existing resources as well as tuition from students in Data Science, to deliver and manage this program.

D-4 List any external sources of funding that will be used to support the implementation or delivery of this new program of study: *(Provide such information as agreements for funding from industry or external grants and indicate the anticipated length of time for each agreement.)*

Not Applicable.

D-5 What are the resource implications to the institution (budget, IT, library, laboratory, computer, space, practicum liability insurance, student services, etc) in delivering this new program of study?

The Data Science program relies on the similar infrastructure needs as our existing programs in Computer Science, Mathematics and Statistics. In essence, this involves computers as well as software licenses. For the most part, software licenses used in Data Science are open source and are accessible without additional costs, such as tools for R or Tableau. Our budget includes refurbishing existing labs with new computers to handle the requirements of this program. As a result, we have included an approximate cost of $42K in year 1, $50K in year 2, $25K in year 4 and $80K in year 5 for computers and software.

Please refer to library support for introduction of new courses (Appendix E).

D-6 Please describe new and existing staffing resources needed to provide this new program of study. *Include reallocation of existing faculty, hiring of new faculty, administrative and support services and any other considerations.*

The program consists mainly of existing courses from Computer Science, Mathematics and Statistics. In addition, we have recently hired several data science researchers which will be involved in the delivery of this program. We have not explicitly included the salaries of the data scientists but have used an average of the salaries of all professors and all instructors in the Faculty.

With respect to space in courses, the departments involved will carefully monitor space in courses and respond to demand as necessary. Declared Data Science Major students will be given the same access to Computer Science courses as those who are declared as a Computer Science student.

Our overall FTE for new staff are as follows: 2.0 FTE new Academic staff ($216,560), 1.33 new Sessional Instructors ($50,710), 3.4 FTE Teaching Assistants ($67,282).

From our existing resources, we will allocate FTEs as follows: 4.68 FTE Professors ($257,667), 2.33 FTE Associate/Assistant Professor ($185,563), 0.20 FTE of AESES Support Staff ($16,073).

D-7 Provide a program implementation plan for the new program of study by academic year (start to maturity) that includes any elements to be phased in (e.g., new faculty hires, distribution of existing faculty and support staff) from launch to maturity:

The Faculty of Science has recently (July 2019) hired 4 members focusing on Data Science. We expect the following based on our enrollments as we monitor them over the length of the program.

If we assume an enrollment of 100 new students in Year 5, we anticipate hiring 2 Assistant professors as projected in our budget. These will phase in over the maturity period of the program as indicated below.
Year 1: 1 Assistant professor
Year 2: 1 Assistant professor
Year 3:
Year 4:

We will need to hire the equivalent of 1.3 FTE of new sessional instructors and 2.17 FTE of new TA to put on the data science program.

D-8 Please describe the effect of this new program on existing capital infrastructure and equipment:

There will not be any effect of this new program on existing capital infrastructure and equipment. The Faculty of Science has all the necessary resources.

D-9 If capital funding is being requested to support additional specialized program materials such as infrastructure or equipment required to provide this new program of study, please provide a detailed description of the use of this capital:

Not Applicable.

E-1 What are the proposed tuition fees?

The tuition fees will be based on existing Faculty of Science fees and therefore will be very similar to fees for existing programs. We have used a rate of $140.17 per credit hour based upon the 2018-19 fee schedule. This was the fee that was in effect when the proposal was prepared. Fees may change subject to Board of Governors and provincial approvals.

E-2 Please provide a rationale for the tuition fee proposed. (*For example, are these tuition fees comparable to tuition for existing programs within the academic unit or to tuition for similar programs offered at other institutions?*)

The tuition fees are comparable to existing programs within the Faculty of Science.

E-3 Please describe any additional fees that would apply to a student in this program?

UM INTERNAL REQUIREMENTS: Please note any new course-fees proposed in support of this program. Please provide a rationale for any new fees. Are these fees comparable to fees for existing programs within the academic unit or for similar programs offered at other institutions?

If the student decides to do the Co-op option, work term fees will apply. Otherwise, there will be no additional fees above and beyond those for existing programs within the Faculty of Science. The work term fees are the same as for all programs in the Faculty of Science. The Co-op fee is $558.25 but this fee has not been incorporated in the financial model.

E-4 Please describe any specific supports to encourage affordability and accessibility to the program:

The supports available are the same as those for existing programs in the Faculty of Science.

SECTION F – SIGNATURES

(A second signature section is provided for joint programs only)

SUBMITTED BY:

President:	*Vice-President/Academic:*
Name:	*Name:*
Signature:	*Signature:*
Date:	*Date:*

For use by joint programs only:

President:	*Vice-President/Academic:*
Name:	*Name:*
Signature:	*Signature:*
Date:	*Date:*

SUBMIT COMPLETED FORM

PROVOST'S OFFICE ONLY Once completed and signed, please submit this application form to Post-Secondary Education and Labour Market Outcomes at PSE-LMO@gov.mb.ca with the following attachments *(double-click to engage check box):*

☐   Cover letter

☐   Program of Study Financial Form

☐   Any supporting documentation *(reviews, letters of support, etc.)*

If you have any questions or require further information, please contact:
Post-Secondary Education and Labour Market Outcomes
Manitoba Education and Training
400-800 Portage Avenue Winnipeg MB R3C 0C4
(204) 945-1833
PSE-LMO@gov.mb.ca

Data Science (4-year Major) Program Course List & Descriptions

Required New Courses

DATA 2010 - Tools and Techniques for Data Science
(Lab Required) An introduction to the field of data science with an emphasis on the fundamental tools and techniques that underlie the field of data science. Prerequisites: [MATH 1240 or MATH 1241] and [one of MATH 1300, MATH 1301, or MATH 1220] and [one of MATH 1700, MATH 1701, MATH 1710, or MATH 1232]. Pre- or co-requisites: COMP 2140 and STAT 2150.

DATA 3010 - Data Science with Real World Data Sets
(Lab Required) This course will expose students to real-world data sets in the study of data science. Prerequisite: DATA 2010.

DATA 4010 - Data Science Capstone Project
A project course where students apply the knowledge and skills acquired in earlier coursework to a substantial data science problem. It will enable the development of soft skills, and explicit consideration of important topics including Ethics, Communication, Data Privacy, Data Presentation and Insight Delivery, all of which are key elements for a training in Data Science, beyond the technical content. This course is restricted to Faculty of Science students in the Data Science Major or Major Co-op. Students are expected to take this course in their final year. Prerequisites: DATA 3010 and permission of the instructor.

Required Courses

COMP 1012 – Computer Programming for Scientists and Engineers
(Lab Required) An introduction to computer programming suitable for solving problems in science and engineering. Students will implement algorithms for numerical processing, statistical analysis and matrix operations. Not to be held with COMP 1010, COMP 1011 or COMP 1013. Prerequisite: Mathematics 40S or equivalent. Co-requisite: MATH 1230 or MATH 1500 or MATH 1501 (or equivalent).
OR
COMP 1010 – Introductory Computer Science 1
(Lab Required) An introduction to computer programming using a procedural high level language. May not be held with COMP 1011 or COMP 1012 or COMP 1013. Prerequisite: any grade 12 or 40S Mathematics, or equivalent.

COMP 1020 – Introductory Computer Science 2
(Lab Required) More features of a procedural language, elements of programming. May not be held with COMP 1021. Prerequisite: COMP 1010 or COMP 1011 (C); or COMP 1012 or COMP 1013 (C); or High School Computer Science 40S (75%) and any grade 12 or 40S Mathematics, or equivalent.

MATH 1220 – Linear Algebra 1

(Lab required) This course is intended for students in mathematically rich disciplines including those planning to enter an Honours or Major program in Mathematics or Statistics. An introduction to vectors, matrices, systems of linear equations and three-dimensional geometry. May not be held with MATH 1210, MATH 1211, MATH 1300, MATH 1301, MATH 1310, or the former MATH 1680. Prerequisite: Pre-calculus Mathematics 40S (70%) or the former Mathematics 40S (300) (70%), or the MSKL 0100 offered Extended Education (B).

OR

MATH 1300 - Vector Geometry and Linear Algebra

(Lab Required) An introduction to vectors, matrices, systems of linear equations and three-dimensional geometry. May not be held for credit with MATH 1210, MATH 1211, MATH 1220, MATH 1310, MATH 1301, or the former MATH 1680. Prerequisite: a minimum grade of 60% in Pre-calculus Mathematics 40S or the former Mathematics 40S (300), or a grade of "C" or better in the MSKL 0100 offered by Extended Education. NOTE: A minimum grade of 70% in Applied Mathematics 40S may be used as a prerequisite to this course.

MATH 1230 - Differential Calculus

(Lab required) The course is intended for students in mathematically rich disciplines including those planning to enter an Honours or Major program in Mathematics or Statistics. Rigorous treatment of limits, continuity, and differentiation (with epsilon-delta proofs), applications in optimization problems, related rates, l'Hopital's rule, curve sketching, Taylor polynomials. Not to be held with MATH 1500, MATH 1501, MATH 1510, MATH 1520, the former MATH 1680, or MATH 1690. Prerequisite: Pre-calculus Mathematics 40S (70%) or the former Mathematics 40S (300) (70%), or the MSKL 0100 offered by Extended Education (B).

OR

MATH 1500 – Introduction to Calculus

(Lab Required) Differentiation and integration of elementary functions, with applications to maxima and minima, rates of change, area, and volume. May not to be held with MATH 1230, MATH 1501, MATH 1510, MATH 1520, the former MATH 1680, or MATH 1690. Prerequisite: a minimum grade of 60% in Pre-calculus Mathematics 40S or the former Mathematics 40S (300), or a grade of "C" or better in the MSKL 0100 offered by Extended Education.

OR

MATH 1510 – Applied Calculus 1

(Lab Required) Functions and graphs; limits and continuity; differentiation of functions defined explicitly, implicitly and parametrically; applications of derivatives to velocity and acceleration, related rates, maxima and minima; differentials, indefinite and definite integrals, application of integration to area. Physical applications in this course make it especially suitable for students intending to take programs in engineering. May not be held with MATH 1230, MATH 1500, MATH 1501, MATH 1520, the former MATH 1530, the former MATH 1680, or MATH 1690. Prerequisites: (a grade of 60% in one of Pre-calculus Mathematics 40S, or the former Mathematics 40S (300), or a grade of "C" or better in the MSKL 0100

offered by Extended Education) and (one of Physics 40S (300), PHYS 0900 (P), or PSKL 0100 (P) offered by Extended Education).

MATH 1232 - Integral Calculus

(Lab required) This course is intended for students in mathematically rich disciplines including those planning to enter an Honours or Major program in Mathematics or Statistics. Integral calculus: theory and techniques of integration, curve sketching (parametric and polar), volume, arc length, surface area and partial derivatives. Sequences and series. Not to be held with MATH 1690, MATH 1700, MATH 1701, MATH 1710. Prerequisite: MATH 1230 (C) or MATH 1500 (B) or MATH 1501 (B) or MATH 1510 (B).

OR

MATH 1700 – Calculus 2

(Lab Required) Theory and techniques of integration, curve sketching, volume, arc length, surface area and partial derivatives. May not be held with MATH 1232, MATH 1690, MATH 1701, MATH 1710. Prerequisite: A grade of "C" or better in one of MATH 1230, MATH 1500, MATH 1501, MATH 1510, MATH 1520, or the former MATH 1680.

OR

MATH 1710 – Applied Calculus 1

(Lab Required) Applications of integration to volumes, centres of mass, moments of inertia, work and fluid pressure; differentiation of trigonometric, inverse trigonometric, exponential, and logarithmic functions; techniques of integration; polar coordinates. Physical applications in this course make it especially suitable for students intending to take programs in engineering. May not be held with MATH 1232, MATH 1690, MATH 1700, MATH 1701. Prerequisite: A grade of "C" or better in one of MATH 1230, MATH 1500, MATH 1501, MATH 1510, MATH 1520, or the former MATH 1680. Prerequisite or concurrent Requirement: PHYS 1050 or PHYS 1051.

MATH 1240 - Elementary Discrete Mathematics

(Lab required) The course is intended for students in mathematically rich disciplines including those planning to enter an Honours or Major program in Mathematics or Statistics. An introduction to Discrete Mathematics. Topics include mathematical induction, modular arithmetic, Boolean algebras, basic sentential logic, elementary set theory and functional notation, partial orders, basic graph theory, basic counting. May not be held with MATH 1241 or MATH 3120. Prerequisite: Pre-calculus Mathematics 40S (60%) or the former Mathematics 40S (300) (60%), or the MSKL 0100 offered by Extended Education (C).

STAT 1150 – Introduction to Statistics and Computing

(Lab required) This course is recommended for students in mathematically rich disciplines, including Statistics, Mathematics, Actuarial Science, Computer Science, and related interdisciplinary programs. Topics to be covered include: summarizing and displaying large datasets, sampling, estimation and significance tests, probability calculations, random variables and probability distributions, introduction to regression and correlation analysis, statistical software. Not to be held with STAT 1000, STAT 1001, STAT 2000, STAT 2001 and STAT 2220. Prerequisite: Minimum of 70% in Pre-calculus Mathematics 40S or a grade of B or better in Mathematical Skills (MSKL 0100) offered by Extended Education or equivalent.

COMP 2140 – Data Structures and Algorithms

(Lab Required) Introduction to the representation and manipulation of data structures. Topics will include lists, stacks, queues, trees, and graphs. May not be held with COMP 2061. Prerequisites: one of COMP 1020, COMP 1021 (C).

MATH 2740 – Mathematics of Data Science

(Lab required) This course introduces some of the mathematical tools used in Data Science. Topics include linear algebra: least squares, singular value decomposition, principal components analysis, and graph theory: centrality, social network theory, clustering. This course can only be used as an elective in an Honours, Major, or Joint Honours program in Mathematics. Prerequisites: [(a "B" or better in MATH 1210 or MATH 1211) or (a "C" or better in one of MATH 1220, MATH 1300, or MATH 1301)] and (a "C" or better in one of MATH 1232, MATH 1690, MATH 1700, MATH 1701, or MATH 1710).

MATH 2720 – Multivariable Calculus – *Proposed description for Fall 2020*

Calculus of several variables. For students in one of the following programs: Actuarial Mathematics, Data Science, Statistics (honours or majors), Physics (honours or majors) Geophysics (honours or majors), and Physical Geography. May not be held with the former MATH 2750, the former MATH 2110, MATH 2130, MATH 2150, MATH 2151 or MATH 2721. Prerequisites: (One of MATH 1220, MATH 1300, MATH 1301, or MATH 1310) and (one of MATH 1232, MATH 1690, MATH 1700, MATH 1701, MATH 1710, or the former MATH 1730).

OR

MATH 2150 - Multivariable Calculus

(Lab required) The course is intended for students in mathematically rich disciplines. Parametric curves, arc length and curvature. Functions of several variables. Level curves. Partial derivatives, gradient, divergence and curl. Max/min problems. Double and triple integrals, line and surface integrals of functions and vector fields, and applications. Green's, Stokes, and divergence theorems. May not be held with MATH 2130, MATH 2151, MATH 2720, MATH 2721, or the former MATH 2750. Prerequisite: MATH 2080 (C) or MATH 2081 (C) or the former MATH 2202 (C).

MATH 2740 - Mathematical Techniques in Data Science

(Lab required) This course introduces some of the mathematical tools used in Data Science. Topics include linear algebra: least squares, singular value decomposition, principal components analysis, and graph theory: centrality, social network theory, clustering. This course can only be used as an elective in an Honours, Major, or Joint Honours program in Mathematics. Prerequisites: [(a "B" or better in MATH 1210 or MATH 1211) or (a "C" or better in one of MATH 1220, MATH 1300, or MATH 1301)] and (a "C" or better in one of MATH 1232, MATH 1690, MATH 1700, MATH 1701, or MATH 1710).

STAT 2150 – Statistics and Computing

(Lab required) This course is recommended for students in mathematically rich disciplines, including Statistics, Mathematics, Actuarial Science, Computer Science, and related interdisciplinary programs. Topics to be covered include: exploratory data analysis and visualization, graphical methods, random number generation, random variables, simple statistical models and computing, Monte Carlo methods,

large sample and simulation-based inference, statistical software packages. Prerequisites: [STAT 1150 (C) or STAT 2000 (B) or STAT 2001 (B)] and [a C or better in one of: MATH 1230, MATH 1500, MATH 1501, MATH 1510, the former MATH 1530, or MATH 1690 (C)].

STAT 2400 – Introduction to Probability 1 – *Proposed description for Fall 2020*
(Lab Required) Basic probability, discrete and continuous random variables, important families of distributions, functions of a random variable, expectation and variance, introduction to joint distributions. This course is not available to students who have previously obtained credit for STAT 3500. Prerequisites: [one of STAT 1150, STAT 2000 (B), or STAT 2001 (B)] and [one of MATH 1232, MATH 1690, MATH 1700 (B), MATH 1701 (B), MATH 1710 (B), or the former MATH 1730 (B)].

COMP 3380 – Databases Concepts and Usages
An introduction to database systems including the relational, hierarchical, network and entity-relationship models with emphasis on the relational model and SQL. Prerequisite: one of COMP 2140 or COMP 2061(C).

COMP 4360 – Machine Learning - *Proposed description for Fall 2020*
Learning strategies; evaluation of learning; learning in symbolic systems; neural networks, genetic algorithms. May not be held with ECE 4450. Prerequisite: COMP 3190 or [STAT 2400, and MATH 2740, and DATA 2010].

MATH 3490 - Optimization - *Proposed description for Fall 2020*
(Lab required) This course introduces the theory and practice of optimization. Both unconstrained and constrained problems are considered, as well as continuous and discrete optimization. Topics include linear programming, unconstrained optimization, constrained nonlinear optimization and integer programming. Applications to Statistics and Data Science will be explored. Prerequisites: [one of MATH 2090, MATH 2091, MATH 2740, the former MATH 2300, the former MATH 2301, the former MATH 2350, or the former MATH 2352] and [one of MATH 2150, MATH 2151, MATH 2720, MATH 2721, or the former MATH 2750].

STAT 3100 – Introduction to Inference - *Proposed to be introduced in Fall 2020*
(Lab Required) Overview of the most common approaches to inference associated with point estimation, confidence intervals and hypothesis testing, including likelihood, least-squares and moment-based methods, as well as large sample approximations. May not be held with the former STAT 3800, or the former STAT 3600. Prerequisites: STAT 2150 and STAT 2400. Pre- or Corequisite: one of MATH 2150, MATH 2151, MATH 2720, MATH 2721, or the former MATH 2750.

STAT 3150 – Statistical Computing - *Proposed to be introduced in Fall 2020*
Programming using statistical software, random number generation, principles of Monte Carlo simulation, simulation-based inference, Monte Carlo integration, and other related topics. Prerequisites: STAT 2150 and STAT 2400.

STAT 3450 Linear Models - ***Proposed to be introduced in Fall 2020***
Least-squares approach to simple and multiple regression, one-way analysis of variance, two-way analysis of variance and related topics. May not be held with STAT 3000, the former STAT 3470, or the former STAT 3120. Prerequisites: STAT 2150 and STAT 2400 and [one of MATH 1220, MATH 1300 (B), or MATH 1301 (B)].

Student must choose at least 4 courses from the list of recommended CS, Math and Statistics Electives below, with at least one course from each of the three departments.

Recommended CS Electives

COMP 2080 – Analysis of Algorithms
Methods of analyzing the time and space requirements of algorithms. Average case and worst case analysis. Models of computation. Prerequisites: MATH 1240 (C), MATH 1241 (C) or COMP 2130 (C); and one of COMP 2140, or the former COMP 2061 (C). STAT 1000 or STAT 1001 or STAT 1150 is strongly recommended.

COMP 2150 – Object Orientation
Design and development of object-oriented software. Topics will include inheritance, polymorphism, data abstraction and encapsulation. Examples will be drawn from several programming languages. Prerequisite: COMP 2160; and one of COMP 2140 or COMP 2061(C).

COMP 4510 – Introduction to Parallel Computation
An overview of the architectures of current parallel processors and the techniques used to program them. Not to be held with ECE 4530. Prerequisites: COMP 3370 (C) and COMP 3430 (C).

COMP 4710 – Introduction to Data Mining
Introduction to data mining concepts and their applications. Prerequisite: COMP 3380 or consent of department.

Recommended Math Electives

MATH 2070 – Graph Theory 1
(Lab required) Introduction to graphs, digraphs, and multigraphs. Topics include trees, cycles and circuits, planarity, basic graph algorithms, and applications of graph theory to social and physical sciences. May not be held with MATH 2071 or the former MATH 2400 or COMP 4340. Prerequisites: [MATH 1240 (C) or MATH 1241 (C)] and [MATH 1220 (C) or MATH 1300 (B) or MATH 1301 (B)].

MATH 2080 – Introduction to Analysis
(Lab required) The course is intended for students in mathematically rich disciplines. Fundamental properties of the real number system as a complete ordered field, Archimedean property, existence of square roots, density of rational numbers, uncountability of real numbers. Sequences, subsequences, limit theorems, monotonicity, Bolzano-Weierstrass theorem, Cauchy sequences. Rigorous treatment of limits and continuity of functions of one and several variables. Uniform continuity. Applications. May not

be held with MATH 2081 or the former MATH 2202. Prerequisites: [MATH 1232 (C) or MATH 1690 (C) or MATH 1700 (B) or MATH 1701 (B) or MATH 1710 (B)] and [MATH 1220 (C) or MATH 1300 (B) or MATH 1301 (B)] and [MATH 1240 (C) or MATH 1241 (C)].

MATH 2090 – Linear Algebra 2
(Lab required) The course is intended for students in mathematically rich disciplines. Abstract vector spaces, linear transformations, bases and coordinatization, matrix representations, orthogonalization, diagonalization, principal axis theorem. May not be held with MATH 2091 or the former MATH 2300 or the former MATH 2301 or the former MATH 2350 or the former MATH 2352. Prerequisite: MATH 1220 (C) or MATH 1300 (B) or MATH 1301 (B).

MATH 2180 – Real Analysis 1
(Lab required) Introduction to metric spaces including connectedness, compactness and continuity; topics in infinite series of numbers, and sequences and series of functions. May not be held with the former MATH 3230. Prerequisite: MATH 2080 (C) or MATH 2081 (C) or the former MATH 2202 (C).

MATH 4370 – Linear Algebra and Matrix Analysis
Vector and matrix norms, matrix factorizations, eigenvalues and eigenvectors, theory of non-negative matrices. Applications to differential equations, math biology, numerical analysis, digital image processing, data mining, GPS, Markov chains, graph theory, etc will be given in this course. Not to be held with the former MATH 4310. Prerequisite: MATH 2090 (C) or MATH 2091 (C) or the former MATH 2300 (B) or the former MATH 2301 (B) or the former MATH 2350 (C) or the former MATH 2352 (C).

Recommended Statistics Electives

STAT 2300 – Principles of Data Collection - *Proposed to be introduced in Fall 2020*
Introduction to the basic principles and foundational aspects of data collection with a focus on the design and basic analysis of observational and experimental studies. Important issues like randomization, blocking and confounding, sampling, stratification, response bias and nonresponse will be covered. May not be held with the former STAT 3480. Prerequisite: one of STAT 1150, STAT 2000 (B), or STAT 2001 (B).

STAT 2800 – Introduction to Probability 2 - *Proposed to be introduced in Fall 2020*
(Lab Required) Joint and conditional distributions, distributions of functions of random variables, laws of total expectation and variance, moments and generating functions. May not be held with the former STAT 3400 or the former STAT 3500. Prerequisite: STAT 2400. Pre- or Corequisite: one of MATH 2150, MATH 2151, MATH 2720, MATH 2721, or the former MATH 2750.

STAT 3030 - Introduction to Stochastic Processes - *Proposed to be introduced in Fall 2020*
Review of conditional probability and expectations, Markov chains, homogeneous and nonhomogeneous Poisson processes. Optional topics include: reliability theory, queuing theory and

Brownian motion. May not be held with the former STAT 3050. Prerequisites: [one of STAT 2800, the former STAT 3400, or the former STAT 3500] and [one of MATH 2150, MATH 2151, MATH 2720, MATH 2721, or the former MATH 2750].

STAT 3550 - Nonlinear Regression Models - *Proposed to be introduced in Fall 2020*
Nonlinear multiple regression, logistic regression, Poisson regression and generalizations, over/under dispersion, model selection techniques. May not be held with STAT 4000. Prerequisite: One of STAT 3450, the former STAT 3470, or the former STAT 3120. Pre- or corequisites: [one of STAT 3100, the former STAT 3800, or the former STAT 3600] and STAT 3150.

STAT 3690 - Multivariate Analysis - *Proposed to be introduced in Fall 2020*
Multivariate normal distribution, multivariate regression and applications, visualization of multivariate data and dimension reduction, principal component analysis, canonical correlation. May not be held with the former STAT 4690. Prerequisites: [one of STAT 2800, the former STAT 3400, or the former STAT 3500] and [one of STAT 3450, the former STAT 3470, or the former STAT 3120] and [one of MATH 2150, MATH 2151, MATH 2720, MATH 2721, or the former MATH 2750].

STAT 4100 – Statistical Inference - *Proposed description for Fall 2020*
(Lab required) Rigorous treatment of inferential methods associated with point estimation, confidence intervals and hypothesis testing, including large sample techniques. May not be held with the former STAT 4140. Prerequisites: [one of STAT 2800, the former STAT 3400, or the former STAT 3500] and [one of STAT 3100, the former STAT 3800, or the former STAT 3600].

STAT 4150 – Bayesian Analysis and Computing - *Proposed to be introduced in Fall 2020*
(Lab required) Bayesian modelling, prior and posterior distributions, predictive distributions, credible regions, Bayes factors and model uncertainty, Bayesian computational methods. Prerequisites: [one of STAT 2800, the former STAT 3400, or the former STAT 3500] and [one of STAT 3100, the former STAT 3800, or the former STAT 3600] and STAT 3150.

STAT 4250 – Statistical Learning - *Proposed to be introduced in Fall 2020*
(Lab required) Topics related to the use of Statistics and inferential methods in machine learning, including the lasso and ridge regression, classification and clustering, neural networks, support vector machines, bagging, boosting and ensemble methods. Prerequisites: [one of STAT 3100, the former STAT 3800, or the former STAT 3600] and STAT 3150 and [STAT 3690 or the former STAT 4690].

Co-op Courses if Selected

SCI 3980 - Co-operative Education Work Term 1
Supervised work experience with an approved employer for a minimum of 12 weeks full-time. Restricted to students admitted to the Honours or Major Co-operative Education Option in the Faculty of Science. Completion of co-op pre-employment workshops required. Final work term report required. Prerequisite: Written permission from the Faculty of Science Co-operative Education Office. (Pass/Fail grade only).

Program Information

The Faculty of Science offers an interdisciplinary 4-year Major program in Data Science. Data Science is an emerging field of study that combines computer science, mathematics and statistics to collect, analyze, visualize and interpret data.

Data Science Entry, Continuation, and Graduation requirements

To enter the Major Degree program in Data Science, a student must have completed at least 24 credit hours with a minimum DGPA of 2.00, and also obtained a minimum grade of "C+" in each of COMP 1020, MATH 1232 (or MATH 1700 or 1710), and STAT 1150.

To continue in the Data Science Major Degree program, students must maintain a minimum DGPA of 2.00.

To graduate with the Bachelor of Science (Major) in Data Science, a student must obtain passing grades on all courses, obtain a minimum DGPA of 2.00, and a minimum grade of C in all required and optional courses that contribute to the Major.

Major Cooperative Option

A co-operative education option is available. Students should refer to Section 3.5 of this chapter for further information on the Co-op programs.

The course and minimum grade requirements for entry and continuation in the Co-operative Option are the same as those required for the regular Major program. However, the entry and continuation DGPA requirement is set at a minimum of 2.5.

Before beginning their first co-op work term, students are required to complete the first and second year requirements of the program.

YEAR 1	YEAR 2	YEAR 3	YEAR 4
DATA SCIENCE MAJOR (Including Co-operative Option if selected) 120 CREDIT HOURS			
COMP 1012[1], COMP 1020 (C+) MATH 1220[1], MATH 1230[1], MATH 1232[1] (C+), MATH 1240 STAT 1150 (C+) 6 credit hours from the Faculty of Arts, which	COMP 2140 MATH 2720[1], MATH 2740 DATA 2010 STAT 2150, STAT 2400 12 credit hours of electives	COMP 3380, COMP 4360 MATH 3490 DATA 3010, DATA 4010[2] (6) STAT 3100, STAT 3150, STAT 3450 3 credit hours from: COMP 2080, COMP 2150, COMP 4510, COMP 4710	

should include the required "W" course 3 credit hours of electives		3 credit hours from: MATH 2070, MATH 2080, MATH 2090, MATH 2180, MATH 4370 3 credit hours from: STAT 2300, STAT 2800, STAT 3030, STAT 3550, STAT 3690, STAT 4100, STAT 4150, STAT 4250 3 additional credit hours from the Faculty of Science[3] 21 credit hours of electives[3] The above 33 credit hours must include at least 12 credit hours of Faculty of Science courses taken at the 3000 or 4000 level	
		Co-op Requirements (if selected): SCI 3980, SCI 3990, and SCI 4980, and SCI 4990 (if a 4th work term is selected)	
30 Hours	30 Hours	30 Hours	30 Hours

NOTES:

[1] The following substitutions are allowed: COMP 1010 in place of COMP 1012; MATH 1300 in place of MATH 1220; MATH 1500 or MATH 1510 in place of MATH 1230; MATH 1700 (C+) or MATH 1710 (C+) in place of MATH 1232; MATH 2150 in place of MATH 2720.

[2] Should be taken in graduating year.

[3] Courses may be chosen from COMP, MATH, or STAT courses included in the course lists in the program chart provided the courses have not been used toward another program requirement.

(Letters in brackets indicate minimum prerequisite standing for further study. The number 6 in brackets indicates a 6 credit hour course.)

Manitoba
Education and Advanced Learning

ADVANCED LEARNING DIVISION
Program Proposal Financial Form

Form Instructions:

1. When proposing a new program *Current Fiscal Year* (the first column) should be left blank, with the first year of the program starting in year 1.

2. When proposing a new program expansion *Current Fiscal* should be entered in the first column.

3. If a program reaches maturity prior to *Fiscal Year 4,* remaining fiscal year columns must still be completed so that *Ongoing Program Funding* can be calculated.

4. Fill in line items for revenue, expenditure, and capital as these pertain to the program. Examples are correspondently listed to the right of the table.

5. Ensure that line items account for overhead. For example, include the amount of tuition that the program will receive after administrative overhead.

6. Only fill out areas shaded in green, using cash accounting. The increment, on-going and total will self-populate accordingly.

Overview	
Institution:	University of Manitoba
Program Name:	Data Science
Contact Information:	Ben Pak Ching Li, Associate Dean, Faculty of Science, University of Manitoba, Ben.Li@umanitoba.ca
Date:	

	Current Fiscal Year	Fiscal Year 1	Increment	Fiscal Year 2	Increment	Fiscal Year 3	Increment	Fiscal Year 4	Increment	Ongoing Program Funding
	(Enter 0's if new program)	Budget Yr. 1	(change from current year to year 1)	Budget Yr. 2	(change from year 1 to year 2)	Budget Yr. 3	(change from year 2 to year 3)	Budget Yr. 4	(change from year 3 to year 4)	
REVENUE INFORMATON										
Contribution from Institution		$ 243,730	$ 243,730	$ 292,328	$ 48,598	$ 365,135	$ 72,806	$ 437,832	$ 72,697	$ 437,832
Tuition		$ 210,255	$ 210,255	$ 268,706	$ 58,451	$ 357,715	$ 89,009	$ 457,159	$ 99,445	$ 457,159
Student Fees		$ 3,150	$ 3,150	$ 3,780	$ 630	$ 4,725	$ 945	$ 5,670	$ 945	$ 5,670
Other		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Contribution from Unit (Existing Resources)		$ 151,541	$ 151,541	$ 274,193	$ 122,652	$ 401,138	$ 126,945	$ 532,525	$ 131,388	$ 532,525
		$ -		$ -		$ -		$ -	$ -	
		$ -		$ -		$ -		$ -	$ -	
		$ -		$ -		$ -		$ -	$ -	
		$ -		$ -		$ -		$ -	$ -	
Total Revenue (A)	$ -	$ 608,676	$ 608,676	$ 839,007	$ 230,331	$ 1,128,712	$ 289,705	$ 1,433,187	$ 304,475	$ 1,433,187

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ALD Form

Institution:	University of Manitoba
Program Name:	Data Science
Contact Information:	Ben Pak Ching Li, Associate Dean, Faculty of Science, University of Manitoba, Ben.Li@umanitoba.ca
Date:	

	Current Fiscal Year (Enter 0's if new program)	Fiscal Year 1 Budget Yr. 1	Increment (change from current year to year 1)	Fiscal Year 2 Budget Yr. 2	Increment (change from year 1 to year 2)	Fiscal Year 3 Budget Yr. 3	Increment (change from year 2 to year 3)	Fiscal Year 4 Budget Yr. 4	Increment (change from year 3 to year 4)	Ongoing Program Funding
EXPENDITURE INFORMATON										
New Academic Salaries - Direct		$ 142,463	$ 142,463	$ 330,691	$ 188,228	$ 360,648	$ 29,957	$ 387,887	$ 27,239	$ 387,887
Existing Academic Salaries - Direct		$ 134,733	$ 134,733	$ 256,796	$ 122,064	$ 383,132	$ 126,336	$ 513,890	$ 130,758	$ 513,890
New Professional/Support Salaries - Direct		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Existing Professional/Support Salaries - Direct		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Operating Expenses		$ 165,000	$ 165,000	$ 25,000	$ (140,000)	$ 95,000	$ 70,000	$ 165,000	$ 70,000	$ 165,000
Student Support		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Indirect Salary Expenses		$ 16,808	$ 16,808	$ 17,396	$ 588	$ 18,005	$ 609	$ 18,635	$ 630	$ 18,635
Administrative Overhead		$ 156,301	$ 156,301	$ 197,801	$ 41,501	$ 260,928	$ 63,127	$ 330,630	$ 69,701	$ 330,630
		$ -		$ -		$ -		$ -		$ -
		$ -		$ -		$ -		$ -		$ -
Total Expenditures (B)	$ -	$ 615,305	$ 615,305	$ 827,685	$ 212,380	$ 1,117,714	$ 290,029	$ 1,416,043	$ 298,328	$ 1,416,043

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Institution:	University of Manitoba
Program Name:	Data Science
Contact Information:	Ben Pak Ching Li, Associate Dean, Faculty of Science, University of Manitoba, Ben.Li@umanitoba.ca
Date:	

	Current Fiscal Year	Fiscal Year 1	Increment	Fiscal Year 2	Increment	Fiscal Year 3	Increment	Fiscal Year 4	Increment	Ongoing Program Funding
	(Enter 0's if new program)	Budget Yr. 1	(change from current year to year 1)	Budget Yr. 2	(change from year 1 to year 2)	Budget Yr. 3	(change from year 2 to year 3)	Budget Yr. 4	(change from year 3 to year 4)	
CAPITAL INFORMATON										
Major Equipment		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Vehicles		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Renovations		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Furniture		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Other		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
		$ -		$ -		$ -		$ -		$ -
		$ -		$ -		$ -		$ -		$ -
		$ -		$ -		$ -		$ -		$ -
		$ -		$ -		$ -		$ -		$ -
		$ -		$ -		$ -		$ -		$ -
		$ -		$ -		$ -		$ -		$ -
		$ -		$ -		$ -		$ -		$ -
		$ -		$ -		$ -		$ -		$ -
Total Capital (C)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Revenue less Expenditures and Capital (A-(B+C))	$ -	$ (6,629)	$ (6,629)	$ 11,322	$ 17,951	$ 10,998	$ (325)	$ 17,144	$ 6,146	$ 17,144
Funding Request		$ -		$ -		$ -		$ -		

SENATE PLANNING AND PRIORITY COMMITTEE (SPPC)

New Program Approval - Financial Form

FACULTY / SCHOOL Science
PROGRAM Data Science

1. STAFFING REQUIREMENTS (FTE)	Year 1	Year 2	Year 3	Year 4	Year 5
New Academic Positions (FTE) (Appendix A)	2.07	5.30	6.03	6.62	6.73
New Professional and Support Positions (FTE) (Appendix A)	-	-	-	-	-
New Indirect Staff (FTE) (Appendix A)	-	-	-	-	-
Subtotal Staffing Requirements (FTE)	2	5	6	7	7

2. PROGRAM COSTS					
Direct Program Costs					
New Academic Salaries (incl bpl) (Appendix A)	$ 142,463	$ 330,691	$ 360,648	$ 387,887	$ 401,463
Existing Academic Salaries (incl bpl) (Appendix A)	134,733	256,796	383,132	513,890	531,876
New Professional/Support Salaries (incl bpl) (Appendix A)	-	-	-	-	-
Existing Professional/Support Salaries (incl bpl) (Appendix A)	-	-	-	-	-
Operating Expenses (Appendix B)	165,000	25,000	95,000	165,000	95,000
Student (Graduate/Undergraduate) Support (Appendix C)	-	-	-	-	-
Major Equipment (Appendix D)	-	-	-	-	-
Vehicles (Appendix D)	-	-	-	-	-
Renovations (Appendix D)	-	-	-	-	-
Furniture (Appendix D)	-	-	-	-	-
Other Capital (Appendix D)	-	-	-	-	-
Subtotal Direct Program Costs	$ 442,196	$ 612,488	$ 838,781	$ 1,066,777	$ 1,028,340

Indirect Program Costs

New Indirect Salary Expenses (incl bpl) (Appendix A)	$ -	$ -	$ -	$ -	$ -
Existing Indirect Salary Expenses (incl bpl) (Appendix A)	16,808	17,396	18,005	18,635	19,288
Tax on Grant and Tuition Revenue	63,571	77,766	99,150	121,458	137,919
Administrative Overhead	11,442	14,579	19,346	24,644	29,077
Subtotal Indirect Program Costs	$ 91,821	$ 109,741	$ 136,500	$ 164,738	$ 186,284

Total Program Costs (Direct & Indirect)	$ 534,017	$ 722,228	$ 975,281	$ 1,231,515	$ 1,214,623

3. ENROLMENT	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Expected Enrolment (headcount)	50	60	75	90	100
Expected Enrolment (credit hours)	1,500	1,800	2,250	2,700	3,000

4. PROGRAM REVENUE ALLOCATED TO FACULTY/SCHOOL					
Operating Grant Revenue (see note)	$ 243,730	$ 292,328	$ 365,135	$ 437,832	$ 486,236
Tuition Revenue (Appendix E)					
• Credit Hour Based					
Undergraduate	114,416	145,788	193,455	246,440	290,772
Graduate	-	-	-	-	-
• Program Based	-	-	-	-	-
• Program/Course Specific Fees	3,150	3,780	4,725	5,670	6,300
• Other Compulsory Student Fees	14,551	17,461	21,827	26,192	29,102
Other revenue	-	-	-	-	-
Total Program Revenue	$ 375,847	$ 459,358	$ 585,141	$ 716,134	$ 812,410

5. EXISTING RESOURCES					
From Operations:					
Academic Salaries (Appendix A)	$ 134,733	$ 256,796	$ 383,132	$ 513,890	$ 531,876
Professional and Support Salaries (Appendix A)	-	-	-	-	-
Indirect Salaries (Appendix A)	16,808	17,396	18,005	18,635	19,288
Current/prior years surplus (carryover)					
From Other Sources:					
Subtotal Existing Resources	$ 151,541	$ 274,193	$ 401,138	$ 532,525	$ 551,164

6. Program shortfall (surplus) (Program Costs -Program Revenue - Existing Resources)	$	6,629	$	(11,322)	$	(10,998)	$	(17,144)	$ (148,950)
Internal Funds Requested through Strategic Allocation									
Funds Requested of the Provincial Government									
Balance (should be zero)	$	6,629	$	(11,322)	$	(10,998)	$	(17,144)	$ (148,950)

Trevor Schultz   Digitally signed by Trevor Schultz
DN: cn=Trevor Schultz, o=Dean's Office Science, ou=Faculty of Science, email=Trevor.Schultz@umanitoba.ca, c=CA
Date: 2019.09.16 08:45:38 -05'00'

September 16, 2019

Submitted by Faculty/School Budget Officer (signature)   **Date**

Reviewed by Graduate Studies Business Manager   **Date**
(For graduate program submissions only)

Chester
Wojciechowski

September 16/19

Reviewed by University Budget Officer (signature)   **Date**

		Average Salary Increase	3.5%
		Average Benefits and Pay Levy	20%

Appendix A - Salary Expenses

SENATE PLANNING AND PRIORITY COMMITTEE
NEW PROGRAM APPROVAL PROCESS

NEW	Year 1		Year 2		Year 3		Year 4		Year 5	
Academic	FTE	Total Salary	FTE	Total Salary	FTE	Total Salary	FTE	Total Salary	FTE	Total Salary
Excluded Academic Admin	-	$ -	-	$ -	-	$ -	-	$ -	-	$ -
Professor	-	-	-	-	-	-	-	-	-	-
Assoc/Asst Professor or Senior Instructor	1.00	95,000	2.00	195,325	2.00	202,161	2.00	209,237	2.00	216,560
Lecturer/Instructor/Sessionals	0.17	5,764	1.00	34,787	1.17	41,769	1.33	48,996	1.33	50,710
Librarians	-	-	-	-	-	-	-	-	-	-
Teaching Assistants	0.91	17,955	2.30	45,463	2.86	56,610	3.28	65,007	3.40	67,282
Subtotal New Academic Salaries	**2.07**	**118,720**	**5.30**	**275,576**	**6.03**	**300,540**	**6.62**	**323,239**	**6.73**	**334,553**
Benefits and Pay Levy		23,744		55,115		60,108		64,648		66,911
Total New Academic Salaries (including BPL)	**2.07**	**$ 142,463**	**5.30**	**$ 330,691**	**6.03**	**$ 360,648**	**6.62**	**$ 387,887**	**6.73**	**$ 401,463**
Professional and Support Staff										
EMAPS	-	$ -	-	$ -	-	$ -	-	$ -	-	$ -
AESES	-	-	-	-	-	-	-	-	-	-
CUPE TA's	-	-	-	-	-	-	-	-	-	-
Subtotal New Professional and Support Staff	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Benefits and Pay Levy		-		-		-		-		-
Total New Professional and Support Staff (incl. BPL)	**-**	**$ -**	**-**	**$ -**	**-**	**$ -**	**-**	**$ -**	**-**	**$ -**
Indirect Staff (Within your faculty/school)										
EMAPS	-	$ -	-	$ -	-	$ -	-	$ -	-	$ -
AESES	-	$ -	-	-	-	-	-	-	-	-
CUPE TA's	-	-	-	-	-	-	-	-	-	-
Subtotal New Indirect Staff	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Benefits and Pay Levy		-		-		-		-		-
Total New Indirect Staff (including BPL)	**-**	**$ -**	**-**	**$ -**	**-**	**$ -**	**-**	**$ -**	**-**	**$ -**
Total New Staff		**$ 142,463**		**$ 330,691**		**$ 360,648**		**$ 387,887**		**$ 401,463**

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Appendix A - Salary Expenses

SENATE PLANNING AND PRIORITY COMMITTEE
NEW PROGRAM APPROVAL PROCESS

EXISTING (Within your faculty/school)	Year 1		Year 2		Year 3		Year 4		Year 5	
Academic	FTE	Total Salary	FTE	Total Salary	FTE	Total Salary	FTE	Total Salary	FTE	Total Salary
Excluded Academic Admin	-	$ -	-	$ -	-	$ -	-	$ -	-	$ -
Professor	0.52	65,272	0.97	124,405	1.42	185,608	1.87	248,953	1.87	257,667
Assoc/Asst Professor or Senior Instructor	0.52	47,006	0.96	89,592	1.41	133,669	1.86	179,288	1.86	185,563
Lecturer/Instructor/Sessionals	-	-	-	-	-	-	-	-	-	-
Librarians	-	-	-	-	-	-	-	-	-	-
Teaching Assistants	-	-	-	-	-	-	-	-	-	-
Subtotal Existing Academic Salaries	**1.03**	**112,277**	**1.93**	**213,997**	**2.83**	**319,277**	**3.73**	**428,242**	**3.73**	**443,230**
Benefits and Pay Levy		22,455		42,799		63,855		85,648		88,646
Total Existing Academic Salaries (including BPL)	**1.03**	**$ 134,733**	**1.93**	**$ 256,796**	**2.83**	**$ 383,132**	**3.73**	**$ 513,890**	**3.73**	**$ 531,876**
Professional and Support Staff										
EMAPS	-	$ -	-	$ -	-	$ -	-	$ -	-	$ -
AESES	-	-	-	-	-	-	-	-	-	-
CUPE TA's	-	-	-	-	-	-	-	-	-	-
Subtotal Existing Professional and Support Staff	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Benefits and Pay Levy		-		-		-		-		-
Total Existing Professional and Support Staff (incl. BPL)	**-**	**$ -**	**-**	**$ -**	**-**	**$ -**	**-**	**$ -**	**-**	**$ -**
Indirect Staff										
EMAPS	-	$ -	-	$ -	-	$ -	-	$ -	-	$ -
AESES	0.20	14,007	0.20	14,497	0.20	15,004	0.20	15,529	0.20	16,073
CUPE TA's	-	-	-	-	-	-	-	-	-	-
Subtotal Existing Indirect Staff	**0.20**	**14,007**	**0.20**	**14,497**	**0.20**	**15,004**	**0.20**	**15,529**	**0.20**	**16,073**
Benefits and Pay Levy		2,801		2,899		3,001		3,106		3,215
Total Existing Indirect Staff (including BPL)	**0.20**	**$ 16,808**	**0.20**	**$ 17,396**	**0.20**	**$ 18,005**	**0.20**	**$ 18,635**	**0.20**	**$ 19,288**
Total Existing Staff		**$ 151,541**		**$ 274,193**		**$ 401,138**		**$ 532,525**		**$ 551,164**
GRAND TOTAL		**$ 294,004**		**$ 604,884**		**$ 761,786**		**$ 920,413**		**$ 952,627**

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Appendix B - Operating Expenses

SENATE PLANNING AND PRIORITY COMMITTEE
NEW PROGRAM APPROVAL PROCESS

	Direct Expenses	Year 1	Year 2	Year 3	Year 4	Year 5
700BGT	Travel - Budget (includes visiting speakers, orientation, research day)	$ -	$ -	$ -	$ -	$ -
701BGT	Hospitality - Budget	$ -	$ -	$ -	$ -	$ -
704BGT	Printing and Duplicating - Budget	$ -	$ -	$ -	$ -	$ -
706BGT	Consumable Materials/Supplies Budget (includes computers)	$ 140,000	$ -	$ 70,000	$ 140,000	$ 70,000
708BGT	Telecommunications - Budget	$ -	$ -	$ -	$ -	$ -
710BGT	Other Expenses (Nonconsumble) Budget	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000
713BGT	Insurance - Budget	$ -	$ -	$ -	$ -	$ -
716BGT	Externally Contracted Serv - Budget	$ -	$ -	$ -	$ -	$ -
718BGT	Professional Fees - Budget	$ -	$ -	$ -	$ -	$ -
740BGT	Repairs and Maintenance - Budget	$ -	$ -	$ -	$ -	$ -
	Subtotal Direct Operating	**$ 165,000**	**$ 25,000**	**$ 95,000**	**$ 165,000**	**$ 95,000**

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Appendix C - Student Support

SENATE PLANNING AND PRIORITY COMMITTEE
NEW PROGRAM APPROVAL PROCESS

Graduate / Undergraduate Support Expense		Year 1		Year 2		Year 3		Year 4		Year 5	
7700	Scholarships	$	-	$	-	$	-	$	-	$	-
7710	Bursaries	$	-	$	-	$	-	$	-	$	-
7720	Awards										
	Subtotal Operating	$	-	$	-	$	-	$	-	$	-

Appendix D - Capital Costs

SENATE PLANNING AND PRIORITY COMMITTEE
NEW PROGRAM APPROVAL PROCESS

Capital Item	Year 1 QTY	Unit Cost	Total	Year 2 QTY	Unit Cost	Total	Year 3 QTY	Unit Cost	Total	Year 4 QTY	Unit Cost	Total	Year 5 QTY	Unit Cost	Total
Major Equipment	-	$ -	$ -	-	$ -	$ -	-	$ -	$ -	-	$ -	$ -	-	$ -	$ -
Vehicles	-	$ -	$ -	-	$ -	$ -	-	$ -	$ -	-	$ -	$ -	-	$ -	$ -
Renovations	-	$ -	$ -	-	$ -	$ -	-	$ -	$ -	-	$ -	$ -	-	$ -	$ -
Furniture	-	$ -	$ -	-	$ -	$ -	-	$ -	$ -	-	$ -	$ -	-	$ -	$ -
Other (*list*)			-			-			-			-			-
…															
Subtotal Operating			$ -			$ -			$ -			$ -			$ -

Appendix E - Tuition   Fee Increase   6.5%

SENATE PLANNING AND PRIORITY COMMITTEE
NEW PROGRAM APPROVAL PROCESS

1. EXPECTED ENROLMENT	Year 1	Year 2	Year 3	Year 4	Year 5
Headcount					
Undergraduate	50	60	75	90	100
Graduate					
Graduate (continuing only)					
Credit Hours					
Undergraduate	1,500	1,800	2,250	2,700	3,000
Graduate					

2. TUITION REVENUE GENERATED BY THE PROGRAM					
• Credit Hour Based - (enter credit hour rate in yr 1)	$ 140	$ 149	$ 159	$ 169	$ 180
Undergraduate	210,255	268,706	357,715	457,159	540,972
Graduate	-	-	-	-	-
• Program Based - (enter annual program fee in yr 1)	$ -	$ -	$ -	$ -	$ -
Undergraduate	-	-	-	-	-
Graduate	-	-	-	-	-
Total Tuition Fees	$ 210,255	$ 268,706	$ 357,715	$ 457,159	$ 540,972
• Continuing Fee - (enter annual continuing fee in yr 2)		$ -	$ -	$ -	$ -
Graduate	-	-	-	-	-
• Program/Course Specific Fees					
Lab Fees - (enter amount in applicable years)	3,150	3,780	4,725	5,670	6,300
Field Trip Fees - (enter amount in applicable years)					
(Fee description/rate)					

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….. *(add as required)…*					
….. *(add as required)…*					
Total Program/Course Specific Fees	$ 3,150	$ 3,780	$ 4,725	$ 5,670	$ 6,300

TOTAL TUITION AND FEES GENERATED BY THE PROGRAM	$ 213,405	$ 272,486	$ 362,440	$ 462,829	$ 547,272

3. TUITION REVENUE ALLOCATED TO THE FACULTY					
• Credit Hour Based - Undergraduate (enter amount)	114,416	145,788	193,455	246,440	290,772
• Credit Hour Based - Graduate	-	-	-	-	-
• Program Based	-	-	-	-	-
• Program/Course Specific Fees	3,150	3,780	4,725	5,670	6,300
• Other Compulsory Student Fees (enter amount)	14,551	17,461	21,827	26,192	29,102
TOTAL TUITION REVENUE ALLOCATED TO THE FACULTY	$ 132,117	$ 167,029	$ 220,007	$ 278,302	$ 326,174

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Operating Worksheet

Acct	Expense	Year 1	Year 2	Year 3	Year 4	Year 5
700BGT	**Travel and Conferences**	$ -	$ -	$ -	$ -	$ -
7001	Travel Academic					
7002	Travel Administration					
7003	Relocation					
7004	Staff Recruitment					
7005	Field Trips					
7006	Team Travel					
7007	Local Travel					
7009	Student Recruitment					
7010	Student Travel					
7130	Airfare					
7131	Accommodation					
7132	Meals (Per Diem-No receipts)					
7133	Meals (with receipts)					
7134	Mileage (Km's)					
7135	Parking					
7136	Car Rental					
7137	Conference Registration					
7138	Taxis					
7139	Misc Travel/Incidentals					
7676	Hospitality					
704BGT	**Printing and Duplicating - Budget**	$ -	$ -	$ -	$ -	$ -
7040	Printing					
7041	Copying					
706BGT	**Consumable Materials/Supplies Budgt**	$ 140,000	$ -	$ 70,000	$ 140,000	$ 70,000
7060	Office Supplies					
7061	Lab Supplies					
7062	Audio Visual Supplies					
7063	Agricultural Supplies					
7064	Safety Supplies					
7065	Sports and Athletic Supplies					
7066	Books and Subscriptions					
7067	Other Supplies					
7068	Computing Supplies	140,000		70,000	140,000	70,000
7069	Maintenance and Cleaning Supplies					
7070	Dental Supplies					
7071	Equipment Foreign Operations					
7072	Supplies Foreign Operations					
708BGT	**Telecommunications - Budget**	$ -	$ -	$ -	$ -	$ -
7080	IST Telecommunications					
7082	Physical Plant Postage					
7085	Departmental Communications					
710BGT	**Other Expenses (Nonconsumble) Budgt**	$ 25,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000
7100	Affiliated Personnel Costs					
7101	Professional Development					
7102	Professional Memberships					

Operating Worksheet

Acct	Expense	Year 1	Year 2	Year 3	Year 4	Year 5
7103	Conferences/Events Hosted by U of M					
7104	Other Services					
7106	Bad Debts					
7107	Advertising and Promotion					
7108	Licenses and Permits					
7109	Software Maintenance	25,000	25,000	25,000	25,000	25,000
7110	Staff Benefits					
7111	Other Non-Consumable Expenses					
7114	Internal Financing Expense					
7116	Internal Services Expense					
718BGT	**Professional and External Services**	$ -	$ -	$ -	$ -	$ -
7160	Externally Contracted Services					
7180	Professional Fees					
7185	Investment Management Expenses					
740BGT	**Repairs and Maintenance**	$ -	$ -	$ -	$ -	$ -
7400	Equipment Repairs & Maintenance					
7401	Building Repairs & Maintenance					
7402	Equipment Rental					
7403	Grounds Maintenance					

University of Manitoba Libraries

Statement for Undergraduate Curriculum Change

UNIVERSITY
OF MANITOBA

Libraries

Faculty	Science
Department	Computer Science
Course #	DATA 2010
Course Name	Tools and Techniques for Data Science

The Libraries' collection can support this new course, as it was described in the documents provided.

It is not expected that this proposed curriculum change will affect the Libraries' ability to continue to provide services such as research and teaching support, reference assistance, document delivery, and the technical infrastructure which allows the discovery and delivery of the Libraries' resources and services.

Grace Romund
Science Liaison Librarian

Tania Gottschalk
Sciences and Technology Library, Acting Head

Kristen Kruse

Kristen Kruse
Acting Coordinator, Collections Management

Lisa Hanson O'Hara
Acting University Librarian

December 14, 2018

Date

University of Manitoba Libraries

Statement for Undergraduate Curriculum Change

UNIVERSITY
OF MANITOBA

Libraries

Faculty	Science
Department	Computer Science
Course #	DATA 3010
Course Name	Data Science 2

The Libraries' collection can support this new course, as it was described in the documents provided.

It is not expected that this proposed curriculum change will affect the Libraries' ability to continue to provide services such as research and teaching support, reference assistance, document delivery, and the technical infrastructure which allows the discovery and delivery of the Libraries' resources and services.

Grace Romund
Science Liaison Librarian

Tania Gottschalk
Sciences and Technology Library, Acting Head

Kristen Kruse
Kristen Kruse
Acting Coordinator, Collections Management

Lisa Hanson O'Hara
Acting University Librarian

December 14, 2018

Date

University of Manitoba Libraries

Statement for Undergraduate Curriculum Change

Faculty	Science
Department	Computer Science
Course #	DATA 4010
Course Name	Capstone Project

The Libraries' collection can support this new course, as it was described in the documents provided.

It is not expected that this proposed curriculum change will affect the Libraries' ability to continue to provide services such as research and teaching support, reference assistance, document delivery, and the technical infrastructure which allows the discovery and delivery of the Libraries' resources and services.

Grace Romund
Science Liaison Librarian

Tania Gottschalk
Sciences and Technology Library, Acting Head

Kristen Kruse
Acting Coordinator, Collections Management

Lisa Hanson O'Hara
Acting University Librarian

December 14, 2018

Date

STATEMENT OF SUPPORT: PART A - REQUEST

Complete Sections A through D of this form. Send a copy, together with Part B and any supporting documents, to unit(s) from which a statement of support is sought. Submit the completed form (Sections A through E) to SCCCC along with Statements of Support (Part B) received. See the *Guidelines for Completion of Undergraduate/ Certificate Course and Curriculum Changes.*

SECTION A –UNIT REQUESTING STATEMENT OF SUPPORT

Faculty/College/School: Science

Department: Choose one

SECTION B – NATURE OF REQUEST FOR SUPPORT

[✓] possible curricular overlap or infringement or conflict of jurisdiction with another unit(s)

[✓] possible curriculum/course changes in another unit(s) arising from proposed curriculum/course change in your unit

[✓] possible impact on demand (increased or decreased) for a specific course(s)

Request for assessment of course intended to satisfy:

[ ] W requirement   [ ] M requirement   [ ] RIC list

Request that response be provided by (indicate date): 01-Apr-2019

SECTION C – DESCRIPTION OF PROPOSED CURRICULUM/COURSE CHANGE

Briefly describe the proposed curriculum/course change in your unit and outline the request for support.

The Faculty of Science is introducing a data science major program. As a result, new data science courses (DATA 2010, DATA 3010, DATA 4010) will be created which may require CS to teach/co-teach these courses. In addition, existing CS courses will be required in the program which will create additional demand for these courses. Finally, the course COMP 4360 will need a prerequisite modification to accommodate this program.

SECTION D – UNIT(S) RECEIVING REQUEST FOR STATEMENT OF SUPPORT

List the faculties/colleges/schools/departments solicited for a statement of support.

Mathematics, Statistics, Computer Science

SECTION E – STATEMENT(S) OF SUPPORT RECEIVED

Attach responses received from other units (including responses to requests for asessement for the W requirement, M requirement, or RIC list, if appropriate) to your faculty/college/school submission to SCCCC.

STATEMENT OF SUPPORT: PART B - RESPONSE

Section F is to be completed by the unit requesting a statement of support. Sections G through J are to be completed by the unit responding to the request. See the *Guidelines for Completion of Undergraduate/Certificate Course and Curriculum Changes*. The completed form (Part B) is to be returned to the unit requesting support.

SECTION F –UNIT REQUESTING SUPPORT

Faculty/College/School: Science

Department: Choose one

SECTION G – UNIT RESPONDING TO REQUEST

Faculty/College/School: Science

Department: Computer Science (074)

SECTION H – RESPONSE TO REQUEST

CS provides support as requested, and in general supports the Data Science program.

SECTION I – IMPACT ON COURSE(S)/PROGRAM(S) IN UNIT RESPONDING AND NEXT STEPS

List course(s)/programs(s) in your unit that would be impacted by the course/curriculum changes being proposed, and indicate when your unit will submit corresponding changes to the SCCCC for Senate approval (e.g. Fall 2019 or Spring 2020).

CS will soon submit pre-requisite change for COMP 4360 as modified above.

SECTION J – SIGNATURES

Department Approval:

James Young		
Type Name	Signature	Date

Digitally signed by James E Young
Date: 2019.03.20 19.47.51 -05'00'

Faculty/College/School Approval:

Pourang Irani		Aug 27 2019
Type Name	Signature	Date

STATEMENT OF SUPPORT: PART A - REQUEST

Complete Sections A through D of this form. Send a copy, together with Part B and any supporting documents, to unit(s) from which a statement of support is sought. Submit the completed form (Sections A through E) to SCCCC along with Statements of Support (Part B) received. See the *Guidelines for Completion of Undergraduate/ Certificate Course and Curriculum Changes.*

SECTION A –UNIT REQUESTING STATEMENT OF SUPPORT

Faculty/College/School: Science

Department: Choose one

SECTION B – NATURE OF REQUEST FOR SUPPORT

[✓] possible curricular overlap or infringement or conflict of jurisdiction with another unit(s)

[✓] possible curriculum/course changes in another unit(s) arising from proposed curriculum/course change in your unit

[✓] possible impact on demand (increased or decreased) for a specific course(s)

Request for assessment of course intended to satisfy:

[ ] W requirement   [ ] M requirement   [ ] RIC list

Request that response be provided by (indicate date): 16-Aug-2019

SECTION C – DESCRIPTION OF PROPOSED CURRICULUM/COURSE CHANGE

Briefly describe the proposed curriculum/course change in your unit and outline the request for support.

The Faculty of Science is introducing a data science major program. As a result, new data science courses (DATA 2010, DATA 3010, DATA 4010) will be created which may require the Department of Mathematics to teach/co-teach these courses. In addition, existing Mathematics courses will be required in the program which will create additional demand for these courses.

SECTION D – UNIT(S) RECEIVING REQUEST FOR STATEMENT OF SUPPORT

List the faculties/colleges/schools/departments solicited for a statement of support.

Mathematics, Statistics, Computer Science

SECTION E – STATEMENT(S) OF SUPPORT RECEIVED

Attach responses received from other units (including responses to requests for asessment for the W requirement, M requirement, or RIC list, if appropriate) to your faculty/college/school submission to SCCCC.

STATEMENT OF SUPPORT: PART B - RESPONSE

Section F is to be completed by the unit requesting a statement of support. Sections G through J are to be completed by the unit responding to the request. See the *Guidelines for Completion of Undergraduate/Certificate Course and Curriculum Changes*. The completed form (Part B) is to be returned to the unit requesting support.

SECTION F –UNIT REQUESTING SUPPORT

Faculty/College/School: Science

Department: Choose one

SECTION G – UNIT RESPONDING TO REQUEST

Faculty/College/School: Science

Department: Mathematics (136)

SECTION H – RESPONSE TO REQUEST
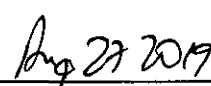
The Department of Mathematics supports this request.

SECTION I – IMPACT ON COURSE(S)/PROGRAM(S) IN UNIT RESPONDING AND NEXT STEPS

List course(s)/programs(s) in your unit that would be impacted by the course/curriculum changes being proposed, and indicate when your unit will submit corresponding changes to the SCCCC for Senate approval (e.g. Fall 2019 or Spring 2020).

MATH 2720 appears in the proposed program chart. Currently MATH 2720 is restricted to students in one of the following programs: Actuarial Mathematics, Statistics, Physics, Geophysics, and Physical Geography. The Department of Mathematics is currently in the process of adding the proposed program to that list, aiming tor Senate Approval in Fall 2019.

SECTION J – SIGNATURES

Department Approval:

Derek Krepski	Derek Krepski	Digitally signed by Derek Krepski Date: 2019 08 16 13.22:28 -05'00'
Type Name	Signature	Date

Faculty/College/School Approval:

Pourang Irani

Type Name	Signature	Date

STATEMENT OF SUPPORT: PART A - REQUEST

Complete Sections A through D of this form. Send a copy, together with Part B and any supporting documents, to unit(s) from which a statement of support is sought. Submit the completed form (Sections A through E) to SCCCC along with Statements of Support (Part B) received. See the *Guidelines for Completion of Undergraduate/ Certificate Course and Curriculum Changes.*

SECTION A –UNIT REQUESTING STATEMENT OF SUPPORT

Faculty/College/School: Science

Department: Choose one

SECTION B – NATURE OF REQUEST FOR SUPPORT

[✓] possible curricular overlap or infringement or conflict of jurisdiction with another unit(s)

[✓] possible curriculum/course changes in another unit(s) arising from proposed curriculum/course change in your unit

[✓] possible impact on demand (increased or decreased) for a specific course(s)

Request for assessment of course intended to satisfy:

[ ] W requirement   [ ] M requirement   [ ] RIC list

Request that response be provided by (indicate date): May 22, 2019

SECTION C – DESCRIPTION OF PROPOSED CURRICULUM/COURSE CHANGE

Briefly describe the proposed curriculum/course change in your unit and outline the request for support.

The Faculty of Science is introducing a data science major program. As a result, new data science courses (DATA 2010, DATA 3010, DATA 4010) will be created which may require the Department of Statistics to teach/co-teach these courses. In addition, existing Statistics courses will be required in the program which will create additional demand for these courses.

SECTION D – UNIT(S) RECEIVING REQUEST FOR STATEMENT OF SUPPORT

List the faculties/colleges/schools/departments solicited for a statement of support.

Mathematics, Statistics, Computer Science

SECTION E – STATEMENT(S) OF SUPPORT RECEIVED

Attach responses received from other units (including responses to requests for asessment for the W requirement, M requirement, or RIC list, if appropriate) to your faculty/college/school submission to SCCCC.

STATEMENT OF SUPPORT: PART B - RESPONSE

Section F is to be completed by the unit requesting a statement of support. Sections G through J are to be completed by the unit responding to the request. See the *Guidelines for Completion of Undergraduate/Certificate Course and Curriculum Changes*. The completed form (Part B) is to be returned to the unit requesting support.

SECTION F –UNIT REQUESTING SUPPORT

Faculty/College/School: Science

Department: Choose one

SECTION G – UNIT RESPONDING TO REQUEST

Faculty/College/School: Science

Department: ~~Computer Science (074)~~ Statistics.

SECTION H – RESPONSE TO REQUEST
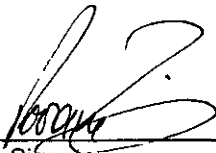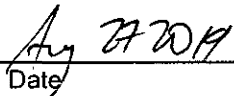
The Department of Statistics supports the request for creating a Data Science program within the Faculty of Science. As part of a major curriculum revision to Statistics programs, considerable effort was made to ensure that the newly created STAT 3100, STAT 3150 and STAT 3450 will be useful to Statistics as well as Data Science majors. We expect to be able to handle the increased demand for existing Statistics courses (esp. STAT 1150, STAT 2150 and STAT 2400) and participate in the teaching of the DATA courses.

SECTION I – IMPACT ON COURSE(S)/PROGRAM(S) IN UNIT RESPONDING AND NEXT STEPS

List course(s)/programs(s) in your unit that would be impacted by the course/curriculum changes being proposed, and indicate when your unit will submit corresponding changes to the SCCCC for Senate approval (e.g. Fall 2019 or Spring 2020).

We see the DATA courses as being interesting electives to the students in our programs, but do not feel like program changes are required at this time. It may be that some (or all) DATA courses could be added to our list of recognized options at some point in the future. This is still under study at this point.

SECTION J – SIGNATURES

Department Approval:

Alexandre Leblanc	Alexandre Leblanc	Digitally signed by Alexandre Leblanc Date: 2019.05.27 12.37:29 -05'00'
Type Name	Signature	Date

Faculty/College/School Approval:

Pourang Irani

Type Name	Signature	Date

STATEMENT OF SUPPORT: PART A - REQUEST

Complete Sections A through D of this form. Send a copy, together with Part B and any supporting documents, to unit(s) from which a statement of support is sought. Submit the completed form (Sections A through E) to SCCCC along with Statements of Support (Part B) received. See the *Guidelines for Completion of Undergraduate/ Certificate Course and Curriculum Changes.*

SECTION A –UNIT REQUESTING STATEMENT OF SUPPORT

Faculty/College/School: Science

Department: Choose one

SECTION B – NATURE OF REQUEST FOR SUPPORT

☐ possible curricular overlap or infringement or conflict of jurisdiction with another unit(s)

☐ possible curriculum/course changes in another unit(s) arising from proposed curriculum/course change in your unit

☐ possible impact on demand (increased or decreased) for a specific course(s)

Request for assessment of course intended to satisfy:

☐ W requirement   ☐ M requirement   ☐ RIC list

Request that response be provided by (indicate date): 30-Apr-2019

SECTION C – DESCRIPTION OF PROPOSED CURRICULUM/COURSE CHANGE

Briefly describe the proposed curriculum/course change in your unit and outline the request for support.

The Faculty of Science is creating a Data Science Major Program with a cooperative option.

SECTION D – UNIT(S) RECEIVING REQUEST FOR STATEMENT OF SUPPORT

List the faculties/colleges/schools/departments solicited for a statement of support.

Computer Science, Mathematics, Statistics, USB, Science Coop.

SECTION E – STATEMENT(S) OF SUPPORT RECEIVED

Attach responses received from other units (including responses to requests for asessement for the W requirement, M requirement, or RIC list, if appropriate) to your faculty/college/school submission to SCCCC.

STATEMENT OF SUPPORT: PART B - RESPONSE

Section F is to be completed by the unit requesting a statement of support. Sections G through J are to be completed by the unit responding to the request. See the *Guidelines for Completion of Undergraduate/Certificate Course and Curriculum Changes*. The completed form (Part B) is to be returned to the unit requesting support.

SECTION F –UNIT REQUESTING SUPPORT

Faculty/College/School: Science

Department: Choose one

SECTION G – UNIT RESPONDING TO REQUEST

Faculty/College/School: Science

Department: Science, Faculty of (02)

SECTION H – RESPONSE TO REQUEST

The Science Co-op Program enthusiastically supports a cooperative option for the proposed Data Science Major Program. The addition of a co-op option will provide the opportunity for Data Science undergraduate students to acquire relevant work experience related to their degree of study and offer tools for students to achieve success in their career development. As well, extending co-op provides an equality of opportunity for the Data Science undergraduate students.

SECTION I – IMPACT ON COURSE(S)/PROGRAM(S) IN UNIT RESPONDING AND NEXT STEPS

List course(s)/programs(s) in your unit that would be impacted by the course/curriculum changes being proposed, and indicate when your unit will submit corresponding changes to the SCCCC for Senate approval (e.g. Fall 2019 or Spring 2020).

There would be no impact on Science Co-op.

SECTION J – SIGNATURES

Department Approval:

Geoffrey Anderson	*Digitally signed by Geoffrey Anderson. DN cn=Geoffrey Anderson, o=University of Manitoba, ou=Science Co-op Program, email=Geoffrey.Anderson@umanitoba.ca, c=CA Date: 2019.04.08 15:21:34 -05'00'*	
Type Name	Signature	Date

Faculty/College/School Approval:

Pourang Irani		Aug 27 2019
Type Name	Signature	Date

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STATEMENT OF SUPPORT: PART A - REQUEST

Complete Sections A through D of this form. Send a copy, together with Part B and any supporting documents, to unit(s) from which a statement of support is sought. Submit the completed form (Sections A through E) to SCCCC along with Statements of Support (Part B) received. See the *Guidelines for Completion of Undergraduate/ Certificate Course and Curriculum Changes.*

SECTION A –UNIT REQUESTING STATEMENT OF SUPPORT

Faculty/College/School: Science

Department: Choose one

SECTION B – NATURE OF REQUEST FOR SUPPORT

[✓] possible curricular overlap or infringement or conflict of jurisdiction with another unit(s)

[✓] possible curriculum/course changes in another unit(s) arising from proposed curriculum/course change in your unit

[✓] possible impact on demand (increased or decreased) for a specific course(s)

Request for assessment of course intended to satisfy:

[ ] W requirement   [ ] M requirement   [ ] RIC list

Request that response be provided by (indicate date): 30-Apr-2019

SECTION C – DESCRIPTION OF PROPOSED CURRICULUM/COURSE CHANGE

Briefly describe the proposed curriculum/course change in your unit and outline the request for support.

The Faculty of Science is introducing a data science major program. As a result, students may take COMP 1013, COMP 1021, MATH 1301, MATH 1501, MATH 1701 to partially satisfy entrance requirements into the Data Science Program.

SECTION D – UNIT(S) RECEIVING REQUEST FOR STATEMENT OF SUPPORT

List the faculties/colleges/schools/departments solicited for a statement of support.

Mathematics, Statistics, Computer Science,USB

SECTION E – STATEMENT(S) OF SUPPORT RECEIVED

Attach responses received from other units (including responses to requests for asessement for the W requirement, M requirement, or RIC list, if appropriate) to your faculty/college/school submission to SCCCC.

STATEMENT OF SUPPORT: PART B - RESPONSE

Section F is to be completed by the unit requesting a statement of support. Sections G through J are to be completed by the unit responding to the request. See the *Guidelines for Completion of Undergraduate/Certificate Course and Curriculum Changes*. The completed form (Part B) is to be returned to the unit requesting support.

SECTION F –UNIT REQUESTING SUPPORT

Faculty/College/School: Science

Department: Choose one

SECTION G – UNIT RESPONDING TO REQUEST

Faculty/College/School: Université de Saint-Boniface

Department: sciences, Faculte des (USB)

SECTION H – RESPONSE TO REQUEST
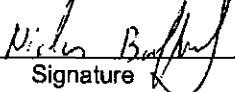
The Université de Saint-Boniface supports the introduction of the data science major program.

SECTION I – IMPACT ON COURSE(S)/PROGRAM(S) IN UNIT RESPONDING AND NEXT STEPS

List course(s)/programs(s) in your unit that would be impacted by the course/curriculum changes being proposed, and indicate when your unit will submit corresponding changes to the SCCCC for Senate approval (e.g. Fall 2019 or Spring 2020).

There is no impact for the Université de Saint-Boniface.

SECTION J – SIGNATURES

Department Approval: _____

Nicolas Bouffard

Type Name   Signature   Date

Faculty/College/School Approval:

Alexandre Brassard

Type Name   Signature   Date

Office of the Associate Dean
(Acting Academic)

248 - 66 Dafoe Road
Winnipeg, Manitoba
Canada R3T 2N2
Phone (204) 474 6700
Fax (204) 474 7525

UM | Faculty of Agricultural
and Food Sciences

November 1, 2019

Dr. Todd Mondor
Deputy Provost (Academic Planning and Programs)
University of Manitoba

RE: *Letter of support for Faculty of Science's Data Science program*

Dear Dr. Mondor:

I am writing to support the Data Science program that the Faculty of Science is proposing to offer. Many disciplines, including agriculture, are heavily relying on data analytics skills to make significant advances. This is evident from the recent success of Manitoba based companies such as Farmers Edge, FarmLink and 151 Research Inc. Digital Agriculture is considered to be the next frontier in food production and this sector will require a workforce adept in data science. The proposed program will produce graduates with strong skills in data analytics, a critical need for many Manitoban businesses in agricultural production, processing and management.

Furthermore, the data science program will generate trainees that can immediately assist companies to maintain a competitive edge. Additionally, the program will benefit students and faculty members within our Faculty. Our students will be able to register in some of the proposed courses, which will help them develop interdisciplinary skills needed to advance data analytics. Faculty members will be able to depend on students in our co-op program or upon graduation to work as research associates within our labs.

I offer my strong support for the skills students will be able to develop through the Data Science offering as well as from the tools they will use, including R, SAS, as well as machine learning techniques required to be competitive employees in a burgeoning field. Please feel free to contact me should you have any further questions.

Sincerely,

Jitendra Paliwal, Ph.D., P. Eng., FEC
Associate Dean (Graduate Programs) and Acting Associate Dean (Academic)
Professor, Biosystems Engineering

umanitoba.ca/afs

Gady Jacoby
Dean and CPA Manitoba Chair in Business Leadership
314 Drake Centre
181 Freedman Crescent
Winnipeg, Manitoba
Canada R3T 5V4
Telephone (204) 474-9209
Fax (204) 474-7545
www.umanitoba.ca/asper

University of Manitoba

Asper School of Business
Faculty of Management

MEMORANDUM

Date: October 10, 2019

To: Dr. Stefi Baum, Dean, Faculty of Science

From: Dr. Gady Jacoby, Dean and CPA Manitoba Chair in Business Leadership

Subject: A Letter of Support for the Proposed New Data Science Program

---

I am pleased to support the Data Science program proposed by the Faculty of Science. This program will address the shortage in Manitoba of university graduates with strong skills in big data management and analytics. In recent years, many companies have increasingly relied on big data to drive business decisions. This did not skip our Province, and local businesses from a wide range of industries have experienced a large growth in the demand for specialized skills in areas such as machine learning, data modeling, data privacy, and data visualization (all of which will be taught in the proposed program). At the same time, data scientists are now among the highest paid professionals. The proposed new program will help train skilled work-ready graduates that will help local companies maintain their competitive edge. The proposed program will also help Manitoba companies (including small businesses) who could benefit from hiring Data Science co-op students.

Developing a strong Data Science area at the Faculty of Science will directly benefit students and faculty members at the Asper School of business. For our students, courses in the proposed program will strengthen their toolkit by interfacing their Business knowledge with elements of Data Science. Our faculty will gain from the potential interdisciplinary collaboration with Science faculty members on Business research utilizing big data in areas such as Marketing, Financne, Human Resource Management, Supply Chain Management, Management Information Systems, and Actuarial Science. Asper School faculty using big data in their research will also gain from potential research assistantship provided by Data Science students. Finally, graduate programs at Asper (MSc, PhD, MBA and MFin) continuously seek to recruit skilled and talented students. I see Data Science students a desirable target group for our graduate student recruitment efforts.

I wholeheartedly support the proposed applied and skills-based Data Science program that provides students with tools required to gain employment and succeed, help advance Data Science related research, and feed graduate programs with skilled candidates.

ASPER SCHOOL OF BUSINESS

UNIVERSITY | Rady Faculty of
ᴏꜰ MANITOBA | Health Sciences

Max Rady College of Medicine
Dept. of Community Health Sciences
S113-750 Bannatyne Avenue
Winnipeg, Manitoba R3W 0W3
Phone: (204) 789-3573
Fax: (204) 789-3905
Email: lisa.lix@umanitoba.ca

October 31, 2019

University of Manitoba Senate
Office of the University Secretary
312 Administration Building
University of Manitoba
Winnipeg, MB R3T 2N2

Re: Support for Faculty of Science Data Science Undergraduate Program

Dear Senate Members:

I am writing to express my support for the creation of an undergraduate Data Science Program within the Faculty of Science at the University of Manitoba. I am a Professor of Biostatistics in the Department of Community Health Sciences, a Canada Research Chair (Tier 1) in Methods for Electronic Health Data Quality, Director of the Data Science Platform in the George & Fay Yee Centre for Healthcare Innovation, and co-lead of an NSERC-funded CREATE (Collaborative Research and Training Experience) program entitled Visual and Automated Disease Analytics (VADA) Program. There is a critical need within Manitoba for a workforce that is adept at managing, evaluating, analysing, visualizing, and interpreting large and complex data. My own research, involvement in the development and delivery of graduate training at the University of Manitoba, and interactions with government have highlighted the gaps in data science training that exist within the province.

With respect to VADA Program, which is led by faculty at both the University of Manitoba and University of Victoria, our intent is to meet the need for analytics specialists who have knowledge of disease etiologies, transmission patterns, and advanced analytic techniques in areas such as data mining and predictive analytics. The VADA Program trains both MSc and PhD students with diverse backgrounds in the health sciences, computational sciences, and health informatics. In the three years that the program has run it has become clear to me how beneficial it would be for students to be exposed to data science theories and methods during their undergraduate programs and to have the option to develop skills in machine learning, data modeling, and data visualization at the undergraduate level, rather than only having that option at the graduate level.

With respect to the Data Science Platform that I lead in the George & Fay Centre for Healthcare Innovation, there is similarly a need for trainees and new hires to have exposure at the undergraduate level to a wide range of Big Data environments, so that they are able to meet the demands within the health research and healthcare sectors. Our staff and faculty, who have backgrounds in statistics, biostatistics, and computer science, collaborate with clinicians, researchers, and decision makers to generate and apply patient-oriented research in the health system and health policy environments. We use large electronic health databases and advanced analytic methods to gain insights into the health of populations and their use of healthcare resources. Working with such large data sets requires an established level of comfort with
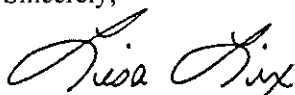
complex data. Our scientists regularly recruit undergraduate Co-op students and other trainees to work on research projects; we currently assist these trainees to develop their data science skills. It would be optimal for students and trainees to instead arrive with a strong foundational skill set established during an undergraduate program.

The creation of an undergraduate Data Science Program at the University of Manitoba would produce a pipeline of students well situated to move into positions within government agencies/organizations and industry after their undergraduate training, or continue their education at the graduate level, especially within interdisciplinary training programs like the VADA Program. Advanced analytic skills are in high demand in both the public and private health sectors and are key to being able to respond to a variety to a variety of scenarios, including the detection, management, and prevention of outbreaks associated with infectious diseases, the measurement and prediction of healthcare use, and the prediction of health outcomes for patients with complex chronic conditions.

I look forward to a positive response from Senate regarding support for an undergraduate Data Science Program in the Faculty of Science at the University of Manitoba.

Sincerely,

Lisa M. Lix, PhD P.Stat.
Professor & Acting Associate Department Head
Tier 1 Canada Research Chair in Methods for Electronic Health Data Quality
Director, Data Science Platform, George & Fay Yee Centre for Healthcare Innovation

E2 - 483 EITC Building
Winnipeg, MB
Canada R3T 2N2
Telephone 204-474-7863
Fax 204-474-7926
science.co-op@umanitoba.ca

UNIVERSITY ᵒᶠ MANITOBA | Science Co-op Program

October 25, 2019

Pourang Irani
Professor, Department of Computer Science Canada Research Chair (Tier 2)
Acting Associate Dean Faculty of Science
E2-580 EITC
University of Manitoba
Winnipeg, Manitoba, Canada R3T 2N2

Dear Pourang,

Co-operative education (co-op) is a form of work-integrated learning which integrates students' classroom-based learning with relevant degree-related work experience. Students participating in co-op have the opportunity to apply their classroom learning in a "real-word" environment. Students develop valuable skills to guide them through their academic education and to prepare for their career after graduation. Currently, the Faculty of Science offers a co-op option in nine undergraduate degree programs.

It is with pleasure to write this letter supporting the establishment of a co-op option for undergraduate students as part of the proposed Data Science degree program. The addition of a co-op option will provide Data Science undergraduate students with relevant work experience related to their degree of study. As well, extending co-op provides an equity of opportunity to ensure all eligible Science undergraduate students have the opportunity to participate in Science Co-op.

To graduate with the Co-op designation on their degree parchment, Data Science co-op students will complete a minimum of three 4-month work terms. Each work term will be full-time, paid and a minimum duration of 12 weeks. This allows Data Science co-op to meet the approval criteria of the Public Service Commission of Canada, the accreditation requirements of Co-operative Education and Work-Integrated Learning (CEWIL) Canada; as well as meeting the Government of Manitoba definition of co-op and the eligibility requirements of the Manitoba Co-operative Education Tax Credit for employers who hire co-op students. Science Co-op will deliver Data Science co-op students the same pre-employment curriculum and services currently provided to other Science Co-op students. Data Science

co-op students will be assigned a Co-op Coordinator; who will support the students during their job search and co-op work terms.
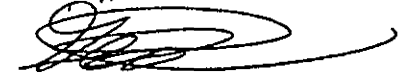
There is a demand for Data Science co-op students, which translates into interest from employers and available employment opportunities for students. The Data Science degree program is a cross-disciplinary fusion of mathematics, statistics and computer science; key competencies in demand by employers. Currently, Science Co-op has more available job opportunities in these disciplines than available students. Reviewing Summer 2019 co-op work term postings, there were approximately 25 local co-op positions which would be classified as "data science". Key competencies required in these positions include database knowledge, data mining, data visualization, machine learning, artificial intelligence and data analytics. No active marketing was undertaken to develop these opportunities as employers directly approached Science Co-op. With active marketing, Science Co-op will be able to develop opportunities in areas such big data, bioinformatics, data analytics, data modelling; machine learning and statistics to support the Data Science co-op option. The goal is to develop 100 data science positions within the next five years.

There is strong support for co-op and work-integrated learning from government. As one of the largest co-op employers in Canada, the federal government has a formal bridging mechanism in which co-op students may be bridged into temporary or permanent positions after graduation. As well, the 2019 federal budget included an investment of nearly $800 million over five years to support the creation of up to 84,000 new work placements per year by 2023-24; with the goal to create a work-integrated learning placement for every student who wants one. This co-op/WIL funding is administered by various national sector councils, which include: BioTalent Canada representing Canada's bio-economy and the Information and Communications Technology Council (ICTC) which supports the development of Canada's digital economy.

Provincial governments also recognize the value of co-op through various incentive programs. Manitoba, Nova Scotia, Ontario and Quebec offer tax credits to employers who hire co-op students. As well, Manitoba offers a Co-op Graduate Hiring Incentive to employers who hire graduates from recognized co-op programs. British Columbia supports STEM co-op student hiring through various funding programs such as the Tech Co-op Grant through Innovate BC. These various federal and provincial government programs provide the financial support for employers to hire Data Science co-op students for local and national opportunities.

With the renewed support of co-op and work-integrated learning by the federal government and support from various provincial governments, it is an ideal time for students currently participating in Science Co-op; as well as to expand to new degree programs or to current programs in the Faculty not currently offering co-op. This expansion will provide the opportunity for more Science undergraduate students to participate in a program highly respected and in demand by employers and recognized for producing enriching experiences and employable graduates.

Sincerely,

Geoffrey D. Anderson
Director, Science Co-op Program
University of Manitoba Faculty of Science

MEMO

REGISTRAR'S OFFICE
Room 400 UMSU University Centre
PH: 474-9425

University
of Manitoba

Date: October 30, 2019

Memo To: Pourang Irani, Acting Associate Dean, Faculty of Science

From: Neil Marnoch, Registrar

Re: **Proposed BSc Major Program in Data Science**

Pourang,

I have reviewed the Faculty of Science proposal to introduce a BSc Major Program in Data Science. It is difficult to provide specific commentary on the instructional space capacity needed to accommodate this program and the new Data Science courses. In general, the university has classroom capacity for additional courses and increased sections or seat capacity within existing courses. Such increases will require careful timetabling that is completed in a coordinated and balanced manner. The size of individual classes, the timetable and the type of classrooms required will determine the fit of our current classroom inventory and the needs of this program.

I am concerned, however, about the added pressure on registration and the ability for students in the program to obtain space in the required courses. Several of the courses specified in the Data Science program are regularly full and/or and have waitlists. As you have indicated, the Faculty is currently taking steps to address this unmet demand through various approaches.

Neil Marnoch
Registrar

338 Machray Hall
Winnipeg, Manitoba
Canada, R3T 2N2
Telephone (204) 474-6274
Fax (204) 474-7621
Saman_Muthukumarana@UManitoba.CA

Department of Statistics

October 27, 2019

Re: Letter of Support for Bachelor and Master in Data Science Programs

I'm writing in support of new Bachelor and Master in Data Science programs proposed by the Faculty of Science. These programs are extremely valuable and necessary for the advancement of Data Science in Manitoba and the University of Manitoba to stay competitive in this emerging field.

Over the past few years, the Faculty of Science has been working hard at expanding the capabilities in Data Science including establishment of a Data Science Centre, named as Data Science Nexus. As highlighted by our local industry and government collaborators in their support letters (attached at the end of this letter), these programs are crucial for filling the gaps in Data Science training and producing trainees who are highly skilled in data analytic and computational competencies necessary in their domains.

It is widely recognized that Data Science is a new field that is shaping and reshaping our world today. Multiple universities have begun to respond to this by creating undergraduate and graduate programs in Data Science. In most of the universities in other provinces in Canada, there are at least one of these types of programs or similar programs are being developed through various existing units or through new institutions[1-6]. In the U.S. and around the world, Data Science programs at undergraduate and graduate levels are becoming the norm.

Demand for Data Scientists is being accelerating in recent years and there are several evidence based predictions by professional agencies and organizations that Data Scientist will be the most demanding job in next decade[7-13]. More specifically, a recent study conducted by Canada's Big Data Consortium also estimated Canada's big
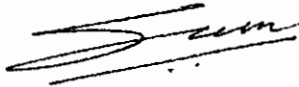
data talent gap is at least 19,000 professionals. The Data Science Nexus also aims to promote and facilitate collaborative interdisciplinary research and education in data science, to train the next generation of data scientists, and to inspire these new data scientists to employ their talent and aspirations to solving our world's problems. By developing these programs/curricula at both the undergraduate and graduate levels and creating new knowledge through interdisciplinary research, we will be able to train data scientists at various levels of expertise that will support both local and global industries in transforming data into useful knowledge for optimal decision-making.

Under Data Science Nexus, we have number of activities that are forthcoming. Nexus 2019: Art of the Possible; International Data Science Conference will take place on November 14, 2019 at UMSU University Centre, University of Manitoba, Fort Garry Campus. The conference features three keynote talks, 15 invited talks, a panel discussion and a networking reception. The sessions focus on the latest innovations in machine learning/AI, data and statistical sciences that address solutions to some of the most pressing challenges in agriculture, Business, eCommerce, finance, gambling and gaming, health and insurance. We have already attracted large number of registered participants beyond our expectations. The conference will also feature a pre-conference workshop on "Tools for Bayesian data science and probabilistic exploration" which has already reached the workshop capacity. Student challenge event presented by number of local industry partners have attracted more than 50 teams again beyond our expectations. We also have a workshop with North Forge Technology; Forge 2019-Applying Art of the Possible to the Finance services; bringing together businesses, entrepreneurs, and researchers. This workshop is also in high demand by local industries and researchers. We are currently running a Nexus Data Science workshop series which has also attracted participants from local industries, government unites and other academic units. Given these increasing trends and demands, the proposed undergraduate and graduate Data Science programs are crucial for Nexus in collaborating and building partnerships with local, national and international industrial partners as some they have already indicated in their support letters.

I strongly believe that establishing these undergraduate and masters Data Science programs at University of Manitoba will foster collaboration between our researchers and external units and successfully address Data Science talent gaps and produce

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individuals who are highly skilled in this emerging field. The proposed programs will also establish the University of Manitoba as a leader in Data Science not only in Manitoba, but nationally and internationally.

Sincerely,

Saman Muthukumarana, Ph.D.
Director, Data Science Nexus
Associate Professor & Associate Head (Graduate)
Department of Statistics

References and Support Letters

1. http://www.sfu.ca/students/calendar/2020/spring/programs/data-science/major/bachelor-of-science.html

2. https://masterdatascience.ubc.ca/

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4. https://www.mcmastercce.ca/foundations-of-analytics/data-science

5. https://uwaterloo.ca/data-science/

6. https://graduate.carleton.ca/cu-programs/data-science-collaborative-masters/

7. https://www.ryerson.ca/graduate/programs/data-science-analytics/

8. https://www.pwc.com/us/en/library/data-science-and-analytics.html

9. https://www.forbes.com/sites/louiscolumbus/2017/05/13/ibm-predicts-demand-for-da #5e47c3667e3b

10. https://www.amstat.org/ASA/News/New-Report-Highlights-Growing-Demand-for-Data-Sc aspx

11. https://data-flair.training/blogs/data-science-job-trends/

12. https://www.equities.com/why-data-science-will-be-the-most-promising-career-in-

13. https://www.careercast.com/jobs-rated/best-jobs-of-2019

3

NORTH FORGE

DARE TO DO

NORTH FORGE
TECHNOLOGY
EXCHANGE

October 22, 2019

Attention: University of Manitoba: Faculty of Science

We are pleased to provide a letter of support for the proposed **Data Science Undergraduate Program, and Data Science Master's Program.**

With the advancements in technology we are seeing an increasing amount of machine learning and artificial intelligence being incorporated into innovative solutions. This means there is a growing demand for people to think about data science into their existing solutions and in the design of new solutions. There is an obvious talent gap in the local market. Companies are competing to acquire the talent to keep their operations running and those who want to start incorporating data capacity into their companies are also struggling. By introducing these programs entrepreneurs will have the talent necessary to enable them to stay competitive and to scale up in Manitoba.

The depth of the program speaks nicely to the diverse needs of the innovation within Manitoba and enables those most likely to succeed to gain the skills, so Manitoba has the talent it needs in a timely fashion.

We commend the University of Manitoba: Faculty of Science for leading this important initiative and look forward to supporting the program as appropriate and relevant.

Sincerely,

Teresa Dukes
President

SMARTPARK INNOVATION HUB
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204.262.6400

FABRICATION LAB
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WINNIPEG, MB R3A 0W4
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NORTHFORGE.CA
INFO@NORTHFORGE.CA

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October 15, 2019

Data Science NEXUS
Faculty of Science
University of Manitoba

Re: Letter of support for a Data Science Undergraduate and Master of Science programs

To Whom It May Concern:

Ensuring the continued productivity of Canada's freshwater fisheries has never been more important considering the past, present, and future environmental stressors affecting Canada's aquatic resources. From the conservation of species at risk, to the assessment and management of development impacts, to the control of aquatic invasive species, Fisheries and Oceans Canada is committed to advancing freshwater ecosystem science while ensuring that Canada remains a global leader in fisheries management and conservation. Through sound science, forward-looking policy, and operational and service excellence, Fisheries and Oceans Canada employees work collaboratively toward economically prosperous fisheries and sustainable aquatic ecosystems.

Recognizing the ecological, social, and economic value of Canada's freshwater resources, it is critical that Canada retain the capacity to train undergraduate and graduate students for successful careers in government, academia, industry, and NGOs. Increased training capacity in the scientific, professional, and managerial aspects of freshwater fisheries has clear downstream benefit to all organizations involved in the science and management of aquatic resources in Canada. Moreover, given the increasing role of technology to meet current research and management challenges (e.g., managing and analysing large fisheries and habitat data sets), trainees entering the Canadian workforce must be familiar with the use and application of such database tools and data analyses, and will be in a better position to apply them when provided collaborative training opportunities within academia and government. Fisheries and Oceans Canada is looking forward to opportunities to collaborate with Dr. Saman Muthukumarana (Statistics, University of Manitoba) and colleagues in the frame of Data Science NEXUS, the new Data Science Research Centre at the University of Manitoba. NEXUS will make a significant contribution to the development of highly qualified personnel in Canada (honours students, graduate students) to meet future demand within the freshwater fisheries sector.

DFO is supportive of Data Science NEXUS' activities and will be seeking to enter into a collaborative agreement to increase expertise and capacity of future graduates in focal areas ranging from statistical modelling to analyzing remote sensing data, and will allow Canada to better respond to the current and future challenges for marine and freshwater fish and fisheries management. One fundamental strength of the proposed project is that it allows trainees to define career streams early

Canada

in graduate training, thus, allowing for greater familiarity with key problems, questions, techniques, and competencies required within government, academia, industry, and NGOs. Moreover, the project recognizes the value of interdisciplinary training (e.g., bridging the biological, statistical, and mathematical sciences), and also includes often overlooked topics such as training in modeling and statistical analysis in fisheries research and management, and career development.

In summary, DFO is strongly supportive of the Data Science NEXUS' Data Science Undergraduate program and the Data Science Masters program and is looking forward to entering into a collaborative agreement between Dr. Muthukumarana and the Riverine Ecology Lab to obtain valuable tools for fisheries management and habitat protection and to increase the training capacity of highly qualified personnel in freshwater fisheries in Canada. If you have questions, please contact me at (204) 983-5230 or Sen.Wang@dfo-mpo.gc.ca.

Sincerely,

Sen Wang
Regional Director of Science
Central and Arctic Region
Fisheries and Oceans Canada

Canada

Data Science Nexus

Letter of Support, October 2019

canada *life* ™

Keri Guenther FCIA, FSA | George Turpie FCIA, FSA
Canada Life | 60 Osborne Street N. | Winnipeg, MB

Saman Muthukumarana, Ph.D.
Director | Data Science Nexus
Department of Statistics | 371 Machray Hall
University of Manitoba | Winnipeg MB

Dear Mr. Muthukumarana,

On behalf Canada Life, please accept this letter as an expression of support for Data Science Nexus and its accompanying programs, the **Data Science Undergraduate Program** and the **Data Science Master's Program.**

We recognize the value of data science to the insurance industry. Building and fostering the evolution of data science with applications to insurance is a strategic focus for our organization. As one of Manitoba's top employers, we see the creation of the Data Science Nexus programs as an influential step in advancing the field of data science in Manitoba. We support the program's mission to promote and facilitate research and education in data science, to train future data scientists, and to support local and global industries in transforming data into useful, actionable insights.

A critical component to the evolution of data science at Canada Life is the availability of a talented resource pool of data scientists. Data Science Nexus aims to train and supply such individuals to industries such as ours. A source of data science graduates and/or cooperative education data science students will be influential to Canada Life's success in our data science journey.

As a beneficiary of the advancement of data science in Manitoba, Canada Life is a supporter of Data Science Nexus and its accompanying programs.

Sincerely,

Keri Guenther, FCIA, FSA
University of Manitoba | BCom. Actuarial Science
Manager | Pricing & Analytics | Group Customer | Canada Life

George Turpie, FCIA, FSA
Senior Vice-President | Pricing & Analytics | Group Customer | Canada Life

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b bold

To the Board,

This letter is to support the creation of a Data Science program, both undergraduate and graduate levels, at the University of Manitoba. We here at Bold Commerce are continually striving to improve our performance by leveraging data to improve our decision-making. As such, we have been actively expanding our Data and Research team whenever we can acquire qualified individuals with strong Data Science skills. Bold Commerce highly values the creation of jobs within the province, and given our clear need for Data Scientists, it would be ideal for us if University of Manitoba graduates were able to fill these roles.

Given our ongoing collaboration with the University of Manitoba Data Science Nexus program and several faculty involved in its creation, we find that there is enormous potential for growing the capabilities of our company through research partnerships with the U of M. One reason that we were excited to expand our company to the Innovation Hub at the University of Manitoba SmartPark is that it would make it easier to collaborate with faculty at the University of Manitoba. Aside from the direct benefit a Data Science program would have for us at Bold Commerce, we wholly support the initiative to build a program directed at training students to better acquire the skills necessary to succeed in an increasingly data-driven world.

Many other companies are also growing their Data Science capabilities. We are not alone in our search for people that possess the skills necessary to accomplish this, and a training program tailored specifically to equip students with the tools to succeed in this field is a necessity. Several companies, such as IBM, are forecasting a continued interest in Data Scientists (https://tinyurl.com/yy94uogh). Many Canadian universities are already capitalizing on growing interest to acquire Data Science skills, thus the University of Manitoba is primed to continue in this tradition and perhaps take charge to become one of the leaders in educating future Data Scientists of Canada[1].

Sincerely,

Yvan Boisjoli
Chief Executive Officer
Bold Commerce, Inc.

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[1]Some example programs include: the Data Science certificate program at the University of Toronto (https://tinyurl.com/yyqruuzy), undergraduate program in Data Science at the University of Waterloo (https://tinyurl.com/y6jfcr4z), and the Masters program in Data Science at the University of British Columbia (https://tinyurl.com/yxwgda2s).

National Microbiology Laboratory
1015 Arlington Street
Winnipeg, Manitoba
R3E 3R2

Wednesday, October 23, 2019

Saman Muthukumarana, Ph.D.
Director, Data Science Nexus
Associate Professor & Associate Head (Graduate)
Department of Statistics
371 Machray Hall
University of Manitoba
Winnipeg, Manitoba
R3T 2N2

Re: Proposed Data Science Undergraduate and Graduate Programs

Dear Dr. Muthukumarana,

We are writing in support of your proposals to establish a Data Science Undergraduate Program and a Data Science Master's Program in the Faculty of Science, University of Manitoba.

The National Microbiology Laboratory (NML) represents Canada's main infectious disease public health lab with responsibility for reference microbiology and quality assurance, lab-based surveillance for infectious diseases, emergency outbreak preparedness and response, training, and research and development. The NML is spearheading an effort to overhaul Canada's public health system to incorporate genomics technologies across all of its science programs. Genomics is among the biggest of the big data sciences, and the NML will require dedicated data scientists as well as domain experts with data science competencies to realize this effort. Yet qualified personnel with the requisite training and skills in data science are in very short supply, both in Canada and more broadly. Indeed, a 2015 study conducted by Canada's Big Data Consortium estimated Canada's big data talent gap is ~19,000 professionals shy of what is needed, with demands expected to grow with ever increasing open access data sets and increased applicability of big data to new market segments[1].

The Genomics and Bioinformatics Labs at the NML are very active in training University of Manitoba students, via undergraduate co-op programs and the Federal Student Work Experience Program. We also supervise graduate students in the University of Manitoba's Department of Computer Science and the Department of Medical Microbiology and Infectious Diseases. Many of these students go on to take up positions at the NML. Your proposal to create undergraduate and graduate programs in data science will address a crucial workforce skills gap at the NML by providing them with the knowledge and skills required to remain on the leading edge of the genomics science and technologies that we rely on to protect Canadians from infectious disease.

We expect that data science will become part of the core curriculum for tomorrow's health professionals. In anticipation of this eventuality we helped to establish and actively participate in the Visual and Automated Disease Analytics (VADA) Program: a graduate training program funded by the National Sciences and Engineering Research Council of Canada (NSERC) as part of its Collaborative Research and Training Experience (CREATE) Program. The VADA program, offered through the University of Manitoba and the

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[1] https://www.ryerson.ca/content/dam/provost/PDFs/Big_Data_Talent_Gap.pdf

Canada ■◆■

University of Victoria, aims to train the next generation of health, health informatics, and computational science graduate students to translate complex health data into insights that improve the health of populations and support health professional decision making. (Note that VADA is not a degree program; it is a training program for graduate students already enrolled in an existing degree program.) Your proposed undergraduate and graduate degree programs will complement and strengthen the VADA program as we strive to train the next generation of highly qualified personnel to apply big data analytics to protect and promote the health of Canadians.

Given our current and growing need for big data analytics, we strongly support your proposals to establish these training programs. In addition, we would be pleased to participate in the training of these individuals through guest lectures, undergraduate co-op programs, and graduate student supervision. We wish you the best of luck in establishing these important and valuable training programs.

Sincerely,

Dr. Gary Van Domselaar, Ph.D.
Chief, Bioinformatics
National Microbiology Laboratory
Public Health Agency of Canada
gary.vandomselaar@canada.ca
Telephone 204-784-5994

Adjunct Professor
Department of Medical Microbiology and Infectious Diseases
Basic Medical Sciences Building
745 Bannatyne Avenue
University of Manitoba
Winnipeg, Manitoba
R3E 0J9

Dr. Morag Graham, Ph.D.
Chief, Genomics
National Microbiology Laboratory
Public Health Agency of Canada
morag.graham@canada.ca
Telephone 204-784-7085

Adjunct Professor
Department of Medical Microbiology and Infectious Diseases
University of Manitoba
Basic Medical Sciences Building
745 Bannatyne Avenue
University of Manitoba
Winnipeg, Manitoba
R3E 0J9

Canada

Wawanesa Insurance

The Data Analytics team at Wawanesa over the last four years has grown from two to twenty-five individuals with diverse professional backgrounds including actuarial science, computer science, electrical engineering, geophysics, machine learning, operations research, software development, and statistics. The main goal of our team is to transform data into value in the form of improved revenue, reduced costs and improved customer experience. We utilize internal and external, both structured and unstructured data, and use approaches ranging from traditional statistical analysis to machine learning in our day-to-day work.

One of the biggest challenges we are currently facing is to attract, train and retain data science talent. Data science requires a range of skills such as domain expertise, statistics, math, machine learning, operations research, ethics, data visualization, and communication. None of the existing educational programs in Manitoba offer a program to prepare data science professionals. We strongly support expanding Data Science capabilities at the University of Manitoba including the establishment of research and collaboration center Data Science Nexus and the development of new undergraduate and master's programs. These initiatives will help us to address increasing demands in the Manitoba data science employment market and will provide easier access to the talent required for the understanding and adoption of new cutting-edge technology in our industry.

Mark S. Struck, FCAS, FCIA, MAAA
Vice President, Data Management & Analytics

To Whom It May Concern:

I am writing to express my support for university Co-op programs and the students they attract.

I am a senior technician with the Pulse Breeding Program at the Agriculture & Agri-Food Canada Research and Development Centre in Lacombe, Alberta. For many years now, Co-op students have been a mainstay of our labour force and have enabled us continue our work in the face of shrinking budgets and restrictions on hiring full-time personnel.

Here are a few reasons why Co-op students are so important to Crop Research at Lacombe:

- They are generally more adventurous and therefore willing to try a variety of jobs and are willing to travel to unfamiliar locales for work experience.
- They tend to be of higher quality, meaning that they require less supervision and are eager to take on responsibility.
- With available work terms of 4, 8 or 12 months, we can hire students to work year-round rather than during just the summer months.
- Co-op students are easier to hire. In our overly-bureaucratic system, hiring Co-op students is still a fairly straightforward process.

In short, I would happily hire nothing but Co-op students, but there are unfortunately not enough to meet the demand here at the Lacombe Research and Development Centre.

It is my understanding that Science Co-op is expanding to include undergraduate students as part of the new Data Science Program. The expansion of Science Co-op into the Data Science field will certainly open up more opportunities for co-op students to come to Lacombe. Having co-op students who possess knowledge of big data and have well-developed analytical capabilities will be a valuable resource, as these students will be able to support our research initiatives.

I fully support any initiative that encourages the development of Co-op programs and their students. I wish the University of Manitoba Science Co-op Program success as it expands and look forward to extending more employment opportunities to their co-op students.

Sincerely

Don Beauchesne
Pulse Breeding Technician | Technicien de l'amélioration des légumineuses à grain
Cultivar Development and Genetic Enhancement Team
Agriculture and Agri-Food Canada | Agriculture et Agroalimentaire Canada
6000 C & E Trail
Lacombe, Alberta   T4L 1W1
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Government of Canada | Gouvernement du Canada

Agriculture and   Agriculture et
Agri-Food Canada   Agroalimentaire Canada

To whom it may concern:

The Department of Forest and Wood Science (Faculty of AgriSciences) at Stellenbosch University is an ardent supporter of co-operative education. Since 2006, the Department has regularly hired co-op students from Canada to participate in various research projects throughout South Africa. 2018 marked the first time a University of Manitoba co-op student, from Science Co-op, was hired. The co-op student completed a 12-month work term with us from May 2018 to May 2019.

It is my understanding Science Co-op is expanding to include undergraduate students as part of the new Data Science Program. As a co-op employer and educator, Stellenbosch strongly supports this expansion. Co-operative education is a powerful and robust experiential learning tool, which integrates students' classroom-based learning with relevant work experience; as well as enriching and furthering their personal development. It has always been our philosophy to feel privileged in bringing Canadian co-op students to South Africa. Our goal is to make their experience one of learning, discovery and achieving.

We are looking forward to having more University of Manitoba Science Co-op students come to Stellenbosch. The expansion of Science Co-op into the Data Science field will certainly open up more opportunities for co-op students to come to Stellenbosch. As one of South Africa's leading research institutions, having co-op students who possess knowledge of big data and have well developed analytical capabilities will be a valuable resource for us as these students will be able to support our research initiatives. I am confident in the continued growth of the successful partnership between the Department of Forest and Wood Science and the University of Manitoba Science Co-op Program as we work together to develop globally engaged citizens.

Kind regards,

25 October 2019

Prof. Dr. Pierre Ackerman
Professor – Forest Engineering
Department of Forest and Wood Science

Departement Bos- en Houtkunde
Department of Forest and Wood Science
Universiteit van Stellenbosch / University of Stellenbosch
Privaatsak X1 MATIELAND 7602 175 P/Bag X1 MATIELAND 7602
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Joel Semeniuk
Founder & CEO
HORIZONthree
4 Fieldberry Way,
East St. Paul, MB

October 19, 2017,

Dr. Stefi Baum
Dean, Faculty of Science
239 Machray Hall
University of Manitoba
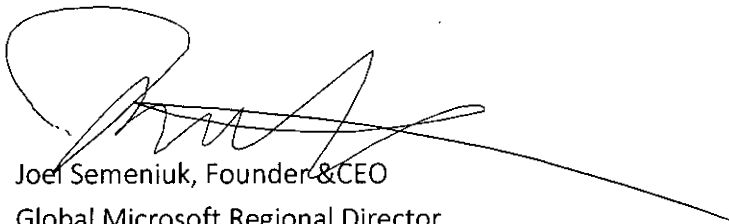Winnipeg, MB, R3T 2N2

Dear Dr. Baum,

Data is the foundation of the emerging Fourth Industrial Evolution that promises to change every aspect of modern society. More data has been produced in the last two years than in the entire history of humanity combined. Today, vast amounts of data are being generated and collected at an unprecedented pace and in all sectors of the economy; from basic sciences to public health, from social media to consumer behaviour, from insurance to finance, in private enterprises and government agencies – and yet digital transformation has only just begun. Data Science is required to take these vast sets of complex data and convert them into meaningful information to help leaders make informed decisions.

I have learned that the Faculty of Science at the University of Manitoba will be launching a 4-year Major Undergraduate Program in Data Science to train students in the discipline of Data Science. As a entrepreneur specializing in global innovation and change management, I strongly support the development of this program. Manitoba companies are ready to innovate on the world stage and are experiencing a bottleneck created by a lack of talent required to analyse, interpret and unleash their potential. Winnipeg has a dire need for more professional data scientists, who can use their analytical skills to solve problems in other academic disciplines such as agriculture, genetics, health, and finance, or who can join industrial partners and learn to solve industry-specific data analytics problems.

Data is the new oil powering the future economy. Data Science is the discipline required to help convert this raw material its many use and forms. Developing and offering this 4-year Undergraduate Program in Data Science is essential for local companies to manage their existing and future data and for Winnipeg to stay competitive in the emerging cyber-physical age. The Undergraduate Program in Data Science is a necessity and will help power the Manitoba economy in the immediate and foreseeable future.

Kind regards,

Joel Semeniuk, Founder & CEO
Global Microsoft Regional Director
Venture Partner, Fresco Capital
Mentor, Laudato Si, The Vatican, Rome

ICTAM

BUILDING CONNECTIONS

Information and Communication Technologies Association of Manitoba
435 Ellice Ave. Winnipeg, Manitoba, R3B 1Y6 | 204.943-7133 | www.ictam.ca

April 8th, 2019

Dr. Stefi Baum
Dean, Faculty of Science
239 Machray Hall
University of Manitoba
Winnipeg, MB, R3T 2N2

Dear Dr. Baum,

Data Science is a new emerging discipline that incorporates elements of computer science, mathematics, statistics, AI, machine learning, data mining & data visualization, as well as data modelling and predictive analysis. In our digital world, vast amounts of data are being generated and collected at an unprecedented pace and in all sectors of the economy; from basic sciences to public health, from social media to consumer behaviour, from insurance to finance, in private enterprises and government agencies. Data Science can take these vast sets of complex data and convert them into meaningful information to help leaders make informed decisions. Data Science has been coined the 'new oil', as it has the potential to disrupt our present society and affect every aspect of our life. It will change how people live.

The Information and Communication Technologies Association of Manitoba (ICTAM), is a member-driven organization that represents the ICT sector in our province. Our constituents have cited the shortage of Data Scientists as a major gap in our local talent pipeline. For this reason, I am excited to see the Faculty of Science at the University of Manitoba will be launching a 4-year Major Undergraduate Program in Data Science to educate students in this increasingly important discipline. On behalf of our over 150 members, I strongly support this program.

Local companies have collected huge amounts of data and, currently, don't have the skilled personnel to analyze and interpret it. Our industry is in need for more professional data scientists. These individuals will use their analytical skills to solve problems not only in our own sector but also in other academic disciplines such as agriculture, genetics, health, and finance. I can assure you there are exceptional opportunities for students to gain employment in the sector. In addition, they will be able to participate in research initiatives with industrial partners while learning to solve industry-specific data analytics problems.

It is widely recognized that Data Science is a new discipline that is shaping and reshaping our world today. It impacts every sector of the economy, and we must be active drivers of this changing world. Developing and offering this 4-year Undergraduate Program in Data Science is essential for local companies to manage their existing and future data. The Undergraduate Program in Data Science is a necessity and fills a real need in the Manitoba economy.

Sincerely

Kathy Knight, CEO
ICTAM

Letter of Support
Data Science Centre

UNIVERSITY
OF MANITOBA

April 12, 2019

DecisionWorks Consulting Inc.
26 Chase Drive
East St Paul, MB
R2E 0H6

Attention:

Dr Stefi Baum
Dean, Faculty of Science
239 Machray Hall
University of Manitoba
Winnipeg, MB R3T 2N2

Dear Dr. Baum,

This letter of support identifies our desire to support the University of Manitoba and their initiative to build a data science centre at the U of M. The specific areas of interest for us to participate in this initiative would be:

1. To provide specific input to the structuring of data science coursework in alignment with industry needs.

2. To be a partner in the rollout of the co-op option as well as major project work (e.g. capstone projects), providing opportunities for students to engage in industrial applications of data science, decision science and applied AI.

3. To provide coordination of industry-specific input as a way of enhancing the focus of industry perspectives as effectively and efficiently as possible for the U of M.

4. To launch an interim "certificate" program in partnership with the U of M to capture interest between now and 2020 when the official program is scheduled to launch as well as generate revenue to offset course development costs.

5. To participate in the delivery of certificate and actual program courses wherever deemed appropriate with a particular interest in graduate programs in data science and management.

Activities that led to the proposed collaboration:

Prior to being introduced to the U of M's desire to build a data science centre, we (DecisionWorks) were planning to launch a non-accredited Data Science Academy of our own. The intent of this Academy was largely to address the gap between what graduates were receiving by way of specific education in data science and what we were seeing as being required skills in order to be productive in application. Once we became aware of the U of M plans, it immediately became obvious to us that the potential for a win / win scenario existed where we could achieve common objectives by partnering rather than competing. This letter of

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support is intended to state our desired intention to partner with the U of M in achieving those win / win objectives.

Why Decisionworks?

DecisionWorks Consulting Inc. (www.decisionworks.ca) is a collaborative decision-making, digital transformation, process optimization and predictive analytics driven consultancy. We believe in the alignment of strategy, process and systems to achieve optimal business outcomes. Further, we have developed a repeatable methodology for consensus-based decision-making as part of the journey towards achieving those optimal business outcomes and see data science, machine learning and applied AI as a key component to enhance our services within this domain, i.e. data-driven influence of consensus-based decisions.

Decisionworks has been active in the data science community for several years now and is increasingly engaging in the delivery of data science / applied AI solutions for our clients. Currently we have active data science / AI client projects in finance, insurance, transportation, logistics and HR. We anticipate an ever-increasing expansion of clients in this and related industries as awareness of the value of these types of projects becomes more commonplace.

Decisionworks is the primary industrial support partner of the growing data science meetup group in Winnipeg and provides leadership and coordination of monthly events, hackathons and related special interest groups. Current meeting sizes vary from 60 to well over 100 attendees, making this an ideal group to draw future students from.

The founder and CEO of Decisionworks is a U of M alumni having graduated with an MBA from the Asper School in 2009. Several members of the Decisionworks team are also U of M graduates in Science, Engineering and Management.

Importance of solving this problem:

The data science market is exploding in terms of demand. Recognition by the market of the inherent value of data, data analysis and predictive analytics is generating demand for skills in planning, designing, implementing and enhancing these types of solutions into core business processes. Moreover, research into advanced methods for data-driven decision-making, natural language processing, robotics integration and AI is highly respected and has long-term value to applications in industry. In contrast to this demand, supply of skills development in these domains within Winnipeg and across Manitoba is limited and where available, focused on specific skill development as opposed to overall and balanced capability that would come out of undergraduate and graduate degree programs.

Efforts to date:

To date, Decisionworks and U of M representatives have conducted one informal and one formal meeting to discuss the potential of a partnership between our two organizations. Additionally, Decisionworks has received (under non-disclosure) current course outlines for the data science undergraduate program and is providing initial commentary to those outlines in this letter of support.

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WORKS

Business opportunity and benefits:

Decisionworks envisions at least two primary business opportunities within the context of a partnership between us and the U of M. These include:

1. Designing and coordinating a certificate program in conjunction with the U of M that could be launched as early as Sept 2019 as a way to capture interest in the data science program in the interim between now and when the program is fully accredited and ready for release.

2. Acting as an industrial partner with the U of M in major project work (i.e. capstone projects) and / or provisioning co-op opportunities for students enrolled in the co-op program.

Investment in the partnership:

DecisionWorks, as the industrial partner in this engagement, is prepared to invest in-kind resource efforts to participate in course design, coordinate industrial input from other industrial partners, and facilitate or co-facilitate meetings.

Furthermore, Decisionworks is prepared to offer financial assistance to market and acquire students into a certificate program and provide qualified instructors for certificate courses, graduate management programs as well as lab instructors as deemed appropriate throughout the partnership. While Decisionworks anticipates participation of these resources would be on a fee-for-course basis, consideration for highly attractive instructor rates would be considered a further investment on our part.

Expected collaboration:

The expected collaboration from this project will come in three forms; monthly working sessions to move course development forward and coordinate industrial input, input to quarterly reviews with steering committees and / or other senior stakeholders within the U of M community and co-submissions of course and lab materials throughout the project.

I trust this letter sufficiently addresses our support for this partnership, our commitment to providing in-kind resources, our plan to work collaboratively with the U of M, and our intention to create business opportunities for both the U of M and Decisionworks in the delivery of certificate programs in the interim between now and when the formal data science courseware is accredited and launched.

Sincerely,

Grant Barkman
CEO and President
DecisionWorks Consulting Inc.

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Report of the Senate Committee on Curriculum and Course Changes on a proposal for a Bachelor of Science (Major) in Data Science, including a Co-operative Education Option, Faculty of Science

Preamble:

1. The [terms of reference](#) for the Senate Committee on Curriculum and Course Changes (SCCCC) are available on the University Governance website. The SCCCC is "to recommend to Senate on the introduction, modification or abolition of undergraduate programs, curricula or courses."

2. At its meetings on October 8, October 10, and December 3, 2019, the SCCCC considered a proposal from the Faculty of Science to establish a Bachelor of Science (Major) in Data Science, including a Co-operative Education Option.

Observations:

1. The proposed Bachelor of Science (Major) in Data Science degree would be a four-year, interdisciplinary program that would require students to complete 120 credit hours of course work, including core courses in data science, computer science, mathematics, and statistics, and a capstone course in the final year (DATA 4010 – Data Science Capstone). Students would have the option to complete a Co-operative Option, which would require that they complete, in addition to all requirements for the degree, at least three and as many as four zero credit hour Co-operative Education Work Term courses.

2. The purpose of the program would be to provide knowledge, skills, and training in the emerging field of data science, in order to address growing labour market demand for graduates in this area provincially, nationally, and internationally. Specifically, it would prepare data scientists with skills to develop computational and mathematical tools, algorithms, and techniques required to analyse large and complex sets of data.
   The proposed program would be the only degree in data science offered in the province.

3. Establishment of the program would require the introduction of three (3) Data Science courses (DATA 2010 – Tools and Techniques for Data Science, DATA 3010 – Data Science with Real World Data Sets, DATA 4010 – Data Science Capstone) totalling 9 credit hours, as described in the proposal. Otherwise, the program would make use of existing courses offered by the Departments of Computer Science, Mathematics, and Statistics, in the Faculty of Science.

4. To enter the program, students would be required to complete at least 24 credit hours with a minimum Degree Grade Point Average of 2.00 and a minimum grade of "C+" in COMP 1020 – Introductory Computer Science 2, MATH 1232 – Integral Calculus (or MATH 1700 – Calculus 2 or MATH 1710 – Applied Calculus 2) and STAT 1150 – Introduction to Statistics and Computing. Students would need to maintain a minimum Degree Grade Point Average of 2.0 to continue in the program.
   The entrance and continuation requirements for the Co-operative Option would be the same as those described above, with the exception that a minimum Degree Grade Point Average of 2.50 would be required to enter and continue in the Co-operative Option.

5.   To graduate from the program, students would be required to obtain a minimum Degree Grade Point Average of 2.0, with passing grades in all courses, and a minimum grade of "C" in all required and optional courses that contribute to the Major.

6.   Projected enrolment for the first intake is 50 students. The maximum seat capacity would be 100 students. The Faculty anticipates this target would be met in the fifth year.

The SCCCC was provided with copies of correspondence from seven current and prospective students who were interested in pursuing careers in data science and who had contacted the Faculty to enquire about the availability of undergraduate, graduate, or continuing education programs in the field. The correspondence from students is not included in the attachments to this Report.

Recommendation:

The Senate Committee on Curriculum and Course Changes recommends:

THAT Senate approve and recommend to the Board of Governors that it approve a proposal to establish a Bachelor of Science (Major) in Data Science, including a Co-operative Education Option, in the Faculty of Science.

Respectfully submitted,

Professor Greg Smith, Chair
Senate Committee on Curriculum and Course Changes

Report of the Senate Planning and Priorities Committee on a proposal for a Bachelor of Science (Major) in Data Science, including a Co-operative Education Option, Faculty of Science

Preamble:

1. The [terms of reference](#) of the Senate Planning and Priorities Committee (SPPC), which are found on the University Governance website, charge SPPC with making recommendations to Senate regarding proposed academic programs.

2. At its meetings on September 30 and November 25, 2019, the SPPC considered a proposal from the Faculty of Science to establish a Bachelor of Science (Major) in Data Science, including a Co-operative Education Option.

Observations:

1. The proposed Bachelor of Science (Major) in Data Science degree would be a four-year program that would require students to complete 120 credit hours of course work. Students would have the option to complete a Co-operative Education Option, which would require that they complete, in addition to all requirements for the degree, at least three zero-credit hour Co-operative Education Work Term courses.

2. The purpose of the interdisciplinary program would be to provide knowledge, skills, and training in the emerging field of data science, in order to address growing labour market demand for graduates in this area, in the province, nationally, and internationally. It would be the only degree in this discipline offered in the province.

3. Establishment of the program would require the introduction of three (3) Data Science courses (DATA 2010 – Tools and Techniques for Data Science, DATA 3010 – Data Science with Real World Data Sets, DATA 4010 – Data Science Capstone) totalling 9 credit hours, as described in the proposal. Otherwise, the program would make use of existing courses offered by the Departments of Computer Science, Mathematics, and Statistics, in the Faculty of Science.

4. In response to the SPPC's recommendation that the program include a core course on ethics and data science, the Faculty said the topic would be covered in several courses in the program, including the three new DATA courses. The course description for DATA 4010, in particular, was revised to specify that it would cover topics in ethics, communication, data privacy, data presentation, and insight delivery.

5. Projected enrolment for the first intake is 50 students. The maximum seat capacity would be 100 students. The Faculty anticipates this target would be met by Year 5.

6. The total cost of delivering the program would be $1,416,043, in Year 4. Revenue to support the program would be derived from the following sources (as of Year 4):

    -   tuition and course fees, which would generate $457,159 and $5,670, respectively, assuming an enrolment of 90 students;

    -   operating grant revenue ($437,832);

    -   existing resources in the Faculty (salaries and benefits for existing faculty and staff; $532,525).

7. Revenues identified in observation 6 would be allocated to the items indicated below (figures are for Year 4):

   - salary and benefits for new academic staff ($387,887), including 2.0 FTE tenure-track faculty, 1.33 FTE Sessional Instructors, and 3.28 FTE Teaching Assistants;
   - salary and benefits for existing academic staff ($513,890), including 1.87 FTE Professors and 1.86 FTE Associate or Assistant Professors or Senior Instructors;
   - salary and benefits for existing support staff ($18,635) (0.2 FTE);
   - operating costs, for computers and software ($165,000); and
   - administrative overhead ($330,630).

8. Resources would be required, on an ongoing basis, to upgrade and renew computers and software required for the Data Science program. The budget describes anticipated annual expenditures of $165,000 (Year 1), $25,000 (Year 2), $95,000 (Year 3), and $165,000 (Year 4). The program would also rely on existing infrastructure, including computers and software, used in Computer Science, Mathematics, and Statistics programs in the Faculty. Licenses for most software required for the program are open source and available at no cost.

9. The University Library indicated it can support the new DATA courses with existing resources.

10. The SPPC asked the Faculty for evidence of sufficient demand to meet the enrolment target identified in the proposal, given that program delivery would rely heavily on tuition revenue and given the budgetary assumption of incremental enrolment of 100 students by the fifth year. The Faculty responded that it was confident that the enrolment target was conservative. It pointed to strong overall enrolment in its Major and Honours programs in Computer Science, Mathematics, and Statistics and strong labour market demand for graduates who would have skill sets drawing on all three of these disciplines. The Faculty anticipates that many students who would otherwise pursue degrees in one of these other areas will opt to enroll in the proposed B.Sc.(Maj.) in Data Science. If the target for incremental enrolment of 100 student was not met, the Faculty indicated it would adjust the number of new academic hires accordingly.

    The SPPC did receive copies of correspondence from seven current and prospective students who were interested in pursuing careers in data science and who had contacted the Faculty to enquire about the availability of undergraduate, graduate, or continuing education programs in the field.

11. At its meeting on November 25, 2019, and on the basis of the SPPC's criteria for assigning priority to new programs / initiatives,[1] the Committee recommended that a high priority level be assigned to the proposal for a Bachelor of Science (Major) in Data Science. The proposal is consistent with the strategic academic and research plans of the Faculty of Science, including with respect to (i) providing opportunities for experiential and interdisciplinary learning and (ii) turning data from every domain of human inquiry and practice into information and information knowledge. The proposed program was also identified as an institutional priority, as future generations would require the skill sets that it would provide, to analyse and make use of the large volume

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[1] http://umanitoba.ca/admin/governance/media/SPPC_Assigning_Priorities_to_New_Programs-Initiatives.pdf

of data that is generated and collected in so many domains now, including every time individuals connect to the internet.

Recommendation:

The Senate Planning and Priorities Committee recommends:

THAT Senate approve and recommend to the Board of Governors that it approve a proposal to establish a Bachelor of Science (Major) in Data Science, including a Co-operative Education Option, in the Faculty of Science. The Senate Committee on Planning and Priorities recommends that the Provost and Vice-President (Academic) not implement the program until satisfied that there would be sufficient space and sufficient funding to support the ongoing operation of the program.

Respectfully submitted,

Professor David Watt, Chair
Senate Planning and Priorities Committee

Report of the Senate Committee on Instruction and Evaluation RE: Proposed Bachelor of Science (Major) in Data Science, Academic Regulations, Faculty of Science

Preamble:

1. The terms of reference for the Senate Committee on Instruction and Evaluation (SCIE) can be found at: http://umanitoba.ca/admin/governance/governing_documents/governance/sen_committees/502.html.

2. At its meeting on October 17, 2019 SCIE considered a proposal from the Faculty of Science regarding the academic regulations for its proposed Bachelor of Science (Major) in Data Science, with Co-operative Education option.

Observations:

1. Entrance to the proposed B.Sc.(Maj.) in Data Science would require completion of at least 24 credit hours with a minimum Degree Grade Point Average of 2.00, and a minimum grade of "C+" in each of COMP 1020, MATH 1232 (or MATH 1700 or 1710), and STAT 1150.

2. Continuation in the program would require that a student maintain a minimum Degree Grade Point Average of 2.00.

3. Graduation requirements would include a passing grade in all courses, obtaining a minimum Degree Grade Point Average of 2.00, and a minimum grade of "C" in all required and optional courses that contribute to the Major.

4. For the Co-operative Education Option, the entrance and minimum grade requirements would be the same as the Major, however, the entrance and continuation Degree Grade Point Average would be a minimum of 2.50.

5. Before beginning their first work term, students in the Co-operative Education Option would be required to complete their first and second year program requirements.

Recommendation

The Senate Committee on Instruction and Evaluation recommends:

> *THAT Senate approve the academic regulations of the proposed Bachelor of Science (Major) in Data Science, with Co-operative Education option.*

Respectfully submitted,

Dr. Mark Torchia, Chair
Senate Committee on Instruction and Evaluation