University of Waterloo  
SENATE  
Notice of Meeting

Date: Monday, June 20, 2011  
Time: 4:00 p.m.  
Place: Needles Hall, Room 3001

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<td><strong>Consent Agenda</strong></td>
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<td>Motion: That Senate approve or receive for information by consent items 1-4 below.</td>
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<td>1. Approval of the May 16, 2011 Minutes [enclosed]</td>
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| 2. Report of the President  
  a. Recognition and Commendation | 2-19 | Information |
| 3. Reports from the Faculties | 20   | Decision |
| 4. Other Business  
  a. Committee/Council Appointments | 21-22| Information |
|  b. Conferral of Degrees | 23-24| Information |
|  c. COU Report | 25   | Decision |
|  d. New Degree Hood | 62-75| Decision/Information |
| **Regular Agenda** |      |        |
| 4:05 5. Business Arising from the Minutes |      |        |
| 6. Reports from Committees and Councils  
  a. Executive Committee | 26   | Decision |
|  b. Graduate & Research and Undergraduate Councils | 27-61| Decision/Information |
|  c. Graduate & Research Council | 62-75| Decision/Information |
|  d. Undergraduate Council | 76-129| Decision/Information |
| 4:45 7. Report of the President | Oral | Information |
| 4:55 8. Q & A Period with the President | Oral | Information |
  a. Executive Council Priorities, 2011-12 | 130  | Information |
|  b. Process for Transition to Clinical Professorial Ranks by Continuing Clinical Lecturers | 131-134| Decision |
| 5:35 11. Report of the Vice-President, University Research | Oral | Information |
| 5:45 12. Other Business |      |        |

**CONFIDENTIAL SESSION**


EW: tad/June 14, 2011  
Erin Windibank, Associate University Secretary
FOR INFORMATION

Recognition and Commendation

Distinguished Professor Emeritus Thomas Fahidy (chemical engineering) is one of 45 new Fellows inducted into the Canadian Academy of Engineering. The ceremony took place in Vancouver, in conjunction with the Academy’s 2011 Annual General Meeting. President Michael Charles commented: “The Academy welcomes the new Fellows, engineers of outstanding calibre, and looks forward to their participation in the Academy’s activities. While the Academy’s recent projects have placed considerable emphasis on the subject of energy and its impact on the environment, including climate, the Academy’s interests are wide ranging. The new Fellows will help shape the Academy’s future directions and contribute to the sustainable development of Canadian society.” Dr. Fahidy’s citation read: By successfully adapting numerous mathematical and statistical methods to electrochemical engineering, Dr. Fahidy has significantly widened their horizon, especially in electrochemical process dynamics and metal deposition combined with electric/magnetic fields.” [June 2/11 CAE news release]

The University of Waterloo Nanorobotics Group (UW_NRG) won the Microassembly Challenge at the International Conference on Robotics and Automation (ICRA) held in Shanghai in May. The group defeated ten other registered teams from top institutions based in the United States, France and Italy. “UW_NRG’s microrobot, measuring a mere half-millimetre in width and a hundredth of a millimetre in height, was the only robot at the competition to successfully manipulate microscale triangles into a tightly packed formation – a formidable challenge requiring extreme precision and reliability. These principles have several critical applications in everything from minimally-invasive surgery to advanced electronics manufacturing. This year’s entry from UW_NRG applied fundamental magnetic principles in an extremely robust and functional package, coupled with an advanced, custom-built control and image recognition system.” The group calls itself “Canada’s premier nanotechnology student organization. Consisting exclusively of undergraduate students from the University of Waterloo, UW_NRG has been straddling the divide between research group and student team since its first ambitious design was drawn on a napkin in 2007. Beyond competing annually at the ICRA, UW_NRG organizes and participates in seminars, tutorials, and community outreach sessions.” [May 13/11 Daily Bulletin]
FOR INFORMATION

A. APPOINTMENTS

Probationary-term Appointments

DUNCAN, Robin, Assistant Professor, Department of Kinesiology, July 1, 2011 to June 30, 2014. B.Sc. Honours (Biological Sciences, with distinction), University of Guelph, 1997; M.Sc. (Nutritional Sciences), University of Toronto, 2000; Ph.D. (Nutritional Sciences), University of Toronto, 2004; Postdoctoral Fellow, University of Toronto, 2005; Postdoctoral Fellow, University of California, Berkeley, 2010. Dr. Robin’s expertise in the field of nutrition, and molecular determinants of health and disease and nutrigenomics will be very relevant to the mission of the Department of Kinesiology, specifically within the physiology research group.

GRIMWOOD, Bryan, Assistant Professor, Department of Recreation and Leisure Studies, October 1, 2011 to June 30, 2015. B.R.L.S., Brock University, 2000; M.A. (Recreation and Leisure Studies), Brock University, 2005; Ph.D. candidate (Geography), Carleton University, pending Summer 2011. Bryan Grimwood will contribute to the new major in Tourism and Parks Management and complement the teaching and research activities in the department.

MIDDLETON, Laura, Assistant Professor, Department of Kinesiology, July 1, 2011 to June 30, 2014. B.H.K (Exercise Science), University of British Columbia, 2001; M.Sc. (Sport and Exercise Science), University of Victoria, 2004; Ph.D. (Community Health & Epidemiology, Geriatric Medicine), Dalhousie University, 2008. Dr. Middleton’s research expertise is in the role of exercise in optimization of cognitive and motor function which will also complement other researchers in the neuroscience and rehabilitation group within the department.

MISENER, Katie, Assistant Professor, Department of Recreation and Leisure Studies, March 1, 2012 to June 30, 2015. B.Kin (Honours), McMaster University, 2003; M.H.K. (Sport Management), University of Windsor, 2005; Ph.D. (Kinesiology – Sport Management), University of Western Ontario, 2009; Postdoctoral Fellow, Ryerson University, Centre for Voluntary Sector Studies, Ted Rogers School of Management, 2009 to present. Dr. Misener’s research expertise in community sport organizations and human resource management will complement the department in the area of recreation and sport business.

Adjunct Appointments

Graduate Supervision

JOPPE, Marion, Professor, Department of Recreation and Leisure Studies, July 1, 2011 to June 30, 2014.

HILBRECHT, Margo, Lecturer, Department of Recreation and Leisure Studies, May 1, 2011 to June 30, 2014.

Graduate Supervision and Research

WALL, Geoff, Professor, Department of Recreation and Leisure Studies, January 1, 2011 to December 31, 2012.
B. **ADMINISTRATIVE APPOINTMENT**

McDONALD, Paul, Chair, Department of Health Studies and Gerontology, July 1, 2011 to June 30, 2015.

Susan J. Elliott
Dean, Applied Health Sciences
FOR INFORMATION

A. APPOINTMENTS

Probationary-term Appointments

BLIT, Joel (MASc University of Waterloo 1999; MBA INSEAD 2002, MA 2003 University of Western Ontario; PhD University of Toronto 2010), Assistant Professor, Department of Economics, July 1, 2011 to June 30, 2014. Prior to joining UW, Dr. Blit was an Assistant Professor of Economics and International Affairs at George Washington University. He is the recipient of numerous prestigious awards including a SSHRC CGS Doctoral Scholarship, the NBER Innovation Policy Research Grant, an Institute of Public Policy Research Grant, and two CIBER research grants. His current research interests include multinational firms, innovation, entrepreneurship, and international development.

HENSTRA, Daniel (BA University of Windsor 2001, MA University of Western Ontario 2002, PhD University of Western Ontario 2007), Assistant Professor, Department of Political Science, July 1, 2011 to June 30, 2014. Dr. Henstra’s research expertise lies in the field of Canadian public administration and public policy, and he has published in the top journals in these fields, particularly on issues relating to local government, emergency management and climate adaptation policies. He also brings to the MPS program useful experience with university administration and applied policy research as well as an impressive track record of teaching excellence. In addition to his leadership role in the MPS program, he will make an important contribution to the Department of Political Science’s strength in Canadian politics.

LIU, Jennifer A. (BA University of California, Berkeley 1991; MA San Francisco State University 2002; PhD University of California, Berkeley and San Francisco 2008), Assistant Professor, Department of Anthropology, July 1, 2011 to June 30, 2014. Dr. Liu joins UW following two years as Freeman Postdoctoral Fellow in the Department of History and Center for East Asian and Pacific Studies, University of Illinois Urbana-Champaign. Her research interests focus on the intersection between medical anthropology and science and technology studies, specifically the modern biological sciences and studies of gene-environment interaction. She explores the anthropology of stem cell research, genomics, and bioethics in relation to varied projects of public health, social identity, nation-building, and how race, ethnicity, and nationality are conceptualized as genomic categories. Dr. Liu will contribute to the department’s research and teaching within Cultural Anthropology and Public Issues Anthropology.

MCAULEY, Tara (BSc University of Toronto 2001, PhD Washington University 2007), Assistant Professor, Department of Psychology, July 1, 2011 to June 30, 2014. Following a three-year Postdoctoral Fellowship in the Department of Psychiatric Research at the Hospital for Sick Children in Toronto, Dr. McAuley joins the Clinical Psychology Division in the Department of Psychology. Her area of research concerns the psychology of executive functions (or that set of inter-related abilities that facilitate purposeful, goal-oriented behaviour). She investigates the nature of executive functions in typical and, importantly, atypical development. Thus, she will add to our Clinical Psychology Division’s expertise in the critical area of child psychopathology.

SCHOLER, Abigail (BA Gettysburg College 2000, PhD Columbia University 2009), Assistant Professor, Department of Psychology, July 1, 2011 to June 30, 2014. Following two years as an Assistant Professor at Gettysburg College, Dr. Scholer joins the Social Psychology Division in the Department of Psychology. Her area of research concerns the psychology of decision-making and
self-control. In this context she focuses on understanding what motivates people to change as they struggle to kick old habits (e.g., problem drinking) or to embrace new ones (e.g., exercising). Thus, she will add to our Social Psychology Division’s expertise in the critical area of the psychology of self-regulation.

Probationary-term Reappointment
SBARDELLATI, John, Assistant Professor, Department of History, July 1, 2011 to June 30, 2014.

Definite-term Appointments
ANDRES, Greg (BA Briercrest College 1998, BA University of Waterloo 2001, MA University of Waterloo 2002, PhD University of Western Ontario 2007), Lecturer, Department of Philosophy, July 1, 2011 to April 30, 2012. Dr. Andres has been a frequent instructor in the department since graduating with his PhD in 2007. He has established himself as a dedicated and versatile teacher who is capable of teaching a wide array of undergraduate courses in philosophy. His current research interests are in Environmental Philosophy. During this past year, he has worked with the engineering faculty as course developer for PD20 in the faculty’s Professional Development Program. He continues to be involved as an instructor with WatPD.

BERBERICH, Greg (BMath University of Waterloo 1992, PhD University of Waterloo 2005), Lecturer, School of Accounting and Finance, May 1, 2011 to June 30, 2012. Dr. Berberich joins the financial accounting and auditing areas of the school. He received his CA designation in 1993 from the Institute of Chartered Accountants of Ontario. His teaching interests are in auditing and financial accounting. In 2001 he was named as a Doctoral Consortium Fellow by the American Accounting Association. He will contribute to the expansion plans of the School of Accounting and Finance by strengthening teaching in our auditing and financial accounting areas.

Definite-term Reappointment
CALLAGHAN, Gerry, Lecturer, Department of Philosophy, January 1, 2012 to December 31, 2013.

Visiting Appointments
YANG, Lihua, Visiting Scholar, Department of Political Science, April 1, 2011 to March 31, 2012.

ZELLER, Regine, Visiting Assistant Professor, Department of Germanic and Slavic Studies, September 1, 2011 to October 26, 2011.

Adjunct Appointments
Instruction
BACIU, Iuliana, Lecturer, Department of Psychology, May 1, 2011 to August 31, 2011.

BASHIR, Mohsin, Lecturer, School of Accounting and Finance, May 18, 2011 to August 31, 2011.

GODDARD, Ben, Lecturer, Department of Psychology, May 1, 2011 to August 31, 2011.

MASON, Elizabeth, Lecturer, Department of Germanic and Slavic Studies, May 1, 2011 to August 31, 2011.

MCCARLEY, Bruce, Lecturer, School of Accounting and Finance, May 1, 2011 to August 31, 2011.

Adjunct Reappointments
Instruction
ABBOTT, Clint, Lecturer, Department of Political Science, September 1, 2011 to December 31, 2011.
AITKEN, Mary Joy, Lecturer, Department of Drama and Speech Communication, May 1, 2011 to August 31, 2011.

ANDRES, Greg, Lecturer, Department of Philosophy, May 1, 2011 to August 31, 2011.

CHMARA, Harold, Lecturer, School of Accounting and Finance, May 1, 2011 to August 31, 2011.

CHASMAR, Hugh, Lecturer, School of Accounting and Finance, May 1, 2011 to August 31, 2011.

CONNOLLY, Mark, Lecturer, Department of Drama and Speech Communication, May 1, 2011 to August 31, 2011.

CORNING, Gail, Assistant Professor, Department of Drama and Speech Communication, May 1, 2011 to August 31, 2011.

FLERAS, Augie, Professor, Department of Sociology and Legal Studies, May 1, 2011 to August 31, 2011.

HASTEDT, Slawomira, Lecturer, Department of Spanish and Latin American Studies, September 1, 2011 to December 31, 2011.

LANGILL, Judy, Lecturer, Department of English Language and Literature, May 1, 2011 to August 31, 2011.

NEWLAND, Jane, Lecturer, Department of French Studies, May 1, 2011 to August 31, 2011.

OLDHAM, Andrew, Lecturer, School of Accounting and Finance, May 1, 2011 to August 31, 2011.

STACEY, Jeffrey, Lecturer, Department of Drama and Speech Communication, May 1, 2011 to August 31, 2011.

VANDERHOOF, Dory, Lecturer, Department of Drama and Speech Communication, May 1, 2011 to August 31, 2011.

WESTLEY, Meg, Assistant Professor, Department of Drama and Speech Communication, May 1, 2011 to August 31, 2011.

YOSHIDA, Emiko, Lecturer, Department of Psychology, May 1, 2011 to August 31, 2011.

Miscellaneous (research, consultations, etc.)

ADAMS, Russell, Assistant Professor, Department of Anthropology, May 1, 2011 to April 30, 2014.

Staff to Faculty Appointment

RUTTAN, Tom (Counselling Services), Lecturer, Department of Psychology, May 1, 2011 to August 31, 2011.

Graduate Student to Part-time Lecturer Appointments

AQUINO, Jennifer, Department of Psychology, May 1, 2011 to August 31, 2011.

BARR, Nathaniel, Department of Psychology, May 1, 2011 to August 31, 2011.

CUMMING, Sara, Department of Sociology and Legal Studies, May 1, 2011 to August 31, 2011.
DAY, Martin, Department of Psychology, May 1, 2011 to August 31, 2011.

EVANS, Natalie, Department of Philosophy, May 1, 2011 to August 31, 2011.

FINN, Tracy, Department of Philosophy, May 1, 2011 to August 31, 2011.

GANAI, Omar, Department of Psychology, May 1, 2011 to August 31, 2011.

KAYAL, Fadi, Department of French Studies, May 1, 2011 to August 31, 2011.

KLEINHANS, Belinda, Department of Germanic and Slavic, May 1, 2011 to August 31, 2011.

LANGSTAFF, Jesse, Department of Psychology, May 1, 2011 to August 31, 2011.

MITCHELL, Jayna, Department of Psychology, May 1, 2011 to August 31, 2011.

PLANTE, Courtney, Department of Psychology, May 1, 2011 to August 31, 2011.

SCHERER, Tanja, Department of Germanic and Slavic Studies, May 1, 2011 to August 31, 2011.

B. ADMINISTRATIVE APPOINTMENTS
HENSTRA, Daniel, Director, Master of Public Service Program, July 1, 2011 to June 30, 2014

MCWEBB, Christine, Director, Global Business Digital Arts Program, May 1, 2011 to April 30, 2015.

RYAN, Robert, International Exchange Officer, Dean of Arts Office, July 1, 2011 to June 30, 2012

SIMPSON, Jennifer, Chair, Department of Drama & Speech Communication, September 1, 2012 to August 31, 2016.

ADMINISTRATIVE APPOINTMENT DATE CHANGES
BARNETT, James, Director, School of Accounting and Finance, from August 1, 2010 to July 31, 2014 to August 1, 2010 to July 31, 2012.

NUTBROWN, Richard, Chair, Political Science, from July 1, 2008 to December 31, 2011 to July 1, 2008 to June 30, 2011.

C. RETIREMENTS
ATKINSON, Anthony, Professor, School of Accounting and Finance, effective August 1, 2011.

GOYDER, John, Professor, Department of Sociology and Legal Studies, effective July 1, 2011.

D. SABBATICALS
For Approval by the Board of Governors
BLOOM, Kathleen, Associate Professor, Department of Psychology, September 1, 2011 to August 31, 2012 at 86.4% salary.

SIMPSON, Jennifer, Associate Professor, Department of Drama & Speech Communication, September 1, 2011 to August 31, 2012 at 91.3% salary.

TAYLOR, Bruce, Professor, Department of Fine Arts, January 1, 2012 to June 30, 2012 at full salary.
WEINSTEIN, Steven, Associate Professor, Department of Philosophy, March 1, 2012 to August 31, 2012 at 85% salary.

E. OTHER LEAVE
WEINSTEIN, Steven, Associate Professor, Department of Philosophy, September 1, 2011 to February 29, 2012, leave without pay.

Ken S. Coates
Dean, Faculty of Arts
FOR INFORMATION

A. APPOINTMENTS

**Definite-term Appointments**

ESMAEILI-RAD, Mohammad, Research Assistant Professor, Department of Electrical & Computer Engineering, March 1, 2011 – February 29, 2012. PhD University of Waterloo 2008; MSc Sharif University of Technology, Tehran, Iran 1999; BEng Kerman University, Kerman, Iran 1997. Dr. Esmaeili-Rad is a specialist in electronic materials and semiconductor growth and processing. He has extensive research experience with silicon-based materials and devices in his PhD work and industrial experience in compound semiconductor materials as an engineer with T-Ray Science Inc. (Waterloo, Ontario)

MIAO, Guo-Xing, Research Assistant Professor, Department of Electrical & Computer Engineering, May 15, 2011 – August 31, 2012. PhD Brown University 2005; MS Brown University 2003; BS Shandong University, China 1999. Dr. Miao studies spin polarized transport through complex barriers/interfaces for the purpose of constructing multifunctional spintronic devices in the field of nonvolatile memory as well as spin logic units. Spin filtering oxides with multiferroic properties are his research focus. This connects to next generation processors and to future quantum processors via topological insulators.

ZACAJ, Ada, Lecturer, Department of Management Sciences, May 1, 2011 – April 30, 2014. PhD candidate University of Waterloo (expected 2013); MASc University of Waterloo 2010; BASc University of Waterloo 2007. Ms Zacaj’s main responsibilities will be to teach the 4th year Engineering Design course and to act as a liaison with industry for student projects and co-op opportunities. As a lecturer she will also teach other courses in the undergraduate Management Engineering program.

**Visiting Appointments**

AHCHONG, Katrina, Scientist, Department of Chemical Engineering, May 1, 2011 – April 30, 2012.

CHENG, Jiin-Rong, Scholar, Department of Mechanical & Mechatronics Engineering, April 30, 2011 – October 28, 2011.

GIOFRE, Vincenzo P., Scholar, Department of Civil & Environmental Engineering, April 17, 2011 – September 30, 2011.

GOLMAKANI, Mehrnaz, Scholar, Department of Chemical Engineering, May 6, 2011 – August 31, 2011.


KARUNARATNE, Desiree N., Scholar, Department of Chemical Engineering, July 12, 2011 – October 11, 2011.

KONAROV, Aishuak, Scholar, Department of Chemical Engineering, May 2, 2011 – May 1, 2012.

LI, Yong, Scholar, Department of Electrical & Computer Engineering, September 1, 2011 – August 31, 2013.
LIN, Chih-Hao, Researcher, Department of Electrical & Computer Engineering, June 1, 2011 – August 31, 2012.

LINDROTH, Pasi, Researcher, Department of Mechanical & Mechatronics Engineering, September 1, 2011 – April 30, 2012.

PATEL Sahej, Scholar, Department of Mechanical & Mechatronics Engineering, May 25, 2011 – August 24, 2011.

YAN, Tongjiang, Researcher, Department of Electrical & Computer Engineering, April 14, 2011 – April 13, 2012.

ZHANG, Hangsheng, Researcher, Department of Chemical Engineering, September 1, 2011 – August 31, 2012.

ZHOU, Haoli, Scholar, Department of Chemical Engineering, April 28, 2011 – April 27, 2012.

ZHU, Mingqiao, Scholar, Department of Chemical Engineering, July 1, 2011 – June 30, 2012.

Adjunct Appointments

ALEMOHAMMAD, Hamid R., Lecturer, Department of Mechanical & Mechatronics Engineering, May 1, 2011 – August 31, 2011.

BRESLER, Lianna, Lecturer, School of Architecture, May 1, 2011 – August 31, 2011

DAULT, Gary, Associate Professor, School of Architecture, May 1, 2011 – August 31, 2011.

ESHRAGHI, Amin, Lecturer, Department of Mechanical & Mechatronics Engineering, May 1, 2011 – August 31, 2011.

FOROOZMEHR, Ehsan, Lecturer, Department of Mechanical & Mechatronics Engineering, May 1, 2011 – August 31, 2011.

GHANIM Amjed, Associate Professor, Department of Management Sciences, May 1, 2011 – August 31, 2011.

KASHEF, Rasha, Lecturer, Department of Electrical & Computer Engineering, May 1, 2011 – August 31, 2011.

LEVITT, Janna, Assistant Professor, School of Architecture, May 1, 2011 – August 31, 2011.

MCNAIR, Robert, Lecturer, School of Architecture, May 1, 2011 – August 31, 2011.

ROBINSON, Mary, Lecturer, Department of Chemical Engineering, May 1, 2011 – August 31, 2011.

ROUZROKH, Amir, Lecturer, Department of Mechanical & Mechatronics Engineering, May 1, 2011 – August 31, 2011.

SCOTT, Tim, Assistant Professor, School of Architecture, May 1, 2011 – August 31, 2011.
SHAKIR, Tahseen, Lecturer, Department of Systems Design Engineering, September 1, 2011 – December 31, 2011.

SHELLEY, Elise, Assistant Professor, School of Architecture, May 1, 2011 – August 31, 2011.

SYME, Paul, Assistant Professor, School of Architecture, May 1, 2011 – August 31, 2011.

THOMPSON, Hugh, Lecturer, School of Architecture, May 1, 2011 – August 31, 2011.

WRIGHT, Derek, Lecturer, Department of Electrical & Computer Engineering, May 1, 2011 – August 31, 2011.

WOODWORTH, William, Lecturer, School of Architecture, May 1, 2011 – August 31, 2011.

Graduate Supervision

BAYRAK, Ozlem, Assistant Professor, Department of Management Sciences, April 15, 2011 – August 30, 2012.

HAJIAN, Arsen, Associate Professor, Department of Systems Design Engineering, January 1, 2011 – December 31, 2014.

KANDILLER, Levent, Professor, Department of Mechanical & Mechatronics Engineering, April 1, 2011 – March 31, 2014.

LIU, Zhen, Professor, Department of Mechanical & Mechatronics Engineering, April 1, 2011 – March 31, 2014.

VERA, Juan, Assistant Professor, Department of Management Sciences, May 1, 2011 – December 31, 2011

WANG, Wilson, Associate Professor, Department of Mechanical & Mechatronics Engineering, May 1, 2011 – April 30, 2014.

Graduate Supervision & Research

MACLEOD, Donaldson, Professor, Department of Civil & Environmental Engineering, May 1, 2011 – April 30, 2013.

UYASAL, Murat, Associate Professor, Department of Electrical & Computer Engineering, May 1, 2011 – April 30, 2014.

Research

KONUK Ibrahim, Government Researcher, Department of Civil & Environmental Engineering, May 1, 2011 – April 30, 2013.

Adjunct Reappointments

Instruction

BOUCHARD, Nikole, Assistant Professor, School of Architecture, May 1, 2011 – August 31, 2011.

CICHY, Mark, Assistant Professor, School of Architecture, May 1, 2011 – August 31, 2011.

LIM TUNG, Fiona, Assistant Professor, School of Architecture, May 1, 2011 – August 31, 2011.
ROSS, Barbara, Assistant Professor, School of Architecture, May 1, 2011 – August 31, 2011

SORLI, Scott, Assistant Professor, School of Architecture, May 1, 2011 – August 31, 2011.

Instruction & Research
IRWIN, Peter, Professor, Department of Civil & Environmental Engineering, September 1, 2011 - December 31, 2011

Graduate Supervision & Research
BIGLARI, Mazda, Assistant Professor, Department of Chemical Engineering, May 1, 2011 – April 30, 2013.

CHOW, Renee, Assistant Professor, Department of Systems Design Engineering, March 1, 2011 – February 28, 2014.

CHUNG, Duane A., Assistant Professor, Department of Chemical Engineering, May 1, 2011 – April 30, 2014.

TIKKA, Timo, Associate Professor, Department of Civil & Environmental Engineering, May 1, 2011 – April 30, 2013.

Cross Appointment
MOOS, Markus, Assistant Professor, School of Planning, Faculty of Environment to Department of Management Sciences, Faculty of Engineering, March 15, 2011 – August 31, 2012.

Graduate Student to Part-time Lecturer Appointments
NARAYANAN, Meyyappan, Department of Management Sciences, May 1, 2011 – August 31, 2011.

PIRNIA, Mehrdad, Department of Management Sciences, May 1, 2011 – August 31, 2011.

B. ADMINISTRATIVE APPOINTMENTS
BAN, Dayan, Associate Director, Nano Engineering, Department of Electrical & Computer Engineering, May 1, 2011 – April 30, 2014.

ISMAIL, Fathy, Deputy Chair, Department of Mechanical & Mechatronics Engineering, May 1, 2011 – April 30, 2012.


ADMINISTRATIVE REAPPOINTMENT
BURN, Donald, Associate Chair, Graduate Studies, Department of Civil & Environmental Engineering, May 1, 2011 – April 30, 2012.

C. SABBATICAL
PAL, Rajinder, Professor, Department of Chemical Engineering, May 1, 2012 – April 30, 2013 at 100% salary

Adel Sedra, Dean, Faculty of Engineering
FOR INFORMATION

A. APPOINTMENTS

Probationary-term Reappointment
SWATUK, Larry, Associate Professor, School of Environment, Enterprise and Development, July 1, 2011 to June 30, 2014. PhD, Dalhousie University, 1993; MA, University of Windsor, 1986; BA (Hons), University of Windsor, 1982.

Adjunct Appointments
Instruction
BARKER, Mike, Lecturer, School of Planning, May 1, 2011 to August 31, 2011.

HENDERSON, Scott, Lecturer, School of Planning, May 1, 2011 to August 31, 2011.

NATHWANI, Jatin, Professor, School of Environment, Enterprise and Development, September 1, 2011 to December 31, 2011.

Graduate Supervision/Committee Membership
BOURBONNIERE, Richard, Professor, Department of Geography and Environmental Management, May 1, 2011 to April 30, 2012.

Cross Appointments
CLARKE, Amelia, Assistant Professor, School of Environment, Enterprise and Development to Department of Geography and Environmental Management, May 1, 2011 to April 30, 2014.

SWATUK, Larry, Associate Professor, School of Environment, Enterprise and Development to Department of Environment and Resource Studies, January 1, 2011 to December 31, 2013.

B. ADMINISTRATIVE APPOINTMENTS

EAGLES, Paul, Director, Tourism Policy and Planning Program, January 1, 2011 to June 30, 2011.

MAIR, Heather, Director, Tourism Policy and Planning Program, July 1, 2011 to June 30, 2012.

M. Seasons
Dean
FOR INFORMATION

A. APPOINTMENTS

Probationary-term Appointments

SANITA, Laura ( Laurea [bachelor’s degree] in Ingegneria Gestionale, Universita di Roma “Tor Vergata,” 2003; Laurea Specialistica [master’s degree] in Ingegneria Gestionale, Universita di Roma “Tor Vergata,” 2005; PhD, University of Rome “La Spienza,” 2009), Assistant Professor, Department of Combinatorics & Optimization, January 1, 2012 - June 30, 2015, Dr. Sanita presently holds a postdoctoral position in the Discrete Optimization group at Ecole Polytechnique Federale de Lausanne in Switzerland. Her research focuses on Combinatorial and Applied Optimization, and more specifically on Network Design, an area that has become one of the hot spots of Operations Research. Dr. Sanita is quickly establishing herself as one of the young leaders in this emerging field. She is the author of more than ten articles that appear in top international journals and conferences, and has given numerous seminars and conference presentations. A characteristic feature of Dr. Sanita’s work is that it successfully bridges the gap between optimization theory and practice. On the theoretical side, she has recently won the coveted 'Best Paper Award' at the 2010 Symposium on the Theory of Computing (STOC) for her groundbreaking work on the Steiner Tree problem. STOC is one of the two flagship conferences in theoretical computing. On the practical side she has worked closely with the Italian telecommunications sector, and holds a patent arising from her work. Dr. Sanita's breadth, technical strength, and energy make her an ideal addition to C&O's Operations Research group. Her presence will attract strong students, as well as researchers to the department and to Waterloo in general. Her versatility will help facilitating contact with industrial partners.

LI, Pengfei (BSc, 2001 and MSc, 2004, Nankai University; PhD, 2007, University of Waterloo), Assistant Professor, Dept. of Statistics and Actuarial Science, January 1, 2012 - June 30, 2015.

Definite-term Appointments

DUPONT, Edward (BMath, 2006 and MMath, 2009, University of Waterloo), Lecturer, Office of the Dean, May 1, 2011 - April 29, 2013. Mr. Dupont will teach six courses per year, participate in student activities as well as work five hours per week for MAPLE TA.


Definite-term Reappointment

LUSHMAN, Bradley, Lecturer, David R. Cheriton School of Computer Science, July 1, 2011 - June 30, 2014.
Visiting Appointments
AHMED, Reaz (Bangladesh University of Engineering and Technology), Associate Professor, David R. Cheriton School of Computer Science, May 1, 2011 – April 30, 2012.


Adjunct Appointments
Instructor
FREURE, Paquita, Lecturer, Dept. of Statistics and Actuarial Science, May 1, 2011 – August 31, 2011.

HARJI, Ashif, Lecturer, David R. Cheriton School of Computer Science, May 1, 2011 – August 31, 2011.

MOSHKSAR, Kamyar, Lecturer, Dept. of Statistics and Actuarial Science, May 1, 2011 – August 31, 2011.

Research
O’HARA HINES, Jeanette (Professor Emeritus), Associate Professor, Dept. of Statistics and Actuarial Science, September 1, 2011 – August 31, 2014.

Adjunct Reappointments
Instructor
AHMED, Rashid, Lecturer, Dept. of Statistics and Actuarial Science, May 1, 2011 – August 31, 2011.

CAMACHO, Fernando, Lecturer, Dept. of Statistics and Actuarial Science, May 1, 2011 – August 31, 2011.

LOO, Clinton, Lecturer, Office of the Dean, May 1, 2011 – August 31, 2011.

McKINNON, Jennifer, Lecturer, Office of the Dean, May 1, 2011 – August 31, 2011.

MERA, Ann Maria, Lecturer, Dept. of Statistics and Actuarial Science, May 1, 2011 – August 31, 2011.

SPIELMACHER, Mark, Lecturer, Office of the Dean, May 1, 2011 – August 31, 2011.

Research
BURRIS, Stanley (Professor Emeritus), Professor, Dept. of Pure Mathematics, July 1, 2011 – June 30, 2014.

Cross Reappointment
HARE, Kevin, Associate Professor, Dept. of Pure Mathematics to the David R. Cheriton School of Computer Science, September 1, 2011 – August 31, 2014.

Graduate Student to Part-time Lecturer Reappointment

Postdoctoral Fellow to Part-time Lecturer Appointments
KITCHING, Matthew, David R. Cheriton School of Computer Science, May 1, 2011 – April 30, 2012.


B. ADMINISTRATIVE APPOINTMENTS

BROWN, Dan, Associate Director, David R. Cheriton School of Computer Science, July 1, 2011 – June 30, 2013.


KAPLAN, Craig, Director, Undergraduate Studies, David R. Cheriton School of Computer Science, July 1, 2011 – June 30, 2013.

LANK, Edward, Associate Director, Undergraduate Studies, David R. Cheriton School of Computer Science, July 1, 2011 – June 30, 2013.

TOMAN, David, Director of Infrastructure, David R. Cheriton School of Computer Science, September 1, 2011 – June 30, 2013.

VAVASIS, Stephen, Associate Chair, Graduate Studies, Dept. of Combinatorics and Optimization, September 1, 2011 – August 31, 2012.

WU, Changbao, Associate Chair, Graduate Studies, Dept. of Statistics and Actuarial Science, September 1, 2011 – August 31, 2014.

ADMINISTRATIVE REAPPOINTMENT

FORSYTH, Peter, Director of Infrastructure, David R. Cheriton School of Computer Science, July 1, 2011 – August 31, 2011.

C. RETIREMENT

O’HARA HINES, Jeanette, Associate Professor, Dept. of Statistics and Actuarial Science, effective August 31, 2011.

D. SABBATICALS

For Approval by the Board of Governors

BEN-DAVID, Shai, Professor, David R. Cheriton School of Computer Science, September 1, 2011 – February 28, 2012 at 85% salary.

LIU, Xinzhi, Professor, Dept. of Applied Mathematics, September 1, 2011 – August 31, 2012 at 85% salary.

TREFLER, Richard, Associate Professor, David R. Cheriton School of Computer Science, July 1, 2011 – June 30, 2012 at 85% salary.

ZHU, Mu, Associate Professor, Dept. of Statistics and Actuarial Science, September 1, 2011 – April 31, 2012 at 85% salary.

Ian P. Goulden
Dean
A. APPOINTMENTS

Probationary-term Appointment

BRODERICK, Avery E., Assistant Professor, Department of Physics and Astronomy, September 1, 2011 to June 30, 2014. [B.S., State University of New York at Stony Brook (1999); Ph.D., California Institute of Technology (2004).] Dr. Broderick’s current research focuses on a broad range of topics within astrophysics, spanning a vast array of scales and research methodologies. A common feature of the research topics he chose is their direct connections to either existing or imminent observations. Most of his research interests are at least tangentially programs in star formation. He is a brilliant, young theoretical astrophysicist who is leading the theoretical part of an effort to image a black hole event horizon. If it is successful, it will be one of the most important achievements in all of science in the past decade. Many would argue that the successful search for the event horizon will prove the existence of black holes.

Probationary-term Reappointments

AFSHORDI, Niayesh, Assistant Professor, Department of Physics and Astronomy, July 1, 2012 to June 30, 2015. [B.A., Sharif University (1999); Ph.D., Princeton University (2004).]

TANG, Xiao-Wu (Shirley), Assistant Professor, Department of Chemistry, July 1, 2012 to June 30, 2013. [B.Sc., Huazhong University of Science and Technology (1993); Ph.D., Massachusetts Institute of Technology (1999).]

Definite-term Appointments

DEAKIN, Laura, Lecturer, Department of Chemistry, May 1, 2011 to April 30, 2014. [B.Sc., McGill University (1991); Ph.D., McGill University (1997); MPH, University of Alberta (2009).] Dr. Deakin has extensive experience in the preparation and delivery of lecture material concerned with health risk assessment, occupational health risks and environmental impact in the area of nanotechnology. She is a consultant to the Professional Engineers of Ontario providing expertise in the area of identification of materials that could present potential public health risks in nanotechnology and molecular engineering. She has also been a consultant to the American Conference on Governmental Industrial Hygiene. Dr. Deakin has done some teaching for the department and we look forward to her formally joining the department.

MacIVER, Sarah, Lecturer, School of Optometry, August 1, 2011 to July 31, 2016. [B.Sc., University of Waterloo (2007); O.D., University of Waterloo (2010).] Dr. MacIver is interested primarily in clinical teaching and continuing to build her clinical experience through direct patient care in the area of disease management. With Ontario having just recently authorized optometrists to begin treating eye disease, including potentially blinding conditions such as uveitis and glaucoma, it becomes important to bring on new faculty who have that expertise and significant experience in that realm. Although completing a residency is not a requirement for licensure in optometry in Ontario, Dr. MacIver has completed a one year residency in disease management. She comes uniquely qualified to be among the vanguard of our faculty in this realm.

Definite-term Reappointments

FREDDO, Janice R., Lecturer, School of Optometry, September 1, 2011 to August 31, 2016.
JONES, Jon P., Research Assistant Professor, Department of Earth and Environmental Sciences, June 1, 2011 to May 31, 2014.

Adjunct Appointments
Graduate Supervision
BACKOV, Renal, Professor, Department of Chemistry, May 1, 2011 to August 31, 2014.

VALLIS, Lori A., Associate Professor, School of Optometry, April 30, 2011 to March 31, 2014.

Graduate Supervision/Graduate Instruction/Research
VIDAL, Guifre, Professor, Department of Physics and Astronomy, May 1, 2011 to April 30, 2016.

Undergraduate Instruction
VOSPER, Heather, Lecturer, School of Pharmacy, May 1, 2011 to August 31, 2011.

Adjunct Reappointments
Graduate Supervision/Research
ORR, Patti, Assistant Professor, Department of Biology, June 1, 2011 to May 31, 2014.

THOMPSON, John E. (Professor Emeritus), Professor, Department of Biology, July 1, 2011 to June 30, 2014.

WATSON, Susan B., Professor, Department of Biology, July 1, 2011 to June 30, 2014

Graduate Supervision/Graduate Instruction/Research
SORKIN, Rafael D., Professor, Department of Physics and Astronomy, May 1, 2011 to April 30, 2016.

Research
PASTERNAK, Jack J. (Professor Emeritus), Professor, Department of Biology, July 1, 2011 to June 30, 2014.

Undergraduate Instruction
DHAMI, Rita, Lecturer, School of Pharmacy, May 1, 2011 to August 31, 2011.

NAGGE, Jeffrey J., Assistant Professor, School of Pharmacy, April 1, 2011 to December 31, 2014.

RICHARD, Cynthia, Assistant Professor, School of Pharmacy, May 1, 2011 to December 31, 2011.

Cross Reappointment
BEAZELY, Michael A., Assistant Professor, School of Pharmacy to Department of Biology, July 1, 2011 to June 30, 2014.

B. ADMINISTRATIVE APPOINTMENTS
BARRA, Monica, Associate Chair, Department of Chemistry, May 1, 2011 to April 30, 2014.

EDWARDS, David, Director, School of Pharmacy and Associate Dean, Pharmacy, June 1, 2011 to May 31, 2015

MOFFATT, Barbara, Associate Dean, Undergraduate Studies, September 1, 2011 to August 31, 2012.
C. SABBATICALS
For Approval by the Board of Governors

MEIERING, Elizabeth, Associate Professor, Department of Chemistry, January 1, 2012 to June 30, 2012, 100% salary arrangement

WAITE, Nancy, Associate Professor, School of Pharmacy, split leave, September 1, 2011 to February 29, 2012 and September 1, 2012 to February 28, 2013, 100% salary arrangement

T.B. McMahon
Dean
University of Waterloo  
SENATE  
June 20, 2011

FOR APPROVAL

______________________________

Committee/Council Appointments

Motion:
That Senate approve the following appointments:

- **Committee on Student Appeals**: Kevin Barton (arts) as graduate student representative, term May 1, 2011 to April 30, 2013.
- **Graduate & Research Council**: Clare Bermingham as the arts graduate student representative, term May 1, 2011 to April 30, 2013.
Memo

To: Erin Windebank
From: Ken Lavigne, Registrar
Date: June 6, 2011
Re: Conferral of Degrees

Following is a list of graduates who have been issued their undergraduate degrees early at various times throughout the year to support employment or immigration requirements outside of Canada. Please include them for information at the next Senate meeting. These degrees have been issued according to the Senate directive of March 27, 2000, which delegates "to the President and the Registrar authority to grant a degree/diploma/certificate when circumstances necessitate outside the normal schedule for such approvals by Senate.

<table>
<thead>
<tr>
<th>Full Name</th>
<th>Degree</th>
<th>Confer Date</th>
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<tbody>
<tr>
<td>Belovay, Keith</td>
<td>Bachelor of Software Engineering</td>
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<td>Berckmans, Ryan</td>
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<td>Birchall, Andrew</td>
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<td>Bogatan, Stefana</td>
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<td>Da Silva, Jonathan</td>
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<td>deVries, Keith</td>
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<td>Dimson, Thomas</td>
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<td>Dornbosch, Michelle</td>
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<td>Hashem, Nadia</td>
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<td>Humadi, Baker Mohamad</td>
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<td>Jeffray, Kyla</td>
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<td>Jones, Shawn</td>
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<td>Kuntz, Joshua</td>
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<td>Li, Tao</td>
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<td>Morrison, Kyle Ian James</td>
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<td>Sivarajan, Krishna</td>
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<td>Smit, Jessica</td>
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<td>Solomon, Daniel</td>
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<td>Song, Sijia</td>
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<td>Stickel, Laura</td>
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<td>Syed, Taif</td>
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<td>Waldman, Lyle</td>
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<td>Weber, Michael</td>
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<td>Wong, Angus</td>
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<td>Wu, Ran</td>
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<td>Xia, Yuan Yuan</td>
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<td>Xu, Hao</td>
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<td>Zhao, Haibin</td>
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<td>Zhiang, Qian</td>
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</table>
FOR INFORMATION

Council of Ontario Universities
Report on Academic Colleagues' (AC) Meetings - Toronto
May 26-27, 2011 - Paul D. Guild

The topics below were among those considered at this COU Meeting of AC.

A. Academic Colleagues Update

A1. What Is The Role Of The University?
An AC after dinner roundtable discussion focused on the above topic which is of great concern in most democratic civil societies around the world. Some of the points raised were consistent with those expressed in the editorial found at the link below. We anticipate more to come from the ACs on this topic.

Link: http://www.adm.uwaterloo.ca/infosec/Giroux.pdf

A2. Granting Trends Toward Larger Awards But To Fewer Researchers
Work is underway to perform ‘fact finding’ on this topic and an AC discussion paper will be presented at a Fall 2011 meeting.

A3. Academic Colleagues’ Membership On Committees
ACs volunteered their additional efforts to committees that will address about half a dozen priority topics during the upcoming academic year, including: student access and financial assistance; relations with other PSE institutions; graduate expansion.

A4. Academic Colleagues’ Summer Retreat
This strategic planning event is scheduled for the last week of August and will be held at the COU offices in Toronto.

B. COU and Executive Update (Peter Gooch joined the group and led discussions)

B1. A Plan For Ontario’s Post Secondary Education
MTCU Minister Milloy has published remarks made at the Canadian Club this month. “Putting Students First” touches on a number of topics that concern the Ministry at this time (such as credit transfer; online learning; increased access to PSE; a government approval process for new satellite campuses) and may be considered indicative of the direction of a Liberal Party Election Platform.

Link: http://www.adm.uwaterloo.ca/infosec/Milloy.pdf

B2. MTCU To Approve New Satellite Campuses
Deputy Minister Newman has made it clear that MTCU will approve any additional satellite campuses that expect to receive provincial funding for capital or operating. The Ministry seems to be using a “procurement model” whereby interested institutions can bid in response to calls for proposals to open new programs.

Link: http://www.adm.uwaterloo.ca/infosec/SatelliteCampus.pdf
B3. Architecture School Has Been Approved At Laurentian University
The Ontario government has approved a new architecture school in Sudbury, the first to be offered in both English and French outside Quebec and with spots for up to 270 undergraduates. The province will provide $21M toward building the school that could open in 2013, depending on the availability of additional complementary funding.

Link: http://www.adm.uwaterloo.ca/infosec/ArchitectureSchool.pdf

B4. Ontario Online Institute
Having seeded this initiative in the last throne speech, the Ministry now has responses from their consultant, the universities, and the colleges of Ontario. It is expected that next steps will await election outcomes.

- Colleges Ontario sent their report in February 2011.
- Council of Ontario Universities sent their report in April 2011.

Link: http://www.adm.uwaterloo.ca/infosec/0OI-Jean-Louis.pdf
Link: http://www.adm.uwaterloo.ca/infosec/0OI-Colleges.pdf
Link: http://www.adm.uwaterloo.ca/infosec/0OI-COU.pdf

B5. Ancillary Publishing Fees
Undergraduate students across the province, represented by the Ontario Undergraduate Student Alliance (OUSA), are concerned about the growing ancillary fees charged by textbook publishers. These fees are to pay for such supplementary learning assets as case studies, teaching videos and testbank quizzes. While MTCU has an ancillary fee policy in place now, some reasonable accommodation for this student concern would seem necessary.

B6. Update on Credit Transfer
COU-MTCU discussions are underway over the $8M per year to be invested with COU members over five years for credit transfer. Straightforward institutional allocations may be based simply on the number of undergraduate students entering specific universities from colleges.

B7. Funding Cut To Executive Offices
The government-imposed 10% cut to presidential and vice-presidential offices in academe (along with executive functions in various other provincially funded institutions) is moving forward. Executive Heads will attest to their cuts (and reinvestment ‘front line’ services) in their regular reports to government.
Memo

To: Tracy Dietrich
From: Ken Lavigne, Registrar
CC: Debbie Knepper, Erin Windibank
Date: May 25, 2011
Re: New Degree Hood for Senate Approval

Please arrange for the approval of a new degree hood in the consent agenda at the June meeting of Senate.

Bachelor of Knowledge Integration (BKI) - The hood is consistent with all Faculty of Environment bachelor degree hoods. It is in the Oxford Bachelor shape, with an orange border and turquoise soutache braid.
The Senate Executive Committee met on June 6, 2011 and agreed to forward the following item to Senate. For further information, please contact the committee secretary at extension 32225.

FOR APPROVAL

Chancellor Nominating Committee
Prem Watsa's first term as chancellor ends April 30, 2012 and, as provided by the University of Waterloo Act, 1972 [excerpt (section 30, subsections 1-3) reproduced below], he is eligible to serve for a second three-year term.

It has been the practice for the Senate Executive Committee to serve as the nominating committee. The Executive Committee is agreeable to again serve as the nominating committee and forwards this recommendation to Senate for approval.

Motion:
That Senate appoint its Executive Committee as the Chancellor Nominating Committee.

CHANCELLOR

Chancellor, election of 30
1. There shall be a Chancellor of the University who shall be elected by the Senate in such manner as the Senate shall determine.

Term of Office
2. The term of office of the Chancellor shall be three years, provided that he shall be eligible for re-election for one additional term.

Duties
3. The Chancellor shall preside at all Convocations and shall admit to degrees, diplomas and certificates such candidates including the recipients of honorary degrees, as may be designated by the Senate.

ew/tad

Feridun Hamdullahpur
Chair
Senate Graduate & Research Council and Senate Undergraduate Council agreed to forward the following items to Senate for information and approval.

Further details are available at: www.adm.uwaterloo.ca/infosec/Committees/senate/sgrc.htm and http://www.secretariat.uwaterloo.ca/Committees/senate/ugc.htm

FOR APPROVAL

GUIDELINES FOR REVIEWS OF ONGOING AND NEW ACADEMIC PROGRAMS

Motion: To approve the revised Institutional Quality Assurance Framework as detailed below and in Attachment 1.

Rationale: Senate approved an initial draft of this document, which specifies processes for review of new and existing undergraduate and graduate program reviews, at its May 17, 2010 meeting. This version incorporates changes required to obtain Ontario Council on Quality Assurance approval, which has now been granted (e.g., definitions of new programs and major modifications, some additional portions removed to associated procedures manual). It was approved by Senate Graduate & Research Council and Senate Undergraduate Council at their meetings of April 4, 2011 and May 10, 2011 respectively.

FOR INFORMATION

SCHEDULE OF PROGRAM REVIEWS

The schedule of undergraduate and graduate program reviews is detailed in Attachment 2.

COUNCIL REPORTING TO SENATE

At the request of the Senate Executive Committee (as presented in its April 18, 2011 report to Senate), Senate Graduate & Research Council and Senate Undergraduate Council have agreed to adopt the following measures, effective September 2011, to conserve time for discussion and participation at Senate by implementing a clear process for inclusion of council items in the Senate consent agenda.

1. All council motions will contain a recommendation that they be presented to Senate either for inclusion in the consent or regular agenda.

2. The following items, which are presented to Senate for information unless otherwise indicated, will normally be recommended for inclusion in the Senate consent agenda unless the council believes that they are likely to be controversial:
   - undergraduate and graduate program reviews and progress reports;
   - minor curricular changes (as defined by the university Institutional Quality Assessment Process (IQAP);
   - five-year reviews of Senate-approved centres and institutes;
   - voluntary closures of Senate-approved centres and institutes (require Senate approval);
   - constitutional changes to Senate-approved centres and institutes (may require Senate approval);
   - changes to policies for the administration of undergraduate studies, graduate studies or research (require Senate approval);
   - approval of new scholarships and awards.
3. The following items, all of which require Senate approval, will normally be recommended for inclusion in the Senate regular agenda:
   - new academic programs;
   - major changes to existing academic programs (as defined by the IQAP);
   - discontinuation of academic programs;
   - proposals for new centres and institutes;
   - involuntary closure of centres and institutes;
   - items that either council believes will be controversial or require open discussion in Senate.

/sig
George Dixon
Vice-President, University Research

Sue Horton
Associate Provost, Graduate Studies

Geoff McBoyle
Vice-President Academic & Provost
UNIVERSITY OF WATERLOO
INSTITUTIONAL QUALITY ASSURANCE FRAMEWORK

Effective July 1 2011

Office of the Associate Vice President, Academic Programs
And Graduate Studies Office
University of Waterloo
Waterloo, Ontario N2L 3G1

May 23, 2011
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A. Purpose and Scope of Reviews

Consistent with good educational practice, the University of Waterloo (UW) regularly reviews its academic programs. This Institutional Quality Assurance framework is consistent with recommendations of the Ontario Universities Council on Quality Assurance (the Quality Council), and are effective July 1 2011. This framework replaces the previous guidelines, namely guidelines for undergraduate programs (originally approved by Senate February 1997), and those for graduate programs (the Ontario Council for Graduate Studies – OCGS – guidelines originally implemented in 1982). Any changes to this framework are subject to approval by Senate and by the Quality Council.

The review processes are subject to regular audit by the Quality Council, on a schedule determined by the Quality Council. The threshold framework for degree expectations are the University of Waterloo Guidelines for University Undergraduate Degree Level Expectations (UUDLES: adopted by Senate 2008), and the University of Waterloo Guidelines for University Graduate Degree Level Expectations (adopted by Senate 2010). These in turn conform to the Ontario Council of Academic Vice-Presidents (OCAV) Guidelines for Degree Level Expectations (adopted by OCAV in 2005: Appendix I).

In addition to the UUDLES, the University of Waterloo intends its graduating students at the Bachelor’s level to be able to articulate their learning from experiential or applied opportunities, and to demonstrate an understanding of the intellectual, social, cultural, and political diversity of the world in which we live.

The OCAV framework for degree expectations, together with the University of Waterloo enhancements, will support departments and academic units in planning or revising curricula and in communicating program goals and outcomes to students and stakeholders. As of July 2011, departments and faculties engaged in program review shall use these guidelines as base expectations while retaining the flexibility to add objectives unique to their specialties.

The Quality Council Framework (2010) defines a degree program as “(a)n identified set and sequence of courses, and/or other units of study, research and practice within an area of disciplinary or interdisciplinary study, which is completed in full or partial fulfilment of the requirements for the awarding of a degree, and is recorded on the graduate’s academic record”. Programs are not necessarily congruent with academic organizational units, and provision should be made to include joint programs and multi- or inter-disciplinary programs in a way appropriate for the institution. (Note that while University of Waterloo student information system often uses the term “plan” to refer to a program, the term “program” will be used throughout this document to avoid confusion).

Following the Quality Council Framework (2010), the scope of academic reviews at University of Waterloo covers “new and continuing undergraduate and graduate degree/diploma programs whether offered in full, in part, or conjointly by any institutions federated and affiliated with the university.” This also extends “to programs offered in partnership, collaboration or other such arrangement with other postsecondary institutions including colleges, universities, or institutes, including Institutes of Technology and Advanced Learning…”
At UW, the fundamental purposes of the review process are to help (1) each program to achieve and maintain the highest possible standards of academic excellence, through systematically reflecting on its strengths and weaknesses, and looking forward to determine what actions would further enhance quality in the program; (2) assess the quality of the program relative to counterpart programs in Ontario, Canada and internationally, and (3) meet public accountability expectations through a credible, transparent, and action-oriented review process.

Another key purpose is to create an institutional culture which understands and values the benefits of program reviews, while recognizing the significant workload implications of preparing a Self Study, hosting a site visit, and providing a Two-year Progress Report.

At the University of Waterloo, the responsibility for undergraduate academic reviews rests with the position of Associate Vice President Academic Programs, created in 1998. The responsibility for graduate academic reviews rests with the Associate Provost, Graduate Studies. Responsibility for specific augmented reviews is allocated to one of these two individuals. These are the sole contacts with the Quality Council.

Policy since 1998 has been that: (1) the reviews would be treated as “whole of Program reviews” in the belief that undergraduate and graduate programs should be considered together, (2) Interdisciplinary Options and Minors are reviewed under the same arrangement as for single-discipline reviews except for the composition of the Review Committee (which consists of three reviewers from other Faculties, but internal to the university; there can also be a student from another program as a fourth member of the panel), and (3) review processes for professional accreditation would be examined to determine if they met the UW and the Quality Council requirements for a Program Review. The design of the Program Review process is intended to be as streamlined as possible, while ensuring its accessibility and transparency to the UW community.

At the University of Waterloo, many students complete their degrees in the Faculty rather than in a Department or School. Faculty-based programs are treated similarly to Department or unit-based reviews.

A schedule for Undergraduate Program Reviews based on a seven year cycle is being used, and has been organized to place undergraduate program reviews in the same year as, or one year before or after, the scheduled Graduate Program Reviews, in order to allow information from one review to be used in the other review. Units are also encouraged where desired and appropriate to undertake combined undergraduate and graduate reviews (i.e. augmented reviews). However, it also is recognized that accreditation for professional programs more often occurs on a five year cycle. In the latter case, the UW schedule of reviews has been modified to allow the UW Program Review to occur simultaneously with the professional accreditation review. The schedule for Undergraduate and Graduate Program Reviews 2011/12 to 2017/18 can be found in the University’s “Manual for Academic Reviews” (hereafter, the Manual). Units are encouraged to combine reviews of undergraduate and graduate programs, and may do so by moving the dates for review, subject to the interval between reviews of individual programs not exceeding eight years.
The Self Study process is started during the preceding academic year with a joint meeting called by the Associate Vice President Academic Programs – AVPA - (undergraduate reviews) and the Associate Provost Graduate Studies – APGS - (graduate reviews). The AVPA and APGS meet with the chairs/directors and administrative assistants of the Programs scheduled to submit their Self Study the following June, so that the Site Visit could be scheduled for either the following fall or winter term. In cases where the academic unit chooses to submit an augmented review, either the AVPA or APGS is assigned primary responsibility for overseeing the particular review (allocation is made in such a way as to share workload appropriately). At the first meeting, the nature of the review process is discussed, and opportunity is provided for questions. After that first meeting, the AVPA/APGS is available to meet with faculty and staff in each Program beginning its Self Study, to discuss matters particular to that Program. Data for the review are provided primarily by Institutional Analysis and Planning, which is responsible for the integrity of the data. These data are not publicly available. For details of data to be provided, and timelines, see the Manual.

The following Sections outline the expectations for Program Reviews, and indicate how the University of Waterloo deals with them. Throughout the UW guidelines, summaries/explanations/suggestions are written in *italics*.

**B. Cyclical Reviews of Existing Academic Programs**

**1. Reviews of Existing Academic Programs not related to Professional Accreditation**

The Quality Council Framework (2010) specifies the key elements for the Institutional Quality Assurance Process (IQAP). These are identified below, followed by the UW approach to each. After discussing the basic process, information is provided regarding the processes for the Self Study and Site Visits.

According to the Quality Council, the institutional review policy should:

(1) include a self-appraisal by professors, staff and students participating in the program. (*UW* A Self Study for an undergraduate program will be reviewed and approved by the Associate Vice President Academic Programs. A Self Study for a graduate program will be reviewed and approved by the Associate Provost, Graduate Studies. A Self Study for an augmented program will be reviewed and approved by either the Associate Vice President Academic Programs or the Associate Provost, Graduate Studies. The guidelines for those reports are provided in the Manual)

(2) have an evaluation, including a site visit by at least two external reviewers including one from universities outside Ontario. One internal reviewer is also mandated, from outside the discipline under review (*UW* each Site Visit involves two external reviewers, at arm’s length [not collaborators from the past seven years, supervisors or supervisees, relatives, etc.] from the program under review, normally with one from a university in
Ontario and one from a university from outside Ontario. Reviewers should be Associate or Full Professors or equivalent, preferably with some experience of program management). Each Site Visit Team also involves one internal UW reviewer, chosen by the AVPA/APGS from a different Faculty than the one in which the program under review is located. Guidelines for Site Visits are provided below.

(3) describe the process of assessment of the Self Study and review within the university, and describe how a Final Assessment Report will be drafted, including an implementation plan for recommendations. (UW: the Program Chair/Director, in collaboration with the Faculty Dean, submits a Chair/Director’s Report to the AVPA/APGS, indicating actions to be taken as a result of what has been learned from the Self Study and the Site Visit. The AVPA/APGS writes a Final Assessment Report, summarizing information from the Self Study, the Review Team Report, and the response from the Program and the Dean as well as the implementation plan. Two years after the entire review process is complete, a Two-year Progress Report is submitted to the AVPA/APGS in which progress is documented regarding actions taken by the Program, the Faculty and the University. Both the Final Assessment Report and the Two-year Progress Report are commented on and evaluated by Senate Undergraduate Council (undergraduate reviews) or Senate Graduate and Research Council (graduate reviews). Any comments and/or concerns raised by Senate Undergraduate Council/Senate Graduate and Research Council, together with the program’s response, will be incorporated into the Final Assessment Report or the Two-year Progress Report prior to it being presented to Senate. The AVPA/APGS subsequently reports to Senate, and provides a one-page summary for all programs which the Provost uses for reporting to the Board. At the time of the next Program Review, the Program is accountable for commitments made in response to the previous Program Review).

(4) describe reporting requirements (UW: the Final Assessment Report is presented at Senate, and hence available publicly on the web in the Senate Minutes; a copy is also sent to the Quality Council. Similarly the Two-year Progress Report is presented to Senate and hence available publicly in the Senate Minutes: links to these documents are also available from \url{http://www.uwaterloo.ca/accountability}.

(5) Provide an institutional manual (UW: \textit{Manual for Academic Reviews}. Maintained by AVPA/APGS’ individual items are updated regularly and sent to Senate Undergraduate Council/Senate Graduate and Research Council for information, available online at \url{http://grad.uwaterloo.ca/faculty/review.html}).

\textbf{The Quality Council Evaluation Criteria}

The curricular content, admission requirements, mode of delivery, bases of evaluation of student performance, commitment of resources and overall quality of any program and its courses are all necessarily related to its goals, learning objectives and learning outcomes. Goals
provide an overview for students, instructors and program/course evaluators of what the program or course aims to accomplish. Learning objectives are an expression of what the instructor(s) intends that the student should have learned or achieved by the end of the program or course. Learning outcomes are what the student has actually learned or achieved in the program or course.

The Quality Assurance Framework (2010) specifies that the review of existing programs should use the following criteria (quoted directly from Quality Council, 2010, pp 23-24):

1 Objectives
a) Program is consistent with the institution’s mission and academic plans.
b) Program requirements and learning outcomes are clear, appropriate and align with the institutions’ statement of the undergraduate and/or graduate Degree Level Expectations.

2 Admission requirements
Admission requirements are appropriately aligned with the learning outcomes established for completion of the program.

3 Curriculum
a) The curriculum reflects the current state of the discipline or area of study.
b) Evidence of any significant innovation or creativity in the content and/or delivery of the program relative to other such programs.
c) Mode(s) of delivery to meet the program’s identified learning outcomes are appropriate and effective.

4 Teaching and assessment
a) Methods for assessing student achievement of the defined learning outcomes and degree learning expectations are appropriate and effective.
b) Appropriateness and effectiveness of the means of assessment, especially in the students’ final year of the program, in clearly demonstrating achievement of the program learning objectives and the institution’s statement of Degree Level Expectations.

5 Resources
Appropriateness and effectiveness of the academic unit’s use of existing human, physical and financial resources in delivering its program(s). In making this assessment, reviewers must recognize the institution’s autonomy to determine priorities for funding, space, and faculty allocation.

6 Quality indicators
a) Faculty: qualifications, research and scholarly record; class sizes; percentage of classes taught by permanent or non-permanent (contractual) faculty; numbers, assignments and qualifications of part-time or temporary faculty;
b) Students: applications and registrations; attrition rates; time-to-completion; final-year academic achievement; graduation rates; academic awards; student in-course reports on teaching; and
c) **Graduates**: rates of graduation, employment six months and two years after graduation, post-graduate study, "skills match" and alumni reports on program quality when available and when permitted by the Freedom of Information and Protection of Privacy Act (FIPPA). Auditors will be instructed that these items may not be available and applicable to all programs.

**7 Quality enhancement**
Initiatives taken to enhance the quality of the program and the associated learning and teaching environment.

**8 Additional graduate program criteria**

a) Evidence that students’ time-to-completion is both monitored and managed in relation to the program’s defined length and program requirements.

b) Quality and availability of graduate supervision.

c) Definition and application of indicators that provide evidence of faculty, student and program quality, for example:

i) Faculty: funding, honours and awards, and commitment to student mentoring;

ii) Students: grade-level for admission, scholarly output, success rates in provincial and national scholarships, competitions, awards and commitment to professional and transferable skills;

iii) Program: evidence of a program structure and faculty research that will ensure the intellectual quality of the student experience;

iv) Sufficient graduate level courses that students will be able to meet the requirement that two-thirds of their course requirements be met through courses at this level.

The templates at UW for the Self Study (see Manual) have been arranged to reflect the points identified by the Quality Council Framework. The UW templates note major headings involving self assessment, of the past and the future, the organization and the people involved, research, service, teaching (with special attention to co-operative education and online learning), the students and the support available (human, physical and financial).

The UW guidelines are broad in scope, so that each Program can emphasize those aspects which are most relevant. The review will cover the last seven fiscal years (spring/fall/winter), with emphasis on the last several. The UW Office of Institutional Analysis and Planning (IAP) will provide most of the historical data to each Program and ensure its integrity.

Under each heading in the UW guidelines are suggested areas that could be discussed and critically examined. In some cases, a topic may fit just as well under another heading. It is not necessary to repeat information in several sections, and generally it will be up to the Program to decide where information should be included in the Self Study. The self-study should be broad-based, reflective, forward-looking and include critical analysis.

The self-study should address and document the:

1. Consistency of the program’s learning outcomes with the institution’s mission and Degree Level Expectations, and how its graduates achieve those outcomes;

2. Program-related data and measures of performance, including applicable provincial, national and professional standards (where available);

3. Integrity of the data;
4. Review criteria and quality indicators identified above;  
5. Concerns and recommendations raised in previous reviews;  
6. Areas identified through the conduct of the self-study as requiring improvement;  
7. Areas that hold promise for enhancement;  
8. Academic services that directly contribute to the academic quality of each program under review;  
9. Participation of program faculty, staff, and students in the self-study

All faculty members should be provided the opportunity to participate in the self-appraisal process and to comment on the Self Study. Faculty from the UW Colleges and part-time faculty who regularly teach in the program are to be given this opportunity. If there are differing views among the faculty these should be noted. Also all faculty members should have the opportunity to participate in the program’s response to the Review Team Report. Again the response should note differing views if there is no consensus among faculty. It is also essential to include staff and student participation in the self-appraisal process, and to inform staff and students (for example at a Town Hall meeting) of the Review Team’s findings.

Guidelines for Site Visits

The following guidelines have been prepared to assist Departments/Schools in making arrangements for the Site Visit related to their Program Reviews.

The Program under review will have the lead role in making arrangements for the schedule for the Site Visit. However, arrangements should be prepared in consultation with the Office of the AVPA or the Graduate Studies Office as appropriate. For augmented reviews (reviews combining both undergraduate and graduate offices), one Office will be assigned primary responsibility, and consultation with the other will occur as needed. Contact the relevant Administrative Assistant.

The schedule for the Site Visit should be prepared at least one month in advance of the visit, so that the Review Team can see the schedule, and have an opportunity to suggest changes.

1. Prior to the Site Visit

1.1 The Chair/Director of the Program under review arranges for completion of a Self Study with input from the Dean, faculty members, staff and students, and in consultation with the Dean of the Faculty, develops a proposed list of reviewers (including phone numbers and email addresses and a brief biography) which is submitted to the AVPA/APGS. Two External Reviewers and one Internal Reviewer are required. Five names should be proposed, and ranked in order of preference, for each of (1) an External Reviewer who will normally come from a university in Ontario; (2) an External Reviewer who will normally come from a university outside Ontario but at the undergraduate level usually within Canada. One External Reviewer may be a non-university appointee (e.g. someone from government or the private sector), provided that she/he has appropriate qualifications to fulfill the Reviewer
role. An Internal Reviewer, who will come from UW but from outside the home Faculty, will be selected by the AVPA/APGS.

1.2 The proposed Reviewers should be at arm’s length from the program, meaning not relatives, collaborators, supervisors/supervisees, etc. The AVPA/APGS will make the final choice of members for the Review Team.

1.3 The Chair/Director identifies several two-day blocks suitable to the Program under review for the Site Visit, and provides those to the AVPA/APGS.

1.4 The Office of the AVPA/the Graduate Studies Office contacts the proposed External and Internal Reviewers, to invite them to serve as Reviewers.

1.5 The Office of the AVPA/the Graduate Studies Office confirms the time and arrangements for the Site Visit with the Reviewers, and obtains the Social Insurance Numbers from the External Reviewers.

1.6 The Office of the AVPA/Graduate Studies Office co-ordinates arrangements for travel and accommodation for the External Reviewers.

1.7 The Office of the AVPA/Graduate Studies Office sends a copy of the Self Study to the External Reviewers at least one month prior to the visit.

2. The Site Visit

2.1 The External Reviewers arrive by not later than the evening before the Site Visit activities are to begin.

2.2 An initial meeting with the AVPA/APGS is held at the start of the visit. The AVPA typically hosts a meeting on the evening before the Site Visit activities begin, for the two External Reviewers and the Internal Reviewer, as well as the Undergraduate Chair/Director of the Program under review and the Dean of the Faculty (or his or her delegate) in which the Program is based. The APGS similarly has an initial meeting with Reviewers at the beginning of the site visit. The purpose of the meeting is (quoting the Quality Council 2010 p21) to ensure that the reviewers:

- Understand their role and obligations;
- Identify and commend the program’s notably strong and creative attributes;
- Describe the program’s respective strengths, areas for improvement, and opportunities for enhancement;
- Recommend specific steps to be taken to improve the program, distinguishing between those the program can itself take and those that require external action;
- Recognize the institution’s autonomy to determine priorities for funding, space, and faculty allocation;
- Respect the confidentiality required for all aspects of the review process.

2.3 The Review Team will have two days to meet with key participants in the Program under review. The Chair/Director should make arrangements for the Review Team to meet at a minimum with the:

2.3.1 Dean and Associate Dean(s) (subject to availability) relevant to the Program under review.

2.3.2 Chair/Director and Associate Chairs.
2.3.3 Faculty (including adjuncts and Federated University and Affiliated University Colleges' faculty where applicable), in groups, or, if feasible, individuals when that is requested.

2.3.4 Staff.

2.3.5 The relevant Librarian

2.3.6 Department of Co-operative Education and Career Services (if there is a Co-op stream).

2.3.7 Undergraduate students (recommended more than one time slot be identified for undergraduates to ensure that adequate opportunity is provided to meet with the Review Team). These meetings should be arranged without faculty present, to facilitate frank and open discussion. It is good practice to ask the Departmental/School Undergraduate Student Association (where one exists) to invite students to participate in this meeting.

2.3.8 Graduate students, with particular attention to ensuring Teaching Assistants are well represented. As with the undergraduates, these meetings should be arranged without faculty present, and it is good practice to ask the Departmental/School Graduate Student Association (where one exists) to invite students to participate in this meeting.

2.3.9 Vice President Academic and Provost (subject to his/her availability).

2.3.10 Graduate reviews will conclude with a second meeting with the Associate Provost Graduate Studies; undergraduate reviews will include the Associate Vice President Academic.

2.4 If possible, the Review Team should be provided by the Program under review with an office in which the Reviewers can leave their belongings, and have discussions among themselves.

2.5 The host Program should discuss with the Review Team if, over lunch periods, the Review Team would like to be by itself, in order to discuss what has been learned, or whether it would appreciate the opportunity to meet with other people.

2.6 The Program should allocate time in the evening after the first day of the Site Visit, and in the latter part of the second day, for the Review Team members to discuss among themselves what they have been learning, how they will structure their report, and how they will divide the tasks for writing the report. UW expects that the Review Team will submit its report within two weeks of the Site Visit. Thus, the Review Team members must be given sufficient time to make arrangements for the preparation of the report before they finish the Site Visit and depart from UW.


1. The Review Team will prepare a report with separate sections for each program (undergraduate and graduate) evaluated, which should be submitted to the AVPA/APGS within two weeks of the completion of the Site Visit. There is no fixed format for the report, provided that it covers the evaluation criteria identified in the Quality Council (2010) Framework, listed above. A suggested template is provided in the Manual. It is recommended that the report should include at least the following:
Part 1: The Review Process

- time of visit.
- documents reviewed.
- individuals and groups met.
- adequacy of Site Visit arrangements

Part 2: Findings, Conclusions and Recommendations

In preparing its report, the Review Team should be aware that the Quality Council (2010) Framework specifies that a review of Programs should address the review criteria 1 through 8, reproduced on pages 7-8 previously. The Review Team is welcome to add other topics as long as attention is given to the points highlighted above.

The most useful report for UW will be one which is “constructively critical”, identifying strengths which should be protected and enhanced, weaknesses that deserve attention, and new opportunities. When weaknesses are identified, the report will be more helpful if suggestions are presented regarding how the weaknesses could be addressed.

The Review Team Report will lose credibility within UW if it is perceived primarily to be a “booster report” for a discipline or profession, and only recommends providing more funding to the Program. A more helpful report will consider what could be done by the Program, by itself or in collaboration with its Faculty and UW, in using limited resources more efficiently and effectively, along with considering where new resources would represent a strategic investment to allow a Program to grow with quality.

The Review Team Report, if necessary, may include a confidential letter of transmittal to cover personnel issues. This letter would only be available to the Dean, AVPA/APGS, and the Vice President Academic and Provost.

4 After the Site Visit

1. The Review Team Report is submitted to the AVPA/APGS, and then copies are distributed to the Vice President Academic and Provost, the Dean of the Faculty, and the Chair/Director of the Program.

2. The external Review Team members submit their travel and accommodation expense claims to the Office of the Associate Vice President Academic/Office of Graduate Studies. The honoraria for the External Reviewers will be paid after the final report from the Review Team has been received.

3. The Program under review is invited to provide comments, verbally or in writing, regarding the experience with the Site Visit, and especially to identify aspects of the Site Visit which could be modified to make the experience more productive. It is important that students also have an opportunity to provide comments related to the Site Visit. Such comments should be sent to the AVPA/APGS.

4. The Chair/Director and the faculty members of the Department/School have an opportunity to provide comments on factual errors in the Review Team Report.
Comments should be sent to the AVPA/APGS within four weeks of receiving a copy of the Report. If no comments are received within that time period, unless other arrangements have been made it will be concluded that the Program has no initial comments to make about the Report.

5. The Chair/Director, in consultation with the Faculty Dean, will submit a report to the AVPA/APGS outlining their responses to each of the following:
- The plans and recommendations proposed in the Self Study report;
- The recommendations advanced by the Review Team in its report;
- The program’s response to the Review Team’s Report;
And will describe:
- Any changes in organization, policy or governance that would be necessary to meet the recommendations;
- The resources, financial and otherwise, that would be provided in supporting the implementation of selected recommendations; and
- A proposed timeline for the implementation of any of those recommendations.
The Chair’s/Director’s Report should be submitted within 10 weeks of the Program receiving its copy of the Review Team Report.

6. The AVPA/APGS will provide a Final Assessment Report to the Vice President Academic and Provost, outlining the nature of the review process, the main findings, conclusions and recommendations from the Review Team Report, and the main conclusions and proposed actions proposed and prioritized by the Program. These actions will include any changes in organization, policy or governance that are necessary, the resources (financial or otherwise) that would be needed, and a proposed timeline. This report will be submitted within four weeks of receiving the Chair’s/Director’s Report described in 4.5 above. The Final Assessment Report will be presented to Senate Undergraduate Council/Senate Graduate and Research Council for approval.

7. The AVPA/APGS will report to Senate that the Program Review has been completed, and highlight main findings and conclusions. The AVPA/APGS will submit a copy of the Final Assessment Report to the Quality Council. The Provost will report to the Board once a year as to which programs were reviewed the previous academic year. The Final Assessment Report referred to in Section 4.6 above is made available publicly in the Minutes of Senate as well as in an academic review website (reachable from http://uwaterloo.ca/accountability). Note that other documents (Self Study, Review Team Report, Chair/Director’s Report) are not public.

8. The Vice President Academic and Provost, or designate, will have responsibility for ensuring that all recommendations and issues arising from the reviews are dealt with in a manner that brings closure to the process, including provision of necessary resources.

9. It is good practice for the Chair/Director to arrange a town hall meeting with staff and students to provide feedback on the review findings.

10. The Chair/Director is responsible for a Two-year Progress Report which is presented to Senate Undergraduate Council/Senate Graduate and Research Council (for approval) and Senate (for information), on steps taken to follow up from the Review.

11. The AVPA/APGS will submit a copy of the Two-year Progress Report to the Quality Council.
Table 1. Summary of timelines for reviews of current programs

<table>
<thead>
<tr>
<th>Fall, previous academic year</th>
<th>Meeting of those responsible in Department/School, with AVPA, APGS and resource persons; final decision as to whether review will be augmented or only undergraduate/only graduate</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 1</td>
<td>Self Study submitted</td>
</tr>
<tr>
<td>Fall/Winter</td>
<td>Site Visit occurs</td>
</tr>
<tr>
<td>2 weeks after visit</td>
<td>Review Team submits Report</td>
</tr>
<tr>
<td>4 weeks after Review Team Report received</td>
<td>Chair/Director submits comments on factual errors/issues in Review Team Report to AVPA/APGS</td>
</tr>
<tr>
<td>10 weeks after Review Team Report received</td>
<td>Chair/Director’s Report submitted on what was learned from Self Study and Review Team Report, and plans for future</td>
</tr>
<tr>
<td>4 weeks after Chair/Director’s Report received</td>
<td>AVPA/APGS submits Final Assessment Report to Senate Undergraduate Council/Senate Graduate and Research Council for approval, and then to Senate for information. Copy of Final Assessment Report sent to the Quality Council</td>
</tr>
<tr>
<td>February of subsequent academic year</td>
<td>Provost reports to Board names of all programs reviewed in previous academic year cycle</td>
</tr>
<tr>
<td>2 years after Site Visit</td>
<td>Two-year Progress Report submitted by Department/School to Senate Undergraduate Council/Senate Graduate and Research Council for approval, and Senate for information</td>
</tr>
</tbody>
</table>

2. Reviews of Existing Academic Programs Relative to Professional Accreditation

The Quality Council (2010) Framework (section 4.2.7) states that “The Institutional Quality Assurance Process may allow for and specify the substitution or addition of documents or processes associated with the accreditation of a program, for components of the institutional program review process, when it is fully consistent with the requirements established in this framework. A record of substitution or addition, and the grounds on which it was made, will be eligible for audit by the Quality Council.”

The AVPA/APGS as relevant reviews the guidelines for the accreditation process, meets with the person(s) at UW responsible for the professional accreditation together with the Director of the Program, to review the guidelines for the accreditation and UW reviews, and to determine what additional information, if any, is required for the UW review. Such discussions occur at the time when work begins by a Program to prepare for the accreditation process, and a memo is filed determining the decision taken. If necessary, the Program under review will be asked to provide supplemental information to meet the needs of the UW review process.

When the Review Team is appointed by an accreditation organization, UW will seek to have a UW faculty member included as a member of the Review Team. If this is not possible, then UW may arrange to have a UW faculty member conduct interviews and examine documents.
related to the UW program review process to provide his or her perspective, and prepare a written report to supplement the accreditation Review Team Report. For master’s programs which are subject to accreditation reviews, it is usually necessary to review the research components of the program. These aspects can be reviewed in conjunction with a review of the PhD program (if one exists) or research master’s in the same unit (if one exists). If the only graduate program in the unit is a professional master’s subject to accreditation, then a separate review of the research components is required.

3. **Combined Reviews of Undergraduate and Graduate Programs**

UW encourages combined reviews (augmented reviews). Augmented reviews can be more efficient and also have academic merit, since there are frequently interactions between the undergraduate and graduate programs. Academic units proposing an augmented review should indicate their intention to the AVPA/APGS in good time (prior to the end of the previous calendar year). The AVPA/APGS will then allocate one of their two Offices as having primary responsibility for the logistics of the review. The review will then follow the normal process appropriate to that Office. Augmented reviews will be presented both at Senate Undergraduate and Senate Graduate and Research Councils. The Chair/Director will be invited to both meetings to respond to questions, the AVPA will be invited to Senate Graduate and Research Council, and the APGS to Senate Undergraduate Council, to ensure coherence in the response to the reviews of the undergraduate and graduate components.

4. **Reviews of Multi- or Inter-disciplinary Programs**

Reviews of inter-disciplinary programs which lead to a degree should follow the same procedures as those for single discipline programs described above. The review of an inter-disciplinary program (including collaborative graduate programs) can be, where appropriate, combined with the review of a larger program. One of the considerations in such combined reviews is whether a Review Team can be assembled which has expertise in both disciplinary and inter-disciplinary programs. Separate report sections must also be written for each program.

Where the inter-disciplinary undergraduate program does not lead to a separate degree (for example undergraduate options), the composition of the Review Committee is different. The Committee is composed of two University of Waterloo faculty members and one external reviewer. The Director of the inter-disciplinary program and the Dean who provide oversight of the program will be invited to suggest individuals to serve on the review committee. The composition of the review committee will be determined by the AVPA.

The process of the Review follows the same arrangement as for single-discipline reviews.

5. **Reviews of Programs Joint with other Universities**

For programs offered jointly with another/other Ontario universities, the procedure is that one individual (normally the Director or equivalent of the joint program) will prepare a Self Study following the template of his/her university, in consultation with faculty, staff and students at the other institution(s). The review team will be chosen in consultation with both/all partners, and the “internal” reviewer can come from each partner, or be chosen to represent all partners.
The review visit will include both/all campuses. The response to the review can be written by the Director of the joint program in consultation with the appropriate Chairs and Deans at both/all participating institutions, and then sent through the regular process at both/all universities. If deemed more appropriate, separate responses could be prepared, one for each participating institution, to follow the normal process at each university.

For programs joint with other universities outside Ontario, UW will follow the review process for Ontario universities. This would not necessarily require a site visit to the other university, provided that the Quality Council has determined that the partner university is also subject to an appropriate quality review process in its own jurisdiction. However UW would obtain information about the components of the program completed outside Ontario as appropriate, and include this in the review within Ontario.

If, in future, UW develops partnerships to offer degree or diploma programs with other institutions such as colleges or institutes, the present document will be modified to include such programs.

6. Reviews Involving Programs at the Federated or Affiliated Institutions

The University of Waterloo has one Federated University (St. Jerome’s) and three Affiliated University Colleges (Conrad Grebel, Renison, St. Paul’s). UW has made arrangements with the colleges to ensure that Program reviews are completed in a coordinated manner. Two major considerations are being addressed. First, when a Program is primarily based within one of the university colleges, the lead role for the Program review is taken by the University College, with the Self Study submitted to the Associate Vice President Academic at UW. Second, during their Program reviews, academic departments at UW are directed to identify when there are complementary disciplinary or program activities at one or more of the University Colleges, to ensure that such activities are considered in the Self Study.

The Colleges may opt to have the program reviews considered at the relevant College Council, in parallel to consideration at Senate Undergraduate Council/Senate Graduate and Research Council.

7. Reviews of For-Credit Diploma and Certificate Programs

Diplomas and certificates, where offered for credit, are reviewed on the same cycle as other programs. They will usually be reviewed in conjunction with a related degree program. Only graduate diplomas (certificates) are reported to the Quality Council.
C. Reviews of New Programs

At University of Waterloo, reviews of new programs follow a similar procedure to reviews of existing programs, with appropriate modifications to the program proposal documentation and the external review (for example, there are no current students to interview or for whom to provide statistics). See Manual for a template.

For new undergraduate programs, the AVPA has responsibility for the review, while for new graduate programs it is the APGS.

The steps for approval for new programs are similar to those for review of current programs.

1. An initial proposal document is developed, addressing the topics outlined in the Quality Council criteria. This proposal goes to the appropriate Department/School and Faculty committees for discussion and approval. If the program includes co-op experience, a report from Co-op and Career Services is required. The proposal specifies if the program is full cost-recovery or not.

2. If an external consultant review with site visit is required, this occurs following Faculty approval, and the unit concerned has the opportunity to respond to the review comments.

3. The proposal (modified if appropriate following the review) then goes to either Senate Undergraduate Council, or Senate Graduate and Research Council, and then Senate, for approval.

4. At this point the proposal is sent to the Quality Council for approval, if approval is required, or for information if required (new undergraduate minors and options do not require notification to the Quality Council).

5. The Board receives information once a year about programs approved to commence in the previous year (along with information on completed reviews of existing programs).

6. If MTCU approval of funding is required, a submission is made to MTCU (see table 2).

7. As is the case for reviews of existing programs, a Two-year Progress Report is required also for new programs. The purpose of the Two-year Progress Report is to provide initial data on student progress and implementation of the program, and to respond to any issues raised by consultants. Copies of the Two-Year Progress Report are sent to the Quality Council for information (or, if required, for decision).

8. Thereafter the program enters into the regular review cycle.

Definition of a New Program:
The Quality Council defines a new [degree] program as “Any degree, degree program, or program of specialization, currently approved by Senate or equivalent governing body, which has not been previously approved for that institution by the Quality Council, its predecessors, or any intra-institutional approval processes that previously applied. A change of name, only, does
not constitute a new program; nor does the inclusion of a new program of specialization where another with the same designation already exists (e.g., a new honours program where a major with the same designation already exists).” The Quality Council further clarifies that “a ‘new program’ is brand-new: that is to say, the program has substantially different program requirements and substantially different learning outcomes from those of any existing approved programs offered by the institution”.

Depending on the type of program, the levels at which approvals are required differ, as in Table 2 below. All new programs require internal approval (up to the Senate level), and depending on whether Quality Council approval and/or MTCU approval is also required, additional approval steps are needed.

Table 2. Level of approval required for new programs and major modifications

<table>
<thead>
<tr>
<th>Program Type</th>
<th>Senate</th>
<th>External consultants</th>
<th>Quality Council</th>
<th>MTCU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergrad minor or option</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Undergrad major or specialization</td>
<td>Yes</td>
<td>Yes if “brand-new”2</td>
<td>Yes if “brand-new”2</td>
<td>Yes, in non-core areas</td>
</tr>
<tr>
<td>Undergraduate degree</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes, in non-core areas</td>
</tr>
<tr>
<td>Undergrad certificate or diploma</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes, if stand-alone</td>
</tr>
<tr>
<td>Graduate field4</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Graduate collab. program</td>
<td>Yes</td>
<td>No</td>
<td>Yes4</td>
<td>Yes</td>
</tr>
<tr>
<td>New graduate degree</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Graduate Diploma</td>
<td>Yes</td>
<td>No</td>
<td>Yes4</td>
<td>Yes, if stand-alone</td>
</tr>
<tr>
<td>Major change to existing program</td>
<td>Yes</td>
<td>No</td>
<td>No (but notification required)</td>
<td>No</td>
</tr>
<tr>
<td>Minor change to existing program</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No (include in annual Program Development Report)</td>
</tr>
</tbody>
</table>

1 Major modifications are defined in section D below
2 See definition of new program above table; notification is required if the change is a major modification but not “brand-new”
3 If graduate programs wish to advertise that a field has been approved by the Quality Council, it must be submitted for Expedited Approval
4 Follows Expedited Approval process defined by the Quality Council.
Aims:
The procedures for assessing proposals for new programs should ensure:
- the program achieves UW's academic excellence goals;
- the program name is appropriate to the content and recognizable to employers;
- the program reflects UW distinctiveness, is technologically current, is creative and innovative in its curriculum content and delivery, and entrepreneurial and appropriately inter-disciplinary in perspective;
- the program has the potential to be one of the best in Canada and at least among the top quarter of similar programs in North America;
- the program has the potential to attract excellent students;
- the program has sufficient resources committed to it.

Planning
Wherever the origins of the idea of a new program, the detailed planning process takes place in the academic unit which will implement it. This planning is done in consultation with various groups, some of which are: the Registrar's Office; the Office of Institutional Analysis and Planning; other relevant academic Departments in the University; Co-operative Education and Career Services (CECS) (if a co-op plan is being proposed); the Offices of the Dean and Associate Dean (Undergraduate/Graduate as appropriate) of the Faculty. In addition it is the unit's responsibility to meet the degree level expectations approved by the University (see Manual) and by MTCU, for non-core programs undergraduate and all graduate programs which are requesting approval for specific funding for BIU entitlement (see Manual).

Program Proposal
A program proposal document is required. A template for new graduate programs is provided in the Manual, and a similar template for new undergraduate programs will shortly be available also in the Manual.

Criteria:
Any proposed new program will be reviewed using the Quality Council (2010) criteria for new programs, quoted directly from pp8-11, as follows:

(1) Objectives
a) Consistency of the program with the institution's mission and academic plans.
b) Clarity and appropriateness of the program’s requirements and associated learning outcomes in addressing the institution’s own undergraduate or graduate Degree Level Expectations
c) Appropriateness of degree nomenclature

(2) Admission requirements
a) Appropriateness of the program’s admission requirements for the learning outcomes established for completion of the program.
b) Sufficient explanation of alternative requirements, if any, for admission into a graduate, second-entry or undergraduate program, such as minimum grade point
average, additional languages or portfolios, along with how the program recognizes prior work or learning experience.

(3) Structure
   a) Appropriateness of the program’s structure and regulations to meet specified program learning outcomes and degree level expectations.
   b) For graduate programs, a clear rationale for program length that ensures that the program requirements can be reasonably completed within the proposed time period.

(4) Program content
   a) Ways in which the curriculum reflects the current state of the discipline or area of study.
   b) Identification of any unique curriculum or program innovations or creative components.
   c) For research-focused graduate programs, clear indication of the nature and suitability of the major research requirements for degree completion.
   d) Evidence that each graduate student in the program is required to take a minimum of two-thirds of the course requirements from among graduate level courses.

(5) Mode of delivery.
   Appropriateness of the proposed methods for the assessment of student achievement of the intended program learning outcomes and Degree Level Expectations.

(6) Assessment of teaching and learning
   a) Appropriateness of the proposed methods for the assessment of student achievement of the intended program learning outcomes and Degree Level Expectations.
   b) Completeness of plans for documenting and demonstrating the level of performance of students, consistent with the institution’s statement of its Degree Level Expectations.

(7) Resources for all programs
   a) Adequacy of the administrative unit’s planned utilization of existing human, physical and financial resources, and any institutional commitment to supplement those resources, to support the program.
   b) Participation of a sufficient number and quality of faculty who are competent to teach and/or supervise in the program.
   c) Evidence that there are adequate resources to sustain the quality of scholarship produced by undergraduate students as well as graduate students’ scholarship and research activities, including library support, information technology support, and laboratory access.

(8) Resources for graduate programs only
a) Evidence that faculty have the recent research or professional/clinical expertise needed to sustain the program, promote innovation and foster an appropriate intellectual climate.

b) Where appropriate to the program, evidence that financial assistance for students will be sufficient to ensure adequate quality and numbers of students.

c) Evidence of how supervisory loads will be distributed, and the qualifications and appointment status of faculty who will provide instruction and supervision.

(9) Resources for undergraduate programs only
Evidence of and planning for adequate numbers and quality of: (a) faculty and staff to achieve the goals of the program; or (b) of plans and the commitment to provide the necessary resources in step with the implementation of the program; (c) planned/anticipated class sizes; (d) provision of supervision of experiential learning opportunities (if required); and (e) the role of adjunct and part-time faculty.

(10) Quality and other indicators
a) Definition and use of indicators that provide evidence of quality of the faculty (e.g. qualifications, research, innovation and scholarly record; appropriateness of collective faculty expertise to contribute substantively to the proposed program).

b) Evidence of a program structure and faculty research that will ensure the intellectual quality of the student experience.

Approval Process:
The normal approval process is as follows (with some variations according to the organization of the academic unit, and whether one or more academic units are involved):

- approval by Departmental/School Curriculum Committee(s);
- approval by Department/School as a whole at a Department/School meeting;
- approval by Provost of financial plan and proposed tuition fees
- approval by the appropriate Faculty(ies) Undergraduate/Graduate Council(s);
- approval by the appropriate Faculty Council(s);
- site visit by external consultants (if required);
- Departments/School response to consultants and modifications of proposal (if required);
- approval by Senate Undergraduate Council or Senate Graduate and Research Council;
- approval by Senate; programs may be advertized once Senate approval has been granted and the proposal has been sent to the Quality Council, but should clearly state “subject to approval by the Quality Council”;
- reports sent to the Quality Council for approval or information, whichever is appropriate;
- approval of funding by MTCU, if required;
- after a new program is approved to commence by the Quality Council, the program will begin within 36 months of the date of approval, otherwise the approval will lapse;
- report to Board on new degrees/certificates/diplomas approved in previous year;
- Two-year Progress Report to Senate Undergraduate Council/Senate Graduate and Research Council and Senate, for new degrees, diplomas and certificates: should respond
to any questions posed by initial reviewers and provide preliminary information on student numbers and progress;
• Two-year Progress Report to the Quality Council, if requested.

Site Visit (if required):
The guidelines for the site visit for current programs should be used. The main difference is that there are no existing students who can be interviewed. However, it may be appropriate (for some new programs) to invite current students who are interested in the new program, to meet with reviewers. This can include students who are interested in transferring into the new program (at the undergraduate level) or applying for the new program (current undergraduates interested in applying to a new graduate program).

Table 3: Timelines for approval of new programs*

<table>
<thead>
<tr>
<th>Month</th>
<th>Approval by Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Month 1</td>
<td>Approval by Faculty</td>
</tr>
<tr>
<td></td>
<td>- Co-op report commissioned</td>
</tr>
<tr>
<td></td>
<td>- Library report commissioned</td>
</tr>
<tr>
<td></td>
<td>- List of consultants sent to GSO/Office of AVPA</td>
</tr>
<tr>
<td></td>
<td>- Proposal brief prepared for consultants (allow 1 month for consultants to read document)</td>
</tr>
<tr>
<td>Month 2</td>
<td>Approval by Faculty</td>
</tr>
<tr>
<td></td>
<td>- Co-op report commissioned</td>
</tr>
<tr>
<td></td>
<td>- Library report commissioned</td>
</tr>
<tr>
<td></td>
<td>- List of consultants sent to GSO/Office of AVPA</td>
</tr>
<tr>
<td></td>
<td>- Proposal brief prepared for consultants (allow 1 month for consultants to read document)</td>
</tr>
<tr>
<td>Month 5-6</td>
<td>Consultant site visit; Review Report received within 2 weeks</td>
</tr>
<tr>
<td></td>
<td>Chair/Director ensures consultation and implementation of any changes recommended by consultants; submits revised brief</td>
</tr>
<tr>
<td>Month 6-7</td>
<td>Approval by Senate Undergraduate Council/Senate Graduate and Research Council</td>
</tr>
<tr>
<td>Month 7-8</td>
<td>Approval by Senate; advertizing permitted with qualification “subject to approval by the Quality Council”</td>
</tr>
<tr>
<td>Month 10</td>
<td>Approval by the Quality Council</td>
</tr>
<tr>
<td>Month 10</td>
<td>Submission to MTCU, if required</td>
</tr>
<tr>
<td>Two years after Site Visit</td>
<td>Two-year Progress Report submitted, as for current programs</td>
</tr>
</tbody>
</table>

*Note that not all new programs require consultant visits (for example, graduate collaborative programs, graduate diplomas); if so, timeline will be shorter: otherwise these represent the minimum time required. Also note that MTCU approval requires an additional 6-8 months.

D. Major modifications of existing programs

Definition
The Quality Council (2010) defines a major modification as one or more of the following program changes:

a) Requirements for the program that differ significantly from those existing at the time of the previous cyclical program review;
b) Significant changes to the learning outcomes;
c) Significant changes to the faculty engaged in delivering the program and/or to the essential physical resources as may occur, for example, where there have been changes to the existing mode(s) of delivery.
And provides the following examples of major modifications, which University of Waterloo has adopted as follows:

a) Requirements that differ significantly from those existing at the time of the previous cyclical program review

- The merger of two or more programs
- New bridging options for college diploma graduates
- Significant change in the laboratory time of an undergraduate program
- The introduction or deletion of an undergraduate thesis or capstone project
- The introduction or deletion of a work experience, co-op option, internship or practicum, or portfolio
- At the master’s level, the introduction or deletion of a research project, research essay or thesis, course-only, co-op, internship or practicum option
- The creation, deletion or re-naming of a field in a graduate program
- Any change to the requirements for graduate program candidacy examinations, field studies or residence requirements
- Major changes to courses comprising a significant proportion of the program, where significant is defined as more than one-third of the courses

b) Significant changes to the learning outcomes

Changes to program content, other than those listed in a) above, that affect the learning outcomes, but do not meet the threshold for a ‘new program’

c) Significant changes to the faculty engaged in delivering the program and/or to the essential resources as may occur, for example, when there have been changes to the existing mode(s) of delivery (e.g. different campus, online delivery, inter-institutional collaboration)

- Changes to the faculty delivering the program: e.g. a large proportion of the faculty retires; new hires alter the areas of research and teaching interests
- A change in the language of program delivery
- The establishment of an existing degree program at another institution or location
- The offering of an existing program substantially online where it had previously been offered in face-to-face mode, or vice versa
- Change to full- or part-time program options, or vice versa
- Changes to the essential resources, where these changes impair the delivery of the approved program

If there is uncertainty as to whether a particular change is major or minor, the AVPA and APGS will be the arbiter for undergraduate and graduate programs respectively. The Provost has the final say in this decision. The Provost has the right to choose to send a particular major modification to the Quality Council for an expedited review, as per section 3.3 of the Quality Council Framework (2010), and if so would follow procedures similar to those for a new graduate field.

Procedure
Major modifications to existing programs require normal internal approval (approval at Department/School, Faculty, Senate Undergraduate Council or Senate Graduate and Research Council, and Senate). Minor modifications follow the same process, with the exception that Senate Undergraduate Council and Senate Graduate and Research Council are empowered to approve these changes on behalf of Senate, as per Senate Bylaw 9. If an existing program is offered in a new location, this requires notification at the Department, Faculty and Senate Undergraduate/Senate Graduate and Research Council levels.

Major modifications require reporting to the Quality Council on an annual process.

E. Audit Process

The Quality Council will audit each institution once every eight years. The objective of the audit is to determine whether or not the University, since the last review, has acted in compliance with the provisions of its Institutional Quality Assurance Process (IQAP) for Cyclical Program reviews as ratified by the Quality Council. The Quality Council Framework (2010) indicates the means of selection of the auditors, together with the steps in the audit process.

F. References


## 2: Schedule of Program Reviews (2011/12 to 2017/18)

Most recent update: June 8, 2011  
Last sent to Senate for information: June 2011

<table>
<thead>
<tr>
<th>Program Descriptor</th>
<th>Last Undergrad Review</th>
<th>Proposed Date for Self Study Submission for Next Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied Health Sciences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health Studies &amp; Gerontology (BSc, MSc, MPH, PhD)</td>
<td>July 2005</td>
<td>☀</td>
</tr>
<tr>
<td>Kinesiology (BSc, MSc, PhD)</td>
<td>July 2004</td>
<td>☀</td>
</tr>
<tr>
<td>Recreation &amp; Leisure Studies, Recreation &amp; Business Management (BA, MA, PhD)</td>
<td>July 2004</td>
<td>☀</td>
</tr>
<tr>
<td>Work and Health (collaborative PhD)</td>
<td>Began 2007</td>
<td>☀</td>
</tr>
<tr>
<td>Ageing, Health and Well-being (collaborative PhD)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend: ☀ = Self Study Submitted; ☀ = Program Review Ready; ☀ = Review Underway; ▲ = Review In Progress; ▲ = Review Complete; ▲ = Review Pending
<table>
<thead>
<tr>
<th>Program Descriptor</th>
<th>Last Undergrad Review</th>
<th>Proposed Date for Self Study Submission for Next Review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arts</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accounting &amp; Financial Management (BAFM, MTax, GDip, MAcc, PhD), Computing &amp; Financial Management (joint with Computer Science), Biotechnology/Chartered Accountancy (joint with Biology)</td>
<td>July 2008</td>
<td>▲ MTax</td>
</tr>
<tr>
<td>Anthropology (BA, MA joint with Guelph)</td>
<td>July 2004</td>
<td></td>
</tr>
<tr>
<td>Applied Language Studies + Applied Language Studies Option (BA)</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Classical Studies (BA: MA Ancient joint with WLU), Medieval Studies*</td>
<td>July 2003</td>
<td>▲</td>
</tr>
<tr>
<td>Digital Experience Innovation (MDEI) Approval Pending</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drama (BA)</td>
<td>July 2002</td>
<td></td>
</tr>
<tr>
<td>East Asian Studies *</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>English Language and Literature (BA 3MAs, PhD)</td>
<td>July 2002</td>
<td>▲</td>
</tr>
<tr>
<td>Fine Arts + Fine and Performing Arts * (BA MFA)</td>
<td>July 2007</td>
<td>▲</td>
</tr>
<tr>
<td>French Studies (UG, MA, PhD)</td>
<td>July 2004</td>
<td>▲</td>
</tr>
<tr>
<td>Geography (see Environment)</td>
<td>July 2007</td>
<td></td>
</tr>
<tr>
<td>Germanic and Slavic Studies (BA, MA – 2 versions - PhD) + Russian and East European Studies (BA, MA)</td>
<td>July 2007</td>
<td>▲</td>
</tr>
<tr>
<td>Global Business and Digital Arts (Sept 2011): (Stratford)</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Global Governance (MA; PhD joint with WLU)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program Descriptor</td>
<td>Last Undergrad Review</td>
<td>Proposed Date for Self Study Submission for Next Review</td>
</tr>
<tr>
<td>--------------------</td>
<td>-----------------------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Arts (cont'd)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>History (BA; MA, PhD joint with Guelph, WLU)</td>
<td>July 2003</td>
<td></td>
</tr>
<tr>
<td>Human Resources Management *</td>
<td>July 2001</td>
<td></td>
</tr>
<tr>
<td>Independent Studies (BIS)</td>
<td>July 2009</td>
<td></td>
</tr>
<tr>
<td>International Studies *</td>
<td>July 2000</td>
<td></td>
</tr>
<tr>
<td>Italian Studies (BA)</td>
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<td></td>
</tr>
<tr>
<td>Jewish Studies *</td>
<td>July 2009</td>
<td></td>
</tr>
<tr>
<td>Legal Studies + Legal Studies and Criminology *</td>
<td>July 2008</td>
<td></td>
</tr>
<tr>
<td>Liberal Studies (BA)</td>
<td>July 2004</td>
<td></td>
</tr>
<tr>
<td>Management Studies*</td>
<td>July 2008</td>
<td></td>
</tr>
<tr>
<td>Mennonite Studies *</td>
<td>July 2009</td>
<td></td>
</tr>
<tr>
<td>Music + Church Music and Worship *, Music and Business (BA)</td>
<td>July 2006</td>
<td></td>
</tr>
<tr>
<td>Peace and Conflict Studies (BA)</td>
<td>July 2005</td>
<td></td>
</tr>
<tr>
<td>Philosophy (BA, MA, PhD)</td>
<td>July 2009</td>
<td></td>
</tr>
<tr>
<td>Political Science (BA, MA)</td>
<td>July 2007</td>
<td></td>
</tr>
<tr>
<td>Psychology (BA, BSc with Psychology in Science) (MA, MAsc, PhD)</td>
<td>July 2002</td>
<td></td>
</tr>
<tr>
<td>Public Service (MA)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religious Studies (BA) + Spirituality and Personal Development *; PhD (joint with WLU); PhD next review in 2017/18 with undergrad</td>
<td>July 2004</td>
<td></td>
</tr>
<tr>
<td>Sexuality, Marriage and Family Studies (BA)</td>
<td>July 2003</td>
<td></td>
</tr>
<tr>
<td>Social Development Studies (BA)</td>
<td>July 2009</td>
<td></td>
</tr>
<tr>
<td>Sociology (BA, MA, PhD); Sociology (Survey Methodology) (MA)</td>
<td>July 2006</td>
<td></td>
</tr>
<tr>
<td>Spanish and Latin American Studies (BA)</td>
<td>July 2003</td>
<td></td>
</tr>
<tr>
<td>Speech Communication (BA)</td>
<td>July 2003</td>
<td></td>
</tr>
<tr>
<td>Theoretical Neuroscience (GDip)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women’s Studies (BA)</td>
<td>July 2006</td>
<td></td>
</tr>
<tr>
<td>Program Descriptor</td>
<td>Last Undergrad Review</td>
<td>Proposed Date for Self Study Submission for Next Review</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------------</td>
<td>-----------------------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>Engineering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Architecture (BArch, BAS, MArch)</td>
<td>July 2005</td>
<td>▲</td>
</tr>
<tr>
<td>Society, Technology and Values *</td>
<td>July 2008</td>
<td>▲</td>
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<tr>
<td>Business, Entrepreneurship and Technology (MBET, GDip); GDip also offered in Abu Dhabi</td>
<td>-</td>
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<tr>
<td>Chemical Engineering (BASc, MASc, MEng, PhD); BASc also offered in Dubai</td>
<td>July 2007</td>
<td></td>
</tr>
<tr>
<td>Civil and Environmental Engineering (BASc, MASc, MEng, Meng infrastructure, PhD; BASc also offered in Dubai); UNENE (joint McMaster/Queens/UWO/UOIT) due 2012, led by McMaster</td>
<td>July 2007</td>
<td></td>
</tr>
<tr>
<td>Electrical Engineering, Computer Engineering (BASc, MASc, MEng, GCert X 4, GDip, PhD)</td>
<td>July 2007</td>
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<tr>
<td>Geological Engineering (BASc: joint with Earth and Environmental Sciences)</td>
<td>July 2007</td>
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<tr>
<td>Management Engineering (BASc)</td>
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<td></td>
</tr>
<tr>
<td>Management Sciences (undergrad option, MASc, MMSc, PhD); (MMSc also offered in Abu Dhabi) Management of Technology MMSc</td>
<td>July 2004</td>
<td></td>
</tr>
<tr>
<td>Mechanical Engineering (BASc, GCert X 3, MASc, MEng, PhD); CONGESE (MASc/MMath) to be submitted by Western in 2013</td>
<td>July 2007</td>
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<tr>
<td>Mechatronics Engineering (BASc)</td>
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<tr>
<td>Nanotechnology Engineering (joint with Chemistry) (BASc) Nanotechnology Collaborative (MSc, MASc, PhD) (joint with Science)</td>
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<tr>
<td>Quantum Information Collaborative (MASc, MMath, MSc, PhD) (joint with Science, Math)</td>
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<tr>
<td>Software Engineering (joint with Computer Science) BSE</td>
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<tr>
<td>Systems Design Engineering (BASc, MASc, MEng, PhD)</td>
<td>July 2007</td>
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<tr>
<td>Program Descriptor</td>
<td>Last Undergrad Review</td>
<td>Proposed Date for Self Study Submission for Next Review</td>
</tr>
<tr>
<td>-----------------------------------------------------------------------------------</td>
<td>-----------------------</td>
<td>--------------------------------------------------------</td>
</tr>
<tr>
<td>Development Practice (MDP) Approval Pending</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environment and Business (BES, MEB)</td>
<td>July 2009</td>
<td></td>
</tr>
<tr>
<td>Environment and Resource Studies (BES, MES, PhD)</td>
<td>July 2007</td>
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</tr>
<tr>
<td>Geography (BA, BES, MA, MSc, MES, PhD: graduate programs joint with WLU)</td>
<td>July 2007</td>
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<tr>
<td>Geography and Environmental Management, Geomatics, Geography and Aviation (BES)</td>
<td>July 2007</td>
<td></td>
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<tr>
<td>International Development (BES)</td>
<td>--</td>
<td></td>
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<tr>
<td>Knowledge Integration (BKI)</td>
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<tr>
<td>Local Economic Development (MAES)</td>
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<tr>
<td>Planning² (BES, MA, MES, MAES, PhD)</td>
<td>July 2005</td>
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<td>Social Innovation (GDip)</td>
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<tr>
<td>Tourism Policy &amp; Planning collaborative MA/MES</td>
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<td>Program Descriptor</td>
<td>Last Undergrad Review</td>
<td>Proposed Date for Self Study Submission for Next Review</td>
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<tr>
<td>Mathematics</td>
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<tr>
<td>Actuarial Science (BMath, MActSc, PhD)</td>
<td>July 2008</td>
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<tr>
<td>Applied Mathematics + Applied Mathematics Earth Sciences Option (BMath, MMath, PhD)</td>
<td>July 2008</td>
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<tr>
<td>Bioinformatics $^1$ (joint with Biology)</td>
<td>July 2008</td>
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<tr>
<td>Biology &amp; Bioinformatics $^1$ (joint with Biology)</td>
<td>July 2008</td>
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<tr>
<td>Business Admin &amp; Computer Science $^1$ (joint with WLU) (Sept 2010) (BBA/BCS)</td>
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<tr>
<td>Combinatorics and Optimization, Operations Research (BMath, MMath, PhD)</td>
<td>July 2008</td>
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<tr>
<td>Computational Mathematics (BMath, MMath)</td>
<td>July 2001</td>
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<tr>
<td>General Mathematics (BMath)</td>
<td>July 2008</td>
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<tr>
<td>Health Informatics (MHI)</td>
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<tr>
<td>Mathematics Business Administration $^1$ (joint with WLU) (BMath/BBA)</td>
<td>July 2008</td>
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<tr>
<td>Mathematics / Information Technology Management (BMath); also offered in Dubai</td>
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<tr>
<td>Mathematical Finance $^1$ (joint with Pure Math and Statistics) Quantitative Finance (MQF)</td>
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<tr>
<td>Mathematical Physics $^1$ (joint with Physics and Astronomy)</td>
<td>July 2008</td>
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<tr>
<td>Mathematics/Chartered Accountancy $^1$ (joint with Accounting and Finance)</td>
<td>July 2008</td>
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<tr>
<td>Mathematics / Financial Analysis and Risk Management (BMath); also offered in Dubai</td>
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<tr>
<td>Mathematics / Teaching Option</td>
<td>July 2008</td>
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<tr>
<td>Mathematics for Teachers (MMT)</td>
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<td>Mathematical Studies</td>
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<tr>
<td>Pure Mathematics (BMath, MMath, PhD)</td>
<td>July 2008</td>
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<td>Program Descriptor</td>
<td>Last Undergrad Review</td>
<td>Proposed Date for Self Study Submission for Next Review</td>
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<tr>
<td>Mathematics (cont)</td>
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<td>Quantum Information (MMath, PhD): joint with Engineering, Math: see Engineering</td>
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<tr>
<td>Scientific Computation / Applied Mathematics (BMath)</td>
<td>July 2008</td>
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<tr>
<td>Statistics (BMath); Statistics and Actuarial Science (MMath, PhD)</td>
<td>July 2008</td>
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<td>Program Descriptor</td>
<td>Last Undergrad Review</td>
<td>Proposed Date for Self Study Submission for Next Review</td>
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<tr>
<td><strong>Science</strong></td>
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<td>Biology (BSc, MSc, PhD), Biochemistry ¹ (joint with Chemistry), Biomedical Sciences, Environmental Sciences/Ecology, Bioinformatics ¹ (joint with Mathematics)</td>
<td>July 2009</td>
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<tr>
<td>Biotechnology/Chartered Accountancy ¹ (joint with Accounting and Finance)</td>
<td>July 2003</td>
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<td>Biotechnology/Economics ¹ (joint with Economics)</td>
<td>July 2003</td>
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<tr>
<td>Chemistry (BSc); (MSc, PhD joint with Guelph), Biochemistry ¹ (joint with Biology), Chemical Physics ¹ (joint with Physics and Astronomy), Geochemistry ¹ (joint with Earth and Environmental Sciences)</td>
<td>July 2008</td>
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<tr>
<td>Computational Science (BSc)</td>
<td>July 2003</td>
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<tr>
<td>Earth and Environmental Sciences BSc, MSc, PhD, Geochemistry ¹ (joint with Chemistry)</td>
<td>July 2004</td>
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<td>Honours and General Science (BSc)</td>
<td>July 2003</td>
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<tr>
<td>Honours Science and Arts Major (BSc)</td>
<td>July 2003</td>
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<tr>
<td>Nanotechnology Collaborative (MSc, MEng, PhD): joint with Engineering: see Engineering</td>
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<tr>
<td>Optometry ² (OD, MSc, PhD)</td>
<td>July 2002</td>
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<tr>
<td>Pharmacy ² (BScPhm, MSc, PhD)</td>
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<tr>
<td>Physics and Astronomy (BSc), Chemical Physics ¹ (joint with Chemistry), Mathematical Physics ¹ (joint with Math) undergraduate; Physics (MSc, PhD) joint with Guelph</td>
<td>July 2005</td>
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<tr>
<td>Psychology ¹ (joint with Arts: see Arts)</td>
<td>July 2002</td>
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<tr>
<td>Quantum Information Collaborative (MAsc, MMath, MSc, PhD) joint with Math, Engineering: see Engineering</td>
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<td>Science and Aviation (BSc)</td>
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<tr>
<td>Science and Business (BSc)</td>
<td>July 2003</td>
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<td>Program Descriptor</td>
<td>Last Undergrad Review</td>
<td>Proposed Date for Self Study Submission for Next Review</td>
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<tr>
<td>University/Colleges</td>
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<td>Conrad Grebel University College</td>
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<td>Theological Studies (MTS)</td>
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<td>Renison University College</td>
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<td>Social Work (BSW)</td>
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<td>St Jerome's University</td>
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<td>Catholic Thought (MCT)</td>
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* inter-disciplinary undergraduate offerings;
+ XXX* the inter-disciplinary offering XXX will be reviewed with the program to which it is attached;
1 these undergraduate plans will be reviewed by each department/school;
2 U/G program review will occur at the same time as the accreditation;
3 all certificates from non-academic units will be reviewed as a group with one external reviewer and one internal;
4 all programs are offered in Waterloo Region, unless otherwise specified.

▲ Graduate Review
● Undergraduate review

*University of Waterloo Academic Review Manual*

Schedule of Program Reviews

*June 2011*
Senate Graduate & Research Council met on May 9, 2011 and agreed to forward the following items to Senate for information and approval.

Further details are available at: www.adm.uwaterloo.ca/infosec/Committees/senate/sgrc.htm

FOR APPROVAL

ESTABLISHMENT OF CENTRES / INSTITUTES

Games Institute

1. **Motion:** To approve changes to the constitution of the Games Institute as requested by Senate and detailed in Attachment 1.

   **Rationale:** At its November 15, 2010 meeting, Senate considered council’s recommendation to approve establishment of the Games Institute for an initial period of five years. After discussing various concerns raised by senators, Senate conditionally approved establishment of the institute subject to the constitution section being rewritten to address a number of concerns and then brought back to Senate. Council understood that the centre’s governance provisions may become subject to further review following the release of recommendations by the committee organized by the vice-president, university research.

FOR INFORMATION

RENEWAL OF CENTRES AND INSTITUTES

**Waterloo Centre for Automotive Research (WatCAR)**

Under the direction of Amir Khajepour, WatCAR brings together more than 345 automotive researchers including more than 110 faculty members from across all six faculties. WatCAR serves as a focal point for original equipment manufacturers, automotive parts manufacturers and material suppliers to identify and access industry-relevant research competencies across campus. Its vision of future transportation includes lightweight, safe and intelligent vehicles that are powered by clean energy and contribute to environmental sustainability. The centre’s five core research areas are clustered around industry demand and consumer demand that is driving industry.

WatCAR has facilitated significant research activity over the past five years, and has helped to generate approximately $23.5 million dollars in research funds. The Ontario Research Fund has contributed funding for eight automotive research projects since its inception, of which the University of Waterloo leads or partners in seven. WatCAR also promotes and profiles student automotive teams and helps to connect student teams with companies looking to test prototype products in a quasi-real world environment.

Acknowledging that WatCAR has made remarkable progress and is an excellent example of a successful university centre, council approved its renewal for a five-year term (June 2011 – May 2016) on behalf of Senate (on the understanding that the centre’s governance provisions may become subject to review following the release of recommendations by the committee organized by the vice-president, university research).

**Centre for Education in Mathematics and Computing (CEMC)**

CEMC is directed by Ian VanderBurgh and works to support teachers in elementary and secondary schools to provide excitement, resources and activities that can be passed on to students. The centre provides enormous
benefit to the Faculty of Mathematics’ recruiting efforts through its mathematics contests and other outreach activities.

Since 2007, thanks to a $125 million dollar grant from the Bill and Melinda Gates Foundation, the centre has significantly expanded the scope of its activities, including a greater web presence, larger repository of free materials, and increased school visits. Last summer it hosted the International Olympiad in Informatics at Waterloo. CEMC recently began offering a part time online Master of Mathematics for Teachers degree, which has 75 students enrolled this spring. The centre has also expanded its international activities, including school visits in India and teacher training in The Gambia.

Hearing that the centre has been involved in the early planning stages of the African Institute for Mathematical Sciences initiative founded by Neil Turok, which is a complementary effort focusing on post-secondary students, members commented that CEMC is an extremely successful initiative that could be emulated elsewhere in the university and approved its renewal for a five-year term (June 2011 – May 2016) on behalf of Senate (on the understanding that the centre’s governance provisions may become subject to review following the release of recommendations by the committee organized by the vice-president, university research).

GRADUATE PROGRAM REVIEWS
On behalf of Senate, council approved an academic review of the Master of Catholic Thought program offered by St Jerome’s University in accordance with the Institutional Quality Assurance Framework adopted by Senate in May 2010.

Based on the material presented in the Final Assessment Report (Attachment 2) and the report of the reading subcommittee, which was formed by council to review the self study and program materials in depth, request additional information and provide recommendations, the program was found to be of good quality with minor concerns.

It was noted that the program requires a large amount of coursework, which is not unusual for a theology program, and that the faculty complement is thin, which has led to faculty members remaining heavily involved in supervising graduate students while on sabbatical. Recommendations for improvement included: increasing the core faculty complement by at least one professor within the next three years; reducing course requirements to align with other university graduate programs and encouraging students to complete the program within the provincial standard four-six year timeline; raising the target for recruitment and enrolment to five-six students per year; giving increased attention to fundraising to provide student financial aid; and increasing outreach, communication and collaboration with relevant offices at the University of Waterloo.

CURRICULAR MODIFICATIONS
On behalf of Senate, council reviewed and approved curricular modifications for the Faculties of Engineering (business, entrepreneurship & technology) and Mathematics (accelerated MMath program in combinatorics & optimization).

SCHOLARSHIPS AND AWARDS
On behalf of Senate, council approved creation of the Desmond Fonn Contact Lens Research Award (endowment) for graduate students in the School of Optometry.

George Dixon
Vice-President, University Research

Sue Horton
Associate Provost, Graduate Studies
To: Senate
From: Senate Graduate & Research Council
Date: June 20, 2011
Subject: Revised Proposal re: Games Institute Constitution

On November 15, 2010, Senate considered council’s recommendation to approve establishment of the Games Institute for an initial period of five years. After discussing concerns raised by senators, Senate conditionally approved establishment of the institute subject to the constitution section being rewritten to address a number of concerns and brought back to Senate. The attached revised constitution has now been submitted and approved by council.

The relevant portion of the November 15 Senate minute is as follows:

Games Institute. The vice-president, university research advised that, subsequent to concerns raised by the Senate Executive Committee, in particular about the governance of the institute, revisions had been made and that the document, as presented, was unanimously approved earlier in the day by SGRC.

Senate heard a motion to approve the establishment of the Games Institute for an initial period of five years (December 1, 2010 to November 30, 2015) as described in the report [enclosed with the Senate agenda].

Dixon and Coates.

Speaking on behalf of FAUW, the president of FAUW drew senators’ attention to what FAUW posits as issues that remain:

(1) The descriptions of “Director” and “Associate Director” [p. 13, #5.1] lack clarity re: the role of the provost; “with cause” (defined, for example, per Policy 40, The Chair) should replace “in exceptional cases”; appointment/reappointment to these positions should include a collegial process with faculty membership playing a role.

(2) “Executive Council” is not collegially constituted (each member is appointed by Waterloo administration) and members need not be tenured faculty. FAUW suggests that five “Core Members” should be regular faculty members, chosen by the faculty membership in a collegial fashion.

(3) “Industry” and “Affiliate” membership categories are confusing: “Industry” includes government and NGOs and the main difference between the two categories appears to be that “Affiliate” members pay while “Industry” members don’t – which may have the unintended consequence of giving the appearance of a mechanism to funnel public dollars to private interests. A claimed benefit of membership [p. 14, #5.2] is “participation in the governance of the Institute” but, in fact, only administration-picked “Executive Council” members have any real say.

(4) Policy 33 (Ethical Behaviour) (set out as the single point of reference on academic freedom) should be coupled with Article 6 (defined academic freedom) in the University of Waterloo/FAUW Memorandum of Agreement.
(5) Changes to the constitution should require Senate approval, as does the original document.

Senate heard an amendment to the main motion: That Senate conditionally approve the creation of the Games Institute as proposed, subject to section 5.0 (Constitution) being rewritten to address the above concerns and brought back for approval at the February 2011 meeting. Further, that the governance provisions of the Games Institute be subject to re-evaluation by Senate in the event new policies are established with respect to the governance of research institutes at the University of Waterloo.

Freeman and Dea. Carried.
5.0 Constitution

Note that the structure of the Institute is subject to change at a later time, if university policy or recommendations require a change. Any changes to this Constitution must be approved by University of Waterloo Senate.

5.1 Management

The Director: The Institute will be led by a Director, reporting to the Vice-President, University Research. The Director will be officially appointed by the Vice-President, Academic & Provost (hereafter Provost) on the recommendation of the Vice-President, University Research (hereafter VPUR) Vice-President, University Research (hereafter VPUR) on the recommendation of the Executive Council and voted upon by the Core Members, for a term of up to four years, normally renewable once. Only a tenured University of Waterloo faculty member may be appointed Director. The Director will be responsible for the overall management of the Institute, the preparation of its annual budget, supervision of Institute employees, and for guiding the research agenda of the Institute, with input from its membership. The VPUR, or designate, will annually review the performance of the Director, and will consult the Executive Council and the Board on reappointment of the Director, recommending such reappointment to the Provost. The Provost, the VPUR may remove the Director prior to his/her end of term via the mutual consent of the Provost, the VPUR, the Executive Committee, the Board, and the Director, or, in exceptional cases, with cause, on the recommendation of the VPUR, the Executive Committee, and the Board (within the parameters of academic freedom outlined in UW Policy 33 and Article 6 of the Memorandum of Agreement between the University of Waterloo and the Faculty Association), with cause as outlined in Policy 40. It is proposed that the Institute’s first Director be Dr. Neil Randall, English Language and Literature, Faculty of Arts. It is proposed that Dr. Randall’s term be for a period of four years.

Note: See Policy 40 for complete overview of duties, qualifications and responsibilities of director.

The Associate Director: The Associate Director will report to the Vice-President, University Research, and will be appointed by the VPUR and Provost, on the recommendation of the Executive Council and the Board, for a term up to three years, normally renewable once. Only a faculty member at the University of Waterloo may be appointed Associate Director, except in exceptional cases in which the most suitable candidate is a faculty member at a similarly research-intensive university. The VPUR and Provost may remove the Associate Director prior to his/her end of term via the mutual consent of the VPUR, the Executive Committee, the Board, and the Associate Director, or, in exceptional cases with cause, on the recommendation of the VPUR, the Executive Committee, and the Board (within the parameters of academic freedom outlined in UW Policy 33). The Associate Director will be particularly focused on directing the research activities of the Institute, including grants, research workshops, publications, seminars, and public talks. It is expected that the Director and Associate Director will, except under exceptional circumstances, be from different faculties. The VPUR, or designate, will annually review the performance of the Associate Director, and will consult the Executive Council and the Board on reappointment of the Associate Director. The VPUR may remove the Associate Director prior to his/her end of term via the mutual consent of the Executive Committee, the Board, and the Associate Director, or, with cause, on the recommendation of the Executive Committee and the Board (within the parameters of academic freedom outlined in UW Policy 33 and Article 6 of the Memorandum of Agreement between the University of Waterloo and the Faculty Association), with
cause as outlined in Policy 40. It is proposed that the Institute’s first Associate Director be Dr. Stacey Scott, Systems Design Engineering, Faculty of Engineering.

The Executive Council will consist of the Director, the Associate Director, and five other Core Members of the Institute, appointed by the University of Waterloo tenured faculty. The Council will be elected by all Core members of the Institute and spread as evenly as possible from among the faculties represented by the Core member list. The Executive Council will make recommendations to the director on the planning of the annual budget, research directions, fundraising and outreach activities. The committee will meet once per year or as needed.

The Board will consist of one of the Deans (for the first years, the Dean of Arts), the Director, the Associate Director, and two members of the Executive Council to be elected biennially by the Executive Council. The first members will be Karen Collins (as Chair) and Kevin Harrigan. The board will be advisory in role, providing general advice on financial management and objectives.

Core Members: UW faculty members and post-doctoral fellows (regular, adjunct or research faculty) who engage in game-related research or teaching may apply to become members at any time with a CV and a short statement regarding goals and reasons for joining. Their membership may be accepted or declined by the Executive Committee within 30 days of application and will last for as long as the member wishes to remain a member, or until membership revocation via 5.2 below. Gaming need not be the only focus of any faculty member’s research in order for that faculty member to take part.

Student Members: UW graduate students who engage in game-related study, research or co-op work may apply for membership with a resume and a short statement regarding goals and reasons for joining. Their membership may be accepted or declined by the directors within 30 days of application and will be annually reviewed.

Industry Members: Industry members from government, NGOs and the private sector Non-academic members of related industry interested in the Institute’s research may participate by working with the Institute, attending workshops and conferences, and may be invited to meetings. Membership will be voted on by the Executive Council within 30 days of application and granted for one year (renewable). The cost per year for industry membership will be $10 per person, or $500 per organization, with the exception of any members who are collaborators or partners on grants with Core members, who will then have free membership.

Affiliate Members: Affiliate members (outside UW) may participate by working with the Institute’s research projects, attending workshops and conferences, and participate in meetings. Membership will be voted on by the Executive Council within 30 days of application and granted for one year (renewable). The cost per year for affiliate membership will be $10 per student, $50 for faculty, and $500 for organizations, with the exception of any members who are collaborators or partners on grants with Core members, who will then have free membership.

5.2 Responsibilities and Privileges of Membership

Members will benefit from membership in terms of access to the Institute’s facilities and equipment, access to any shared funding opportunities and research collaborations, participation in seminars, public lectures, workshops and conferences held by or supported by the Institute, and participation in the governance of the Institute.
Members are expected to contribute to the Institute through discussions, activities and/or research. Such contributions may mean, for instance, collaborating on research projects, publication of research, teaching at or attending a workshop or conference, attending public lectures, and/or sitting on committees. Members who have not participated in any such activities for a full calendar year and who cannot demonstrate reasonable attempts to do so will be subject to suspension or revocation of membership by the Executive Committee on consultation with the Vice-President, Academic & Provost.

Members’ ethical behaviour and academic freedom will be governed by University of Waterloo Policy 33 and (Ethical Behaviour) and Article 6 (Academic Freedom) in the UW/FAUW Memorandum of Agreement. In cases of misconduct, the Executive Council may recommend to the the Vice-President, Academic & Provost, within the parameters of Policy 33 and Article 6, the suspension or revoking of a membership.

5.2 Responsibilities and Privileges of Membership

Members will benefit from membership in terms of access to the Institute’s facilities and equipment, access to any shared funding opportunities and research collaborations, participation in seminars, public lectures, workshops and conferences held by or supported by the Institute, and participation in the governance of the Institute.

Members are expected to contribute to the Institute through discussions, activities and/or research. Such contributions may mean, for instance, collaborating on research projects, publication of research, teaching at or attending a workshop or conference, attending public lectures, and/or sitting on committees. Members who have not participated in any such activities for a full calendar year and who cannot demonstrate reasonable attempts to do so will be subject to suspension or revocation of membership by the Executive Committee on consultation with the Vice-President, Academic & Provost.

Members’ ethical behaviour and academic freedom will be governed by University of Waterloo Policy 33. In cases of misconduct, the Executive Council may recommend to the Vice-President, Academic & Provost, within the parameters of Policy 33, the suspension or revoking of a membership.

5.3 Initial Executive Council Members

Neil Randall (Arts)
Stacey Scott (Engineering)
Karen Collins (Arts)
Gray Graffam (Arts)
Kevin Harrigan (Arts)

5.4 Initial Core Members (faculty and post-doctoral fellows) listed

Alphabetically (see faculty bios in Appendix)

1. Catherine Burns (Sys Des) (c4burns@uwaterloo.ca)
2. Rob Burns (Kinesiology) (rwburns70@sympatico.ca)
3. Karen Collins (DAC) (collinsk@)
4. Brian Cullen (PDF, Arts)
5. Chrysanne DiMarco (Computer Science) (cdimarro@)
6. Mike Dixon (Psych) (mjdixon@)
7. Colin Ellard (Psych)
8. Jonathan Fugelsang (Psych) (jfugels@)
9. Gray Graffam (Anth) (ggraffam@)
10. Mark Hancock (Man. Sci) (mark.hancock@)
11. Kevin Harrigan (DAC) (KevinH@)
12. Andy Houston (Drama) (houston@)
13. Fue-Sang Lien (Mechanical and Mechatronics Engineering) (fslien@)
14. Vance MacLaren (PDF, Arts)
15. Hannah Martson (PDF, CS)
16. Aimee Morrison (English) (ahm@)
17. Marcel O’Gorman (English) (marcel@)
18. Neil Randall (mrandall@)
19. Stacey Scott (ENG: Sys Des) (s9scott@)
20. Scott Spidell (Drama) (sspidell@)
21. Peter Taillon (PDF, Arts)
22. Michael Terry (CS: HCI) (mterry@)

Initial Student Members

Michael Hancock (English)
Jason Hawreliak (English)
Alex Hodge (CCAT)
Michelle Jarick (Psychology)
Candice Jensen (Psychology)
Jennifer Aquino (Psychology)
Amberly West (English)
Phillip McClelland (Systems Design Engineering)
Yu-Ling (Betty) Chang (Systems Design Engineering)
Adam Bradley (English)
Jim Wallace (Systems Design Engineering)

5.3 Changes to the Constitution

Any Core Member may propose changes to the constitution at any time. Changes will require the supportive vote of the majority of the Executive Council (50 percent + 1) and are subject to the approval of the University of Waterloo’s Senate Graduate and Research Council. Governance provisions of the Institute are subject to re-evaluation by Senate in the event new policies are established with respect to governance of research institutes at UW.
Final Assessment Report

Academic Review of Master of Catholic Thought

May 9 2011

Background and process

The Master of Catholic Thought (MCT) was approved in 2004, as a degree offered by St. Jerome’s University, and the first students were accepted for academic year 2005-06. In 2006 the program became a conjoint program with the University of Waterloo.

The program was scheduled for review in 2010-11, along with other theological and religious studies programs at the university. This was the first cycle of academic reviews of graduate programs which occurred under the revised University of Waterloo Guidelines for Academic Reviews (passed by Senate in May 2010).

A self-study was prepared by the program, and external reviewers visited February 8-9 2011. The external reviewers were Dr. Catherine Clifford (University of St. Paul’s, Ottawa) and Dr. Elizabeth Dryer (Fairfield University, CT, USA), with Dr. Nancy Theberge (AHS) as the internal reviewer. The review report was sent to the Program Director, and responses and an Implementation Plan were received with input both from the Program Director and the Dean at St. Jerome’s (the Dean’s cover letter is dated April 20 2011). The Dean of Arts also indicated his receipt of the report and acceptance of the recommendations by email (May 2 2011). This Final Assessment Report is based on the self-study, the review report, and the program response and implementation plan.

The Final Assessment Report, along with the self-study and review report, were provided to a reading subcommittee of Senate Graduate and Research Council. The committee consisted of an Associate Dean, a faculty member and a graduate student member (none of these were associated with St. Jerome’s). This group led the discussion of the Final Assessment Report at the Council meeting on May 9 2011, and provided advice on the final rating from the review, which was approved by Senate Graduate and Research Council. This Final Assessment Report will be forwarded to Senate for information in the consent agenda on June 20 2011.

Self Study

The MCT is a part-time only program. Students are required to take 13 courses (5 required courses, 5 electives offered by MCT out of up to 9 options, and 3 other appropriate electives, which can include graduate-level theology courses offered at Conrad Grebel University College and potentially Waterloo Lutheran Seminary). In addition to the courses, they are required to write a major research paper of 35-50 pages, which is anticipated to take a year to write part-time. The coursework is expected to take 4-6 years to complete part-time, with an additional year for the research paper. Students may be inactive for one or more terms during this period – since the normal term limit for a part-time Masters program is 15 terms or 5 years.

Typically, four courses are offered each year. In the fall one core and one elective course are offered, each in a 3-hour block on one evening. In the winter, one course (core or elective) is offered alternate Saturdays in a 6-hour block. In the spring, one course (core or elective) is offered in a two-week intensive mode.

Students also are encouraged to take advantage of an excellent lecture series offered at St. Jerome’s.
There are currently two full-time faculty who support the program. One (the program Director, Cristina Vanin) focuses her graduate activities exclusively in this program, and the other (Myroslaw Tataryn) has been the St. Jerome's Dean for the past five years, but both teaches in the program and supervises Major Research Papers. A third faculty member (the former Principal) is no longer at St. Jerome's, and a fourth individual (Scott Kline) is the Director of the St. Jerome’s Centre for Responsible Citizenship and due to time constraints has not taught or supervised in the program. One other faculty member at St. Jerome’s (Nicolaj Zunic) has taught one course but his primary responsibilities are with Philosophy. Drs. Vanin, Tataryn and Kline are also affiliated with the Department of Religious Studies and involved with the joint PhD with Wilfrid Laurier University.

The rest of the teaching has been undertaken by adjunct faculty, including Visiting Professors and faculty from Regis College, University of Toronto. All the current and completed supervisions of Major Research papers have to date been undertaken by Drs. Vanin and Tataryn.

18 students started in the newly conjoint program in 2006-07, and 2 new students entered in 2007-08, 1 in 2008-09 and 2 in 2009-10. By the end of the 2009-10 academic year, 1 student had transferred, 4 had withdrawn, and 3 graduated in spring 2010, leaving a balance of 15 continuing students. A further 2 students have already completed in 2010-11, and there may be others who complete and graduate in the spring 2011 convocation. The first three students did indeed complete in the five years that was anticipated (for those not taking terms off from study).

Students who are admitted are required to have a minimum 75% average from a four-year Honours Bachelors program, and are interviewed prior to admission. Students are not required to have a background in religious studies or even in Arts at the undergraduate level. The program is targeted towards those who are already employed. “The aim is to extend the knowledge base of those engaged in leadership roles within Catholic institutions (health care, education, social services).” (review report, p4). Many of the students are mature students. Graduates have been able to use their Major Research Papers in their professional life (one paper is being used by the Waterloo Catholic District School Board, and another by the Catholic Health Association of Ontario).

Review report

The reviewers used the 8 program criteria specified by the Quality Council and adopted by the University of Waterloo in its Institutional Quality Assurance Framework. The reviewers concluded that “the program offers a high quality learning experience”, and “fosters excellence in critical thinking in oral and written expression, research skills, and a fine integration of theory and praxis”. “Students manifested a confident ability to think theologically, and a mastery of the breadth and depth of the Catholic intellectual tradition in an ecumenical, inter-faith context”. They commented that “(s)tudents had nothing but praise, appreciation and admiration for the quality of their professors” and that “(s)tudent response to sessional faculty was extremely positive”. The program fits well with St. Jerome’s commitment to “learning and academic excellence; gospel values of love, truth and justice, and the formation of leaders for the service of the community and the Church”.

The reviewers came up with 5 recommendations aimed at enhancing the program. These are quoted verbatim as follows:

1. Given that the bulk of the program hinges on the contributions of two members of the St. Jerome’s Faculty who carry other administrative responsibilities, have supervised all of the Major Research Papers to date, and have taught 7-8 of the 15 courses offered in the past four years, we recommend that the program increase the complement of core faculty to 3, at minimum, and
ideally, 4 professors within the next 3 years. We define core faculty as those professors who participate regularly in teaching, advising, and supervising masters’ research papers. It is deemed advantageous to continue to employ key sessional faculty from outside the institution, but this must be in addition to a strong core faculty at the host institution.

2. a) We recommend consideration of a reduction in program requirements to either:
   i) 8 courses and no major research paper, or
   ii) 6 courses and a major research paper.
   This adjustment would bring the program structure more into line with existing Master’s programs in the Faculty of Arts, at University of Waterloo. Further, it would enable students to complete program requirements in a more timely manner. Lastly, it would make it easier to envision offering the program on a full-time basis (while maintaining the option for part-time study), an expressed goal of the university and supported by the external team.
   b) In accordance with existing provincial standards for graduate programs, we recommended that students be encouraged to complete the program within 4, not to exceed 6, years.

3. To ensure the robust nature and quality of the program, we recommend raising the target for recruitment and enrollment from 2-3 students per year to 5-6. This will require a greater investment of human and financial resources in the activities of publicity and promotion, including the provision of administrative support for the Program Director. Targeted publicity and recruitment of mature candidates for graduate study should be aimed at the following audiences: the Catholic education community, the Diocese of Hamilton, Pastoral Services of regional hospitals, Catholic social services, undergraduate programs in religion, and other educated Catholic adults. The presence of a new bishop and a new Vice-President for Academic Affairs may provide new opportunities for this type of recruitment.

4. We recommend that serious attention be given to raising additional funds for student financial aid. Such financial support might include external grants, various types of diocesan and parochial scholarships, and the identification of additional internal resources.

5. As the MCT is a conjoint degree between St. Jerome’s University and the University of Waterloo, we recommend increased outreach, communication and, where appropriate, collaboration with relevant offices at the University of Waterloo (such as the Graduate Studies Office, the Faculty of Arts, the Religious Studies Department, and the Task Force on the relationships between Waterloo and its affiliate colleges). Enhanced communication with the relevant bodies at the three other affiliate colleges is also suggested. There may be opportunities for personnel from Waterloo to serve on committees of the MCT such as a re-activated advisory committee. Similarly, it may be beneficial to consider having the MCT Program Director sit as an observer of the Graduate Advisory Group in the Faculty of Arts, University of Waterloo. Such outreach in both directions would increase the profile of the MCT in the wider University of Waterloo community, enable St. Jerome’s to benefit from the University of Waterloo’s experience and resources for graduate studies, and enhance collaboration between the two bodies.

Other suggestions were that the program could now develop more specific learning objectives, given the five years of experience; that the program might wish to develop guidelines of the expectations for the Major Research Paper, and should maintain copies in the library; and that monitoring of time-to-completion should occur (with the recommendations above for shortening the program). It was also suggested that admitting 1-2 students per year is too low to maintain the vibrancy of the cohort (the program currently aims to admit 2-3 per year). The reviewers suggest that classes should be
between 6-12 students, which would require admitting at least 3-4 per year (since more than one cohort enrolls in each core course at a given time)

Program Response

Recommendation 1
We agree with the reviewers that the MCT would benefit from an increase in the complement of core faculty members. Indeed, Dr. Scott Kline has been identified as a third core faculty member who will be teaching regularly in the program, and who will be available for supervision. By 2012-2013, we expect that teaching in MCT will figure in Dr. Kline’s regular teaching load.
As well, a fourth faculty member should be available by 2014-2015 when Dr. David Perrin resumes regular teaching and supervising responsibilities.

Recommendation 2
a) At this time, we think it best to keep the program requirements as they are. As per another recommendation, the MCT program has begun more substantive conversations with Conrad Grebel University College, which also has a conjoint theology program with the University of Waterloo. Those conversations, and our own review of other theology programs in the province of Ontario, indicate that our program fits within the norm of program requirements in the discipline of theology.
b) We appreciate the desire to have students complete graduate programs as quickly as possible. However, it is important to keep in mind that the MCT is a completely part-time program. Students in the program generally take two courses per year. Indeed, the program is attracting the type of students that we had in mind initially, namely, students who are working full-time. As we calculated at the time that the program was established, students would complete the program within 5-7 years. This has been the case. We expect that it will continue to be the case.

Recommendation 3
The reviewers recommend the provision of administrative support for the MCT Director in the area of recruitment. Over the next year, we are going to identify a person in the St. Jerome’s University Registrar’s Office who will have responsibility to provide support for the MCT Director to facilitate recruitment to the program.
Furthermore, it is expected that, within the next two years, St. Jerome’s University will establish a Chair in Catholic Theology; the holder will also function as the Director of the program. The establishment of such a Chair was part of the rationale for the establishment of an endowment for the MCT program. Once the Chair is in place, the MCT Director’s responsibilities for recruiting, teaching, and supervising will be defined more clearly. Furthermore, the holder will be relieved of other administrative duties.
We recognize the value of a more robust recruitment program. With the establishment of the Chair in Catholic Theology, and with a larger core group of faculty members, we foresee an increased enrolment target in 2013-2014.
In addition, conversations that have begun with the new bishop of the diocese and with the regional Directors of Catholic Boards of Education, and the return of the current Vice-President and Academic Dean to regular teaching and supervision responsibilities in 2012-2013, will all aid in greater targeted publicity and recruitment to the MCT program.

Recommendation 4
Our hope is that, with more support from the regional Boards of Education and the Diocese, there will be increased funds available to our students.
As well, in the next two-three years, we will have conversations with regional religious communities that support theological education. We will ask them to consider adjusting the criteria for their bursaries, so that the various bursaries which they have established could be available to students in the MCT program.
Recommendation 5
We agree with the recommended increase in outreach, communication, and, where appropriate, collaboration with other offices at the University of Waterloo. As indicated above, we have begun conversations with Conrad Grebel University College in order to have better collaboration with regard to our respective theology programs. We will also be speaking to other faculty members at the University of Waterloo, such as Dr. Peter Frick at St. Paul University College, who are interested and able to contribute to the theology programs. During the next two years, we intend to extend that conversation and collaboration to include Waterloo Lutheran Seminary.

In the next year, we will speak to the Faculty of Arts about whether the Master of Catholic Thought program can be represented at the Graduate Advisory Group.

Beginning in 2012-2013, we will enhance our communication to MCT students about course opportunities at other local and regional theological institutions. We will encourage students in the program to avail themselves of courses at Conrad Grebel University College, Waterloo Lutheran Seminary, and the Toronto School of Theology.

Learning Outcomes
The Review Report speaks about the learning outcomes of the Master of Catholic Thought program. Over the next three years, we intend to clarify and enhance the description of the learning outcomes for the program.

Additional areas
The following is a list of things that have arisen over the last five years of offering the MCT program. We intend to look at these items over the next three-five years.

- the possibility of developing a methods course; we imagine that such a course can provide students with critical information about graduate work in areas such as research, writing, bibliographies, etc;
- the development of a full-time Master of Catholic Thought program;
- the examination of where our students are going after they graduate from the program in order to evaluate whether we are attracting the students, and providing the type of program, that was originally intended;
- the development of additional opportunities for student interaction outside courses, e.g., integrative seminars; colloquia;
- the value and benefit of establishing a formal relationship with the Toronto School of Theology;
- in 2012-2013, undertake a review of the structure and selection of elective offerings.

Two-year Implementation Plan
Summarizing the above, steps to be achieved by September 1 2013 (when the two-year implementation report is received) are:

1. Dr. Scott Kline (or another tenure stream faculty member) will teach electives and be available for supervision in the program, as his primary graduate responsibility at the Masters level;
2. Based on other programs in theological studies, there is no appetite for reducing the course requirements. However, the University requirements will be adhered to, in that 15 terms (5 years) is the limit for degree completion for a part-time Masters. Students proceeding in terms 16-18 require permission for an extension from the Program Director, and those in terms 19-21 require permission of the Associate Dean, Graduate from the Faculty (in this case Arts);
3. A recruitment support person from the Registrar’s Office at St. Jerome’s will be identified in 2011/12;
4. A Chair in Catholic Theology will be established by September 2013, if all goes well;
5. Greater collaboration with Conrad Grebel is underway, and will be extended to other faculty members, e.g. at St. Paul University College in 2011/12, and at Waterloo Lutheran Seminary by September 2013;
6. A review of electives will be undertaken in 2012/13;
7. In 2011/12 St Jerome's University will request that a representative of MCT be allowed to attend the Graduate Arts Group in the Faculty of Arts (either as a member or observer).
8. Learning outcomes will be enhanced and clarified;

Longer term steps include:

1. By 2013-14, an additional tenure stream faculty member will be available to teach and supervise as his/her primary graduate responsibility, bringing core faculty numbers to four;
2. With additional faculty support, and the Chair in Catholic Theology, enrolment targets will increase in 2013-14;
3. Efforts will be made to ensure student financial support;
4. The development of a methods course will be considered;
5. A full-time program offering will be considered;
6. Efforts will be made to track employment of students after graduation;
7. Additional opportunities for students will be developed, e.g. integrative seminars, colloquia
8. The value of establishing a formal relationship with the Toronto School of Theology will be considered.

Senate Graduate and Research Council agreed that the program review outcome was Good Quality: Minor Concerns. Items 1 and 2 in the Two-year Implementation Plan were of especial importance. The large number of courses required was a particular issue given the limited number of core faculty: and it is undesirable to rely too heavily on sessional teaching in graduate programs.
Senate Undergraduate Council met on May 10, 2011 and agreed to forward the following items to Senate for approval and information, as indicated below [further details may be obtained at: www.secretariat.uwaterloo.ca/Committees/senate/ugc.htm].

FOR APPROVAL

UNDERGRADUATE ADMISSION REQUIREMENTS FOR 2012

1. Motion: Council recommends approval of the undergraduate admission requirements for 2012 as provided in attachment #1.

NEW ACADEMIC PROGRAMS  [effective September 1, 2012]

- Faculty of Science
  Physics and Astronomy
  i) Honours Life Physics - Regular (Non-specialized), ii) Honours Life Physics - Regular (Medical Physics Specialization), iii) Honours Life Physics - Regular (Biophysics Specialization), iv) Honours Life Physics - Co-operative (Non-specialized), v) Honours Life Physics - Co-operative (Medical Physics Specialization), vi) Honours Life Physics - Co-operative (Biophysics Specialization)

2. Motion: To approve the following new plans: [Note: rationale is on page 7.]

  i) Honours Life Physics - Regular (Non-specialized)
  The honours life physics academic plan is in the form of a core of required courses, plus appropriate electives. This plan provides a solid foundation in basic physics, chemistry and biology while allowing a flexible, interdisciplinary and integrative approach to the study of the life sciences. While emphasizing physics, through appropriate selection of electives, this plan prepares students for careers which require a broad scientific knowledge or for programs in biophysics, medical physics, optometry, medicine, veterinary medicine, dentistry, physiotherapy, occupational therapy, pharmacy, forensics, and radiotherapy. The electives allow students to prepare for these programs and strengthen complementary areas of interest. Students are strongly urged to consult the admission requirements of the professional schools of interest to aid in their choice of electives. See the note to all honours life physics students below. This academic plan is also available in the co-operative system of study.

  The honours life physics - medical physics specialization requires additional courses also taken by honours physics students, and medical physics courses, in preparation for a graduate level program in medical physics, leading to certification or for work in medical physics. The biophysics specialization increases the depth and breadth of physics and biology courses at an honours level, to allow strengthening of areas of interest and as preparation for graduate level study or work in industry. See the notes below under the heading “Suggested Electives” at the end of each specialization. These academic plans are also available in the co-operative system of study. Continuation in honours life physics requires a cumulative overall average of 60% and a cumulative average of 60% in physics courses and 60% in biology courses.

  In order to graduate with an honours life physics degree, the following requirements must be met:

  1. Successful completion of 22.25 units.
  2. Mandatory (core) courses as listed below.
  3. No more than 3.0 “SCI-labelled” units can be used.
  4. Completion of the English Language Proficiency Examination (ELPE).

Year One
Fall
PHYS 10 Physics Seminar
BIOL 130/130L Introductory Cell Biology/Lab
PHYS 121/(PHYS 111L or PHYS 131L)
  Mechanics/Laboratory or PHYS
  111/111L Physics I/Laboratory
CHEM 120/120L Physical and Chemical
  Properties of Matter/Laboratory
MATH 127 Calculus 1 for the Sciences
  One elective (0.5 unit)
Winter
PHYS 10 Physics Seminar
BIOL 239 Genetics
PHYS 122/(PHYS 122L OR PHYS 132L)
Waves, Electricity and Magnetism/Laboratory or PHYS 112/112L Physics 2/Laboratory
CHEM 123/123L Chemical Reactions, Equilibria and Kinetics/Laboratory
MATH 128 Calculus 2 for the Sciences
One elective (0.5 unit)

Year Two
Fall
PHYS 10 Physics Seminar
CHEM 266/266L Basic Organic Chemistry/Laboratory
PHYS 224 Electricity and Magnetism for Life and Medical Physics or PHYS 242/242L Electricity and Magnetism/Laboratory
PHYS 256/256L Geometrical and Physical Optics/Laboratory
PHYS 225 Modeling Life Physics
*For students interested in Medical Physics, CHEM 266/266L may be taken in 4A
One elective (0.5 unit)

Winter
PHYS 10 Physics Seminar
PHYS 280/Biol 280 Introduction to Biophysics
BIOL 273/273L Principles of Human Physiology 1/Laboratory or One 100- or 200-level Biology course
CHEM 237/237L Introductory Biochemistry/Laboratory
Two electives (1.0 unit)

Year Three
Fall
PHYS 10 Physics Seminar
PHYS 380 Molecular and Cellular Biophysics
Four electives (2.0 units)

Winter
PHYS 10 Physics Seminar
PHYS 395 Biophysics of Therapeutic Methods or PHYS 396 Biophysics of Imaging
Four electives (2.0 units)

Students must take an additional minimum of 2.25 units from the following list:
- BIOL 240/240L Fundamentals of Microbiology/Laboratory*
- BIOL 308 Principles of Molecular Biology
- BIOL 373/373L Principles of Human Physiology 2/Laboratory† or BIOL 301 Human Anatomy
- PHYS 124 Modern Physics
- PHYS 233 Introduction to Quantum Mechanics or PHYS 234 Quantum Physics 1
- PHYS 263 Classical Mechanics and Special Relativity
- PHYS 358 Thermal Physics
- PHYS 359 Statistical Mechanics
- PHYS 383 Medical Physics

* BIOL 240/240L can be taken fall of first, second or third year
† BIOL 373 can be taken in third or fourth year

Notes to all Honours Life Physics Students:

1. Electives may be taken in any area of the student's choosing. Students should be aware that health profession programs often require courses in one or more of the following subject areas: English, mathematics, computer science, sociology, accounting, economics, languages, psychology, philosophy and humanities. The departmental undergraduate advisors in physics and astronomy are available to assist any student in the plan.

2. Entry into School of Optometry and School of Pharmacy: See admission requirements in either of the respective web sites.

ii) Honours Life Physics - Regular (Medical Physics Specialization)
Consult your undergraduate advisor for suggested sequencing of the required courses. Besides the core, these students must also take:
- PHYS 124 Modern Physics
- PHYS 224L Electricity and Magnetism for Life and Medical Physics Laboratory
- PHYS 233 Introduction to Quantum Mechanics
PHYS 358 Thermal Physics  
PHYS 383 Medical Physics  
PHYS 483 Advanced Therapeutic Concepts in Oncology in Medical Physics  
MATH 227 Calculus 3 for Honours Physics  
MATH 228 Differential Equations for Physics and Chemistry  
BIOL 373 Principles of Human Physiology 2

Suggested electives for this specialization are:  
BIOL 301 Human Anatomy  
CHEM 333 Metabolism 1  
PHYS 236 Computational Physics 1  
PHYS 239 Scientific Computation 1  
PHYS 391L/391L Electronics/Laboratory  
PHYS 392L/392L Scientific Measurement and Control/Laboratory or PHYS 353L/353L Digital Electronics/Laboratory  
PHYS 437A Research Project  
PHYS 437B Research Project  
STAT 202 Introductory Statistics for Scientists

iii) Honours Life Physics - Regular  
(Biophysics Specialization)
Students specializing in biophysics may take STAT 202 Introductory Statistics for Scientists in place of PHYS 225 Modeling Life Physics and PHYS 437A or PHYS 437A/B Research Project or BIOL 499A/B Senior Honours Project, in place of PHYS 491 Special Topics in Life, Medical and Biophysics. Note that PHYS 437A/B and BIOL 499A/B are taken over two terms. Besides the core courses, students in the Biophysics specialization are required to take:  
PHYS 121 Mechanics  
PHYS 122 Waves, Electricity and Magnetism  
PHYS 122L Waves, Electricity and Magnetism Laboratory or PHYS 132L Waves, Electricity, Magnetism and Measurement Laboratory  
PHYS 234 Quantum Physics 1  
PHYS 242 Electricity and Magnetism 1  
PHYS 242L Electricity and Magnetism Laboratory  
PHYS 263 Classical Mechanics and Special Relativity  
PHYS 358 Thermal Physics  
PHYS 359 Statistical Mechanics  
One additional 300- or 400-level Physics course  
MATH 114 Linear Algebra for Science  
MATH 227 Calculus 3 for Honours Physics  
MATH 228 Differential Equations for Physics and Chemistry  
BIOL 308 Principles of Molecular Biology  
An additional 2.5 units of 300- or 400-level Biology courses

Suggested electives for this specialization:  
PHYS 334, 342, 364 are prerequisites to a number of fourth year Physics courses. 

Students intending to continue to graduate school (including for instance biology, physics, biophysics): If you are planning to undertake graduate work after completing your undergraduate degree program, we recommend that you choose electives that will give you the desired background for your choice of graduate program, school and area of specialization. Please consult with an undergraduate advisor and graduate officer regarding other electives needed for your choice of graduate program. 

For those life physics students interested in experimental methods, 2.0 units are recommended from:  
PHYS 131L Mechanics Laboratory (in place of 111L)  
PHYS 132L Mechanics, Waves and Measurement Laboratory (in place of 122L)  
PHYS 236 Computational Physics 1  
PHYS 260L Intermediate Physics Laboratory 1  
PHYS 391L/391L Electronics/Laboratory  
PHYS 392L/392L Scientific Measurement and Control/Laboratory or PHYS 353L/353L Digital Electronics/Laboratory  
BIOL 335L Molecular Biology Techniques  
BIOL 361 Biostatistics and Experimental Design

For those life physics students interested in theoretical methods, 2.0 lecture units are recommended from:  
BIOL 364 Mathematical Modeling in Biology  
AMATH 382/BIOL 382 Computational Modeling of Cellular Systems  
PHYS 236 Computational Physics 1  
PHYS 239 Scientific Computation 1  
PHYS 364 Mathematical Physics 1  
PHYS 365 Mathematical Physics 2  
PHYS 334 Quantum Physics 2  
PSYCH 420 An Introduction to Computational Neuroscience Methods
CS 473 Medical Image Processing
SYDE 384 Biological and Human Systems
(for those who have not taken BIOL 273)
SYDE 444 Biomedical Measurement and Signal Processing

For those life physics students interested in biophotonics, PHYS 364 Mathematical Physics 1 and PHYS 342 Electricity and Magnetism 2 are recommended with an additional 1.0 lecture unit from:

PHYS 393 Physical Optics
PHYS 394 Light Matter Interaction
PHYS 391/PHYS 391L Electronics/Laboratory
PHYS 392/392L Scientific Measurement and Control/Laboratory or PHYS 353/353L Digital Electronics/Laboratory

For those life physics students interested in microbiology, BIOL 240/240L Fundamentals of Microbiology/Laboratory and BIOL 241 Introduction to Applied Microbiology are recommended with an additional 2.0 units from:

BIOL 345, 346, 348L, 431, 442, 443, 444, 447, 448, 449

For those life physics students interested in environmental sciences, BIOL 250 Organismal and Evolutionary Ecology, BIOL 350 Ecosystem Ecology and BIOL 359 Evolution are recommended with an additional 1.5 units from:

BIOL 351, 354, 361, 383, 450, 452, 455, 456, 457, 462, 470, 479, 480, 488, PHYS 364

For those life physics students interested in molecular biology and biotechnology, BIOL 208 Analytical Methods in Molecular Biology, BIOL 342 Molecular Biotechnology 1 and BIOL 432 Molecular Biotechnology 2 are recommended with an additional 1.5 units from:

BIOL 331, 335L, 434, 483, 484

iv) Honours Life Physics - Co-operative (Non-specialized)
The honours co-operative life physics academic plan is in the form of a core of required courses, plus appropriate electives. This plan provides a solid foundation in basic physics, chemistry and biology while allowing a flexible, interdisciplinary and integrative approach to the study of the life sciences. While emphasizing physics, through appropriate selection of electives, this plan prepares students for careers which require a broad scientific knowledge or for programs in biophysics, medical physics, optometry, medicine, veterinary medicine, dentistry, physiotherapy, occupational therapy, pharmacy, forensics, and radiotherapy. The electives allow students to prepare for these programs and strengthen complementary areas of interest. Students are strongly urged to consult the admission requirements of the professional schools of interest to aid in their choice of electives. See the note to all honours co-operative life physics students below. This academic plan is also available in the regular system of study.

The honours co-operative life physics – medical physics specialization requires additional courses also taken by honours physics students, and medical physics courses, in preparation for a graduate level program in medical physics, leading to certification or for work in medical physics. The biophysics specialization increases the depth and breadth of physics and biology courses at an honours level, to allow strengthening of areas of interest and as preparation for graduate level study or work in industry. See the notes below under the heading “Suggested Electives” at the end of each specialization. These academic plans are also available in the regular system of study.

Departmental advisors in physics and astronomy, and biology, for medical physics and physics and astronomy for biophysics are available to advise students on course sequencing.

Continuation in honours co-operative life physics requires a cumulative overall average of 60% and a cumulative average of 60% in physics courses and 60% in biology courses.

In order to graduate with an honours co-operative life physics degree, the following requirements must be met:

1. Successful completion of 22.25 units.
2. Mandatory (core) courses as listed below.
3. No more than 3.0 “SCI-labelled” units can be used.
4. Completion of the English Language Proficiency Examination (ELPE).
5. For detailed information on co-op program requirements, please see the Co-operative Program Evaluation information and the Co-operative Education and Career Services section of the undergraduate calendar.

Year 1A (Fall)
PHYS 10 Physics Seminar
BIOL 130/130L Introductory Cell Biology
/Laboratory
PHYS 121/(PHYS 111L or PHYS 131L)
Mechanics/ Laboratory or PHYS
111/111L Physics 1/Laboratory
CHEM 120/120L Physical and Chemical
Properties of Matter/Laboratory
MATH 127 Calculus 1 for the Sciences
One elective (0.5 unit)

Year 1B (Winter)
PHYS 10 Physics Seminar
BIOL 139 (239) Genetics
PHYS 122/(PHYS 122L OR PHYS 132L)
Waves, Electricity and
Magnetism/Laboratory or PHYS
112/112L Physics 2/Laboratory
CHEM 123/123L Chemical Reactions,
Equilibria and Kinetics/Laboratory
MATH 128 Calculus 2 for the Sciences
One elective (0.5 unit)

Year 2A (Fall)
PHYS 10 Physics Seminar
CHEM 266/266L Basic Organic Chemistry
1/Laboratory*
PHYS 224 Electricity and Magnetism for
Life and Medical Physics or PHYS
242/242L Electricity and Magnetism
1/Laboratory
PHYS 256/256L Geometrical and Physical
Optics/Laboratory
PHYS 225 Modeling Life Physics
One elective (0.5 unit)
*For students interested in medical physics,
CHEM 266/266L may be taken in 4A

Year 2B (Fall)
PHYS 10 Physics Seminar
PHYS 280/ BIOL 280 Introduction to
Biophysics
BIOL 273/273L Principles of Human
Physiology 1/Laboratory or One 100- or
200-level Biology course
CHEM 237/237L Introductory
Biochemistry/Laboratory
Two electives (1.0 unit)

Year 3A (Spring)
PHYS 10 Physics Seminar
PHYS 380 Molecular and Cellular
Biophysics
Four electives (2.0 units)

Year 3B (Winter)
PHYS 10 Physics Seminar
PHYS 395 Biophysics of Therapeutic
Methods or PHYS 396 Biophysics of
Imaging
Four electives (2.0 units)

Year 4A (Fall)
PHYS 10 Physics Seminar
PHYS 491 Special Topics in Life, Medical
and Biophysics
Four electives (2.0 units)

Year 4B (Winter)
PHYS 10 Physics Seminar
PHYS 395 Biophysics of Therapeutic Methods
or PHYS 396 Biophysics of Imaging
Four electives (2.0 units)

Students must take an additional minimum of
2.25 units from the following list:
BIOL 240/240L Fundamentals of
Microbiology/Laboratory*
BIOL 308 Principles of Molecular Biology
BIOL 373/373L Principles of Human
Physiology 2/Laboratory† or BIOL 301
Human Anatomy
PHYS 124 Modern Physics
PHYS 233 Introduction to Quantum
Mechanics OR PHYS 234 Quantum
Physics 1
PHYS 263 Classical Mechanics and
Special Relativity
PHYS 358 Thermal Physics
PHYS 359 Statistical Mechanics
PHYS 383 Medical Physics

* BIOL 240/240L can be taken in the fall of
first, second or third year.
† BIOL 373 can be taken in third or fourth year.

Notes to all Honours Co-operative Life
Physics Students:
1 Electives may be taken in any area of the
student's choosing. Students should be
aware that health profession programs
often require courses in one or more of
the following subject areas: English,
mathematics, computer science,
sociology, accounting, economics,
languages, psychology, philosophy and
humanities. The departmental
undergraduate advisors in physics and
astronomy are available to assist any
student in the plan.

2 Entry into School of Optometry and School
of Pharmacy: See admission requirements in
either of the respective web sites.
v) Honours Life Physics - Co-operative  
(Medical Physics Specialization)  
Consult your undergraduate advisor for  
suggested sequencing of the required courses.  
Besides the core, these students must also take:  

PHYS 124 Modern Physics  
PHYS 224L Electricity and Magnetism for  
Life and Medical Physics Laboratory  
PHYS 233 Introduction to Quantum  
Mechanics  
PHYS 358 Thermal Physics  
PHYS 383 Medical Physics  
PHYS 483 Advanced Therapeutic Concepts  
in Oncology in Medical Physics  
MATH 227 Calculus 3 for Honours Physics  
MATH 228 Differential Equations for  
Physics and Chemistry  
BIOL 373 Principles of Human Physiology 2  

Suggested electives for this specialization are:  
BIOL 301 Human Anatomy  
CHEM 333 Metabolism 1  
PHYS 236 Computational Physics 1  
PHYS 239 Scientific Computation 1  
PHYS 391/391L Electronics/Laboratory  
PHYS 392/392L Scientific Measurement  
and Control/Laboratory or PHYS  
353/353L Digital Electronics/Laboratory  
PHYS 437A Research Project  
PHYS 437B Research Project  
STAT 202 Introductory Statistics for  
Scientists  

vi) Honours Life Physics - Co-operative  
(Biophysics Specialization)  
Students specializing in biophysics may take  
STAT 202 Introductory Statistics for Scientists  
in place of PHYS 225 Modeling Life Physics  
and PHYS 437A or PHYS 437A/B Research  
Project or BIOL 499A/B Senior Honours  
Project, in place of PHYS 491 Special Topics  
in Life, Medical and Biophysics. Note that  
PHYS 437A/B and BIOL 499A/B are taken  
over two terms. Besides the core courses,  
students in the biophysics specialization are  
required to take:  

PHYS 121 Mechanics  
PHYS 122 Waves, Electricity and  
Magnetism  
PHYS 122L Waves, Electricity and  
Magnetism Laboratory or PHYS 132L  
Waves, Electricity, Magnetism and  
Measurement Laboratory  
PHYS 234 Quantum Physics 1  

PHYS 242 Electricity and Magnetism 1  
PHYS 242L Electricity and Magnetism  
Laboratory  
PHYS 263 Classical Mechanics and  
Special Relativity  
PHYS 358 Thermal Physics  
PHYS 359 Statistical Mechanics  
One additional 300- or 400-level Physics course  
MATH 114 Linear Algebra for Science  
MATH 227 Calculus 3 for Honours Physics  
MATH 228 Differential Equations for  
Physics and Chemistry  
BIOL 308 Principles of Molecular Biology  
An additional 2.5 units of 300- or 400-level  
Biology courses  

Suggested electives for this specialization:  

PHYS 334, 342, 364 are prerequisites to a  
number of fourth year Physics courses.  

Students intending to continue to graduate  
school (including for instance biology,  
physics, biophysics): If you are planning to  
undertake graduate work after completing  
your undergraduate degree program, we  
recommend that you choose electives that  
will give you the desired background for  
your choice of graduate program, school and  
area of specialization. Please consult with an  
undergraduate advisor and graduate officer  
regarding other electives needed for your  
choice of graduate program.  

For those life physics students interested in  
experimental methods, a minimum of 2.0  
units are recommended from:  

PHYS 131L Mechanics Laboratory (in  
place of 111L)  
PHYS 132L Mechanics, Waves and  
Measurement Laboratory (in place of 122L)  
PHYS 236 Computational Physics 1  
PHYS 260L Intermediate Physics Laboratory 1  
PHYS 391/PHYS 391L Electronics/ Laboratory  
PHYS 392/392L Scientific Measurement  
and Control/Laboratory or PHYS  
353/353L Digital Electronics/Laboratory  
BIOL 335L Molecular Biology Techniques  
BIOL 361 Biostatistics and Experimental Design  

For those life physics students interested in  
theoretical methods, a minimum of 2.0 units  
are recommended from:  

BIOL 364 Mathematical Modeling in Biology  
AMATH 382/BIOL 382 Computational  
Modeling of Cellular Systems  
PHYS 236 Computational Physics 1
Senate Undergraduate Council
June 20, 2011, Report to Senate

PHYS 239 Scientific Computation I
PHYS 364 Mathematical Physics I
PHYS 365 Mathematical Physics 2
PHYS 334 Quantum Physics 2
PSYCH 420 An Introduction to Computational Neuroscience Methods
CS 473 Medical Image Processing
SYDE 384 Biological and Human Systems
(for those who have not taken BIOL 273)
SYDE 444 Biomedical Measurement and Signal Processing

For those life physics students interested in microbiology, PHYS 364 Mathematical Physics I and PHYS 342 Electricity and Magnetism 2 are recommended with a minimum of 1.0 lecture unit from:

PHYS 393 Physical Optics
PHYS 394 Light matter Interaction
PHYS 391/PHYS 391L Electronics/Laboratory
PHYS 392/392L Scientific Measurement and Control/Laboratory or PHYS 353/353L Digital Electronics/Laboratory

PHYS 394 Light matter Interaction
PHYS 391/PHYS 391L Electronics/Laboratory
PHYS 392/392L Scientific Measurement and Control/Laboratory or PHYS 353/353L Digital Electronics/Laboratory

For those life physics students interested in biophotonics, PHYS 364 Mathematical Physics I and PHYS 342 Electricity and Magnetism 2 are recommended with a minimum of 1.0 lecture unit from:

PHYS 393 Physical Optics
PHYS 394 Light matter Interaction
PHYS 391/PHYS 391L Electronics/Laboratory
PHYS 392/392L Scientific Measurement and Control/Laboratory or PHYS 353/353L Digital Electronics/Laboratory

Rationale: These proposed new programs are designed to give a multidisciplinary training in science to incoming students who do not wish to choose between life and physical sciences but wish to combine the two. The programs are aimed at students who, coming out of high school, would have chosen a university with a common first year plan or a flagship multidisciplinary program but would now choose the University of Waterloo for a plan combining physics and life sciences. The new biophysics specialization provides an in depth combination of biology and physics and also allows students to emphasize more heavily either biology or physics or to maintain an evenly weighted specialization in both. Life physics maintains a balance between physics and biomedical courses and allows students to satisfy prerequisite requirements for health professions. Medical physics focuses on physics applied to medicine and preparation for this physics-based health profession. A larger number of specialized physics courses will prepare students for further training in medical physics. The specializations will each draw students with differing career goals: those who wish a challenging program will choose biophysics, those who wish to enter a health profession with a physics focus will choose medical physics and those who wish greater flexibility to enter a number of health professions, while taking less specialized courses will choose life physics. The plans share a total of 5.5 teaching tasks and are expected to attract 50-80 new students to Waterloo. The plans are designed so that students can transfer among the plans after first year by making up only one course.
Honours Physics and Astronomy (Regular and Co-operative)

3. Motion: To approve the following new plans: [Note: rationale is on page 10.]

Honours Physics and Astronomy (Regular)
The honours physics and astronomy academic plan is intended for students with a strong interest in astronomy. The plan provides depth and breadth in physics equal to our current honours physics plan, but with additional depth in astronomy. The plan will allow graduates the flexibility to pursue jobs or graduate study in either physics or astronomy.

The honours physics and astronomy academic plan is in the form of a core of required courses, plus appropriate electives.

Continuation in honours physics and astronomy requires a cumulative overall average of 60% and a 60% cumulative physics average. In addition, students must have an average of at least 65% in the lecture courses PHYS 121, 122, 124, MATH 114, and MATH 127, 128 (or equivalents) in order to continue into year two.

In order to graduate with an honours physics and astronomy degree, the following requirements must be met:

1. Successful completion of 19.0 lecture units plus 2.0 physics lab units
2. Mandatory (core) courses as listed below plus an additional 2.5 units of physics electives of which 1.5 units must be 400-level courses and including 1.0 unit of astronomy electives (see list below) (PHYS 437A and 437B may not be counted towards these 1.5 units).
3. No more than 3.0 SCI-labelled units can be used.
4. Completion of the English Language Proficiency Examination (ELPE)

Year One
Fall
CHEM 120/120L Physical and Chemical Properties of Matter/Laboratory
MATH 114 Linear Algebra for Science
MATH 127 Calculus 1 for the Sciences
PHYS 10 Physics Seminar
PHYS 121/131L Mechanics/Laboratory
One elective (0.5 unit)

Winter
CHEM 123/123L Chemical Reactions,

PHYS 10 Physics Seminar
PHYS 234 Quantum Physics I
PHYS 242/242L Electricity and Magnetism I/Laboratory
PHYS 270/270L Astronomical Observations, Instrumentation and Data Analysis/Laboratory
PHYS 263 Classical Mechanics and Special Relativity
One elective (0.5 unit)

Year Two
Fall
MATH 227 Calculus 3 for Honours Physics
MATH 228 Differential Equations for Physics and Chemistry
PHYS 10 Physics Seminar
PHYS 236 Computational Physics I
PHYS 256/256L Geometrical and Physical Optics/Laboratory
One elective (0.5 unit)

Winter
PHYS 10 Physics Seminar
PHYS 334 Quantum Physics 2
PHYS 358 Thermal Physics
PHYS 363 Intermediate Classical Mechanics
PHYS 364 Mathematical Physics 1
One elective (0.5 unit)

Year Three
Fall
PHYS 10 Physics Seminar
PHYS 474 Galaxies
PHYS 475 Cosmology
Three electives (1.5 units)

Winter
PHYS 10
PHYS 474 Galaxies
PHYS 475 Cosmology
Three electives (1.5 units)
Winter
PHYS 10
Five electives (2.5 units)
Students in year four should normally take a total of 5.0 units. In addition to the required courses listed above these must include an additional of 0.5 unit of 400-level physics electives and an additional 1.0 unit of physics electives.
Astronomy electives: two of: PHYS 275, PHYS 239, PHYS 476

Honours Physics and Astronomy (Co-operative)
The honours physics and astronomy academic plan is intended for students with a strong interest in astronomy. The plan provides depth and breadth in physics equal to our current honours physics plan, but with additional depth in astronomy. The plan will allow graduates the flexibility to pursue jobs or graduate study in either physics or astronomy.

The honours co-operative physics and astronomy academic plan is in the form of a core of required courses, plus appropriate electives.

Continuation in honours co-operative Physics and astronomy requires a cumulative overall average of 60% and a 60% cumulative physics average. In addition, students must have an average of at least 65% in the lecture courses PHYS 121/122/124, MATH 114, and MATH 127/128 (or equivalents) in order to continue into year two.

In order to graduate with an honours co-operative physics and astronomy degree, the following requirements must be met:
1. Successful completion of 19.0 lecture units plus 2.0 physics lab units.
2. Mandatory (core) courses as listed below plus an additional 2.5 units of physics electives of which 1.5 units must be 400-level courses and including 1.0 unit of astronomy electives (see list below) (PHYS 437A and 437B may not be counted towards these 1.5 units).
3. No more than 3.0 SCI-labelled units can be used.
4. Completion of the English Language Proficiency Examination (ELPE).
5. For detailed information on co-op program requirements, please see the Co-operative Program Evaluation information and the Co-operative Education and Career Services section of the undergraduate calendar.

Year 1A (Fall)
CHEM 120/120L Physical and Chemical Properties of Matter/Laboratory
MATH 114 Linear Algebra for Science
MATH 127 Calculus 1 for the Sciences
PHYS 10 Physics Seminar
PHYS 121/131L Mechanics/Laboratory
One elective (0.5 unit)

Year 1B (Winter)
CHEM 123/123L Chemical Reactions, Equilibria and Kinetics/Laboratory
MATH 128 Calculus 2 for the Sciences
PHYS 10 Physics Seminar
PHYS 122/122L Waves, Electricity and Magnetism/Laboratory
PHYS 124 Modern Physics
PHYS 175/175L Introduction to the Universe/Laboratory

Year 2A (Fall)
MATH 227 Calculus 3 for Honours Physics
MATH 228 Differential Equations For Physics and Chemistry
PHYS 10 Physics Seminar
PHYS 236 Computational Physics 1
PHYS 256/256L Geometrical and Physical Optics/Laboratory
One elective (0.5 unit)

Year 2B (Spring)
PHYS 10 Physics Seminar
PHYS 234 Quantum Physics 1
PHYS 242/242L Electricity and Magnetism 1/Laboratory
PHYS 270/270L Astronomical Observations, Instrumentation and Data Analysis/Laboratory
PHYS 263 Classical Mechanics and Special Relativity
One elective (0.5 unit)

Year 3A (Spring)
PHYS 10 Physics Seminar
PHYS 334 Quantum Physics 2
PHYS 358 Thermal Physics
PHYS 363 Intermediate Classical Mechanics
PHYS 364 Mathematical Physics 1
One elective (0.5 unit)
Year 3B (Winter)
PHYS 10 Physics Seminar
PHYS 342 Electricity and Magnetism 2
PHYS 359 Statistical Mechanics
PHYS 370L Astronomy Laboratory
PHYS 375 Stars
Two electives (1.0 unit)

Year 4A (Fall)
PHYS 10
PHYS 474 Galaxies
PHYS 475 Cosmology
Three electives (1.5 units)

Year 4B (Winter)
PHYS 10
Five electives (2.5 units)

Students in year four should normally take a total of 5.0 units. In addition to the required courses listed above these must include an additional 0.5 unit of 400-level physics electives and an additional 1.0 unit of physics electives.

Astronomy Electives: two of: PHYS 275, PHYS 239, PHYS 476

Rationale: The honours physics and astronomy academic plan is intended to attract students with a strong interest in astronomy. The plan will provide depth and breadth in physics equal to the department's current honours physics plan, but with additional depth in astronomy. The plan will allow graduates the flexibility to pursue jobs or graduate study in either physics or astronomy. Three new lecture courses have been added to current course offerings in astronomy: a first year introductory course that provides a broad foundation in astronomy and relevant physics concepts, a second year course that provides an introduction to astronomical observing techniques and data analysis, and a fourth year course focused on galaxies and that fills a gap in the department's current astronomy curriculum. In addition, the plan offers labs attached to the first and second year courses, and a senior upper-year lab. The depth and breadth of undergraduate astronomy in this plan will place Waterloo among the top five universities in Canada at this level.

Chemistry & Physics and Astronomy
Honours Materials and Nanosciences (Regular and Co-operative)

4. Motion: To approve the following new plans: [Note: rationale is on page 13.]

Materials and Nanosciences (Regular and Co-operative)
The materials and nanosciences plan (acronym: MNS) is an interdisciplinary plan offered jointly by the Department of Chemistry and the Department of Physics and Astronomy. Both materials science and nanoscience have been very active research areas during the past few decades, and are now having major impact in diverse fields, ranging from manufacturing to materials technology to nanomedicine to renewable energy to information technology. This academic plan is aimed at students interested in learning about and working in these new high-tech fields. This plan complements the nanotechnology engineering plan offered through the Faculty of Engineering. It is, however, designed for students who are more motivated by and interested in the fundamental building blocks of materials and devices, both at the macroscopic and nanometer scales. This plan has two themes, one associated with inorganic and organic materials, the other with biomaterials. Both regular and co-operative versions of this plan are available.

The honours materials and nanosciences academic plan meets admission requirements for graduate programs in chemistry, and would be particularly suitable for admission into nanoscience and nanotechnology graduate programs. It is also intended for students who wish to find employment in industries associated with such fields as alternative energy sources, information technology, emerging materials, and biomedical therapies and diagnostics.

The honours materials and nanosciences plan takes the form of a core of required courses plus appropriate electives. The numbering for the MNS core courses provides relevant information regarding their content. The middle digit indicates the main scientific content of the course: 0 indicates both chemistry and physics, 1 indicates chemistry, 2 indicates physics, and 3 indicates biochemistry. Fourteen electives allow students to strengthen complementary areas of interest. This plan is offered in both regular and co-operative. Co-op sequencing is: 1A, 2B, off, 2A, WT, 2B, WT, 3A, WT, WT, 3B, WT, 4A, 4B.
Honours Materials and Nanosciences (Regular)
Continuation in the honours materials and nanosciences plan requires a cumulative overall average of 60% and a cumulative overall science average of 60%. In order to graduate with an honours materials and nanosciences degree, the following requirements must be met:

1. Successful completion of 22.5 units.
2. Mandatory (core) courses as listed below.
3. Of the 7.0 elective units, 4.5 units are technical electives, to be chosen from the list of technical electives, and 2.5 units are free electives. Courses other than those listed under technical electives may also qualify as technical electives, subject to approval by the academic plan advisor.
4. Completion of the English Language Proficiency Examination (ELPE).

Year One
Fall
BIOL 230 Introductory Cell Biology
CHEM 120/120L Physical and Chemical Properties of Matter/Laboratory
MATH 127 Calculus 1 for the Sciences
MNS 101 Materials and Nanosciences in the Modern World
PHYS 121/121L Mechanics/Laboratory

Winter
CHEM 123/123L Chemical Reactions, Equilibria and Kinetics/Laboratory
MATH 128 Calculus 2 for the Sciences
MNS 102 Techniques for Materials and Nanosciences
PHYS 122/122L Waves, Electricity and Magnetism/ Laboratory
One elective (0.5 unit)

Year Two
Fall
CHEM 266/266L Basic Organic Chemistry 1/Laboratory
MATH 227 Calculus 3 for Honours Physics
MATH 228 Differential Equations for Physics and Chemistry
MNS 211 Chemistry and the Solid State
PHYS 232L Measurement Laboratory
One Elective (0.5 unit)

Winter
CHEM 237/237L Introductory Biochemistry/Laboratory
CHEM 254 Thermodynamics
MNS 221 Physics and the Solid State
MNS 201L Materials and Nanosciences Laboratory
PHYS 242 Electricity and Magnetism 1
PHYS 280 Introduction to Biophysics

Year Three
Fall
CHEM 209 Introductory Spectroscopy and Structure
CHEM 356 Introductory Quantum Mechanics
MNS 331 Biomaterials (Bio stream) or MNS 321 Electrical and Optical Properties of Materials (Materials stream)
Two electives (1.0 unit)

Winter
MNS 322 Polymer Materials
PHYS 342 Electricity and Magnetism 2
Three electives (1.5 units)

Year Four
Fall
PHYS 380 Molecular and Cellular Biophysics (Bio stream) or PHYS 461 Nanophysics (Materials stream)
Four electives (2.0 units)

Winter
CHEM 357 Physical Biochemistry (Bio stream) or CHEM 350 Chemical Kinetics (Materials stream)
MNS 431 Special Topics in Nanomaterials (Bio stream) or MNS 410 Special Topics in Solid-State Materials (Materials stream)
Three electives (1.5 units)

List of Technical Electives
BIOL 239 Genetics
BIOL 240 Fundamentals of Microbiology
BIOL 309 Analytical Methods in Molecular Biology
CHEM 267 Basic Organic Chemistry 2
CHEM 310 Transition Metals/Inorganic Materials
CHEM 333 Metabolism 1
CHEM 340 Introduction to Computational Chemistry
CHEM 410 Special Topics in Inorganic Chemistry
CHEM 430 Special Topics in Biochemistry
CHEM 450 Special Topics in Physical Chemistry
CHEM 470 Special Topics in Polymer Chemistry
Honours Materials and Nanosciences (Co-operative)
Continuation in the honours co-operative materials and nanosciences plan requires a cumulative overall average of 60% and a cumulative science average of 60%. In order to graduate with an honours co-operative materials and nanosciences degree, the following requirements must be met:

1. Successful completion of 22.5 units.
2. Mandatory (core) courses as listed below.
3. Of the 70 elective units in this plan, 45 units are technical electives, to be chosen from the list of technical electives, and 25 units are free electives. Courses other than those listed under Technical Electives may also qualify as technical electives, subject to approval by the academic plan advisor.
4. Completion of the English Language Proficiency Examination (ELPE).
5. For detailed information on co-op program requirements, please see the Co-operative Program Evaluation information and the Co-operative Education and Career Services section of the undergraduate calendar.

Fall 1A
BIOL 230 Introductory Cell Biology
CHEM 120/120L Physical and Chemical Properties of Matter/Laboratory
MATH 127 Calculus 1 for Sciences
MNS 101 Materials and Nanoscience in the Modern World
PHYS 121/121L Mechanics/Laboratory

Winter 1B
CHEM 123/123L Chemical Reactions, Equilibria, and Kinetics/Laboratory
MATH 128 Calculus 2 for Sciences
MNS 102 Techniques for Materials and Nanosciences

Fall 2A
CHEM 209 Introductory Spectroscopy and Structure
CHEM 266/266L Basic Organic Chemistry/Laboratory
MATH 227 Calculus 3 for Honours Physics
MATH 228 Differential Equations for Physics and Chemistry
MNS 211 Chemistry and the Solid State
PHYS 232L Measurement Laboratory

Spring 2B
CHEM 237/237L Introductory Biochemistry/Laboratory
CHEM 254 Thermodynamics
MNS 201L Materials and Nanosciences Laboratory
MNS 221 Physics and the Solid State
PHYS 242 Electricity and Magnetism 1
One Elective (0.5 unit)

Winter 3A
MNS 322 Polymer Materials
PHYS 280 Introduction to Biophysics
PHYS 234 Quantum Physics 1
Two Electives (1.0 unit)

Winter 3B
CHEM 350 Chemical Kinetics (Materials stream) or CHEM 357 Physical Biochemistry (Bio stream)
PHYS 342 Electricity and Magnetism 2
Three Electives (1.5 units)

Fall 4A
MNS 331 Biomaterials (Bio stream) or MNS 321 Electrical and Optical Properties of Materials (Materials stream)
PHYS 380 Molecular and Cellular Biophysics (Bio stream) or PHYS 461 Nanophysics (Materials stream)
Three Electives (1.5 units)

Winter 4B
MNS 410 Special Topics in Solid-State Materials (Materials stream) or MNS 431 Special Topics in Nano-Biomaterials (Bio stream)
Four Electives (2.0 units)

List of Technical Electives
BIOL 239 Genetics
BIOL 240 Fundamentals of Microbiology
BIOL 309 Analytical Methods in
<table>
<thead>
<tr>
<th>molecular Biology</th>
<th>CHEM 470 Special Topics in Polymer Chemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 267 Basic Organic Chemistry 2</td>
<td></td>
</tr>
<tr>
<td>CHEM 310 Transition Metals/Inorganic Materials</td>
<td>CHEM 494A Research Project and CHEM 494B Research Project or PHYS 437A Research Project and PHYS 437B Research Project</td>
</tr>
<tr>
<td>CHEM 333 Metabolism 1</td>
<td>PHYS 256 Geometrical and Physical Optics</td>
</tr>
<tr>
<td>CHEM 340 Introduction to Computational Chemistry</td>
<td>PHYS 334 Quantum 2</td>
</tr>
<tr>
<td>CHEM 410 Special Topics in Inorganic Chemistry</td>
<td>PHYS 335 Condensed Matter Physics</td>
</tr>
<tr>
<td>CHEM 430 Special Topics in Biochemistry</td>
<td>PHYS 359 Statistical Mechanics</td>
</tr>
<tr>
<td>CHEM 450 Special Topics in Physical Chemistry</td>
<td>PHYS 360A Modern Physics, Laboratory 1</td>
</tr>
<tr>
<td></td>
<td>PHYS 396 Biophysics of Imaging</td>
</tr>
</tbody>
</table>

**Rationale:** These new academic plans address the educational needs for the state-of-the-art emerging field of applications of nanosciences and materials sciences. A set of nine new proposed courses carrying the MNS designation provide a core around which this academic plan is constructed. None of these courses are currently offered by the Faculty of Science. It should be noted that although some of the proposed MNS courses do overlap other Faculty of Science courses to a limited extent, they address materials science and nanoscience aspects in greater depth, and emphasize nanoscale properties and phenomena in particular. Many MNS courses will focus on science at the nanoscale, and as such may serve as a set of courses that are complementary to courses offered in the nanotechnology engineering plan. The new courses introduced for this proposed plan are intended to build upon one another as students progress through the plan. In particular, the two new first year courses are intended to introduce emerging topics in materials science and nanoscience to the students, and have been designed to highlight scientific concepts and techniques that are specifically relevant to these areas. Two new second year MNS courses introduce the appropriate chemistry and physics concepts required for senior level MNS courses in this academic plan. Three new third year MNS courses address specific nano- and materials-sciences aspects of the MNS plan. Two new fourth year courses, MNS 410 and MNS 431, provide bridges between the foundations of this subject area and specific aspects and detailed applications of materials science and nanoscience in the intensely active areas of nanomaterials research and applications. Note that as both MNS 410 and MNS 431 are special topics courses, whose calendar number represent in principle several different courses that may be offered once the plan attains steady-state operation.

**Physics and Astronomy**

**Biophysics Minor**

5. **Motion:** To approve the following new minor:

The biophysics minor is designed for students in biology or physics. The biophysics minor is also available to students in other plans, both within and outside the Faculty of Science.

In order to graduate with a minor in biophysics, the following requirements must be met:

1. Successful completion of 5.5 units.
2. The following courses must be successfully completed.
   - BIOL 230, 239, 308;
   - PHYS 121, (111L or 121L or 131L), 122, (122L or 132L);
   - 1.0 lecture unit from PHYS 225 or STAT 202; PHYS 256, 256L; 233 or 234; 242, 242L or 224, 224L; or 241, 260A; 263, 358, 359.
   - 1.5 units from BIOL 280/PHYS 280, PHYS 380, 383, 395, 396, 491.
3. A minimum cumulative average of 60% must be obtained separately in all biology and physics courses.
4. Lecture units must include at least 1.5 units from 300- or 400-level biology and physics courses.

*Note: A minor in biophysics will not be awarded together with a minor in biology and/or physics. A minor in biophysics will not be awarded together with honours life physics.*

**Rationale:** The proposed minor in biophysics has required courses in biology, physics and biophysics. This minor would be most easily achieved by honours physics students (who already have the core physics courses) or honours biology students (who already have the core biology courses), but it will also be available to other students, both within and outside the Faculty of Science. Once the biophysics minor has been approved, the faculty will initiate a phasing out of the current biophysics specialization attached to the physics and mathematical physics plans, directing interested students to the new biophysics minor.

**CHANGED ACADEMIC PROGRAMS** [effective September 1, 2012]

- **Faculty of Science**
  - Biology
  - Biomedical Sciences

6. **Motion:** To approve the following changes to the plan [Note: plan curriculum by year is not included; new text = **bold**, deleted text = *strikethrough*]:

The Faculty of Science Biomedical Sciences Academic Plan includes courses prepares graduates for entry into a comprehensive array of professional programs in the health care field. Core subjects are offered which are common requirements for the majority of professional programs. These are supplemented with a significant number of elective courses which allow students to tailor their programs to meet the admission requirements for programs in optometry, medicine, dentistry, physiotherapy, occupational therapy, pharmacy, forensics, and radiotherapy or to pursue graduate studies in the health disciplines. Students are strongly urged to consult the admission requirements of the professional schools of interest to aid their choice of electives. (*See note at end of academic plan requirements*)

Students must maintain an overall cumulative average of 60% and a cumulative average of 65% in all science courses in order to be eligible to continue in the plan. Students are advised to consult prospective professional school entrance requirements as admission averages can be significantly higher than the minimum averages to stay in the plan. In order to graduate, the following requirements must be met:

1. Successful completion of at least 22.25 units (including labs); of the 22.25 units that are required, at least 16.75 must be from the Faculty of Science.
2. No more than 3.0 “SCI”-labelled units may be used.
3. Mandatory courses as listed below.
4. Two courses (1.0 unit) of biology courses must be from BIOL 441, 442, 444 or 473. An additional five courses (2.5 units) of 300- or 400-level biology courses of which three courses (1.5 units) must be from the 400-level. A minimum of 3.0 Science elective units is required (at least 2.5 units must be obtained at the 300- and 400-level, exclusive of SCI labelled courses).
5. Enrolling in a course a third time after two previous unsuccessful attempts is normally not permitted (see Faculty of Science policy on repeating courses).
6. A minimum of 2.0 lecture units from the list of “complementary elective” courses.
7. The balance of units is derived from “free elective” courses.
8. Completion of the English Language Proficiency Examination (ELPE).

**Rationale:** The Department of Biology reviewed the honours biomedical sciences undergraduate curriculum in 2010. A working group consisting of biology and biomedical sciences academic advisors recommended the above changes to the biomedical sciences plan that better expose students to the breadth of the discipline. The biomedical sciences plan has also been changed to better align with the honours biology plan requirements.
Chemistry
Chemistry Minor

7. Motion: To approve the following changes to the plan [Note: new text = bold, deleted text = strikeout]:

In order to graduate with a minor in chemistry the following requirements must be met.

A student with more than three failed attempts at chemistry lecture courses will may not receive a minor in chemistry.

The student must be in an honours academic plan However, a student is not eligible for a minor in chemistry if he/she is registered in an honours academic plan offered by the Department of Chemistry or in a plan including the designation “Specialization in Chemistry”. A minor in chemistry will not be awarded together with a minor in biochemistry, as this would require triple counting of some courses.

The following courses must be taken, with a minimum cumulative average of 60% separately in lecture and laboratory courses:

1. CHEM 120/120L, 123/123L, 129 or 209. All of CHEM 120, 120L, 123, 123L and 140.
2. An additional 3.0 lecture units from 200-level or higher Honours-level Chemistry courses, of which a minimum of 1.0 lecture unit must be from 300- or 400-level Chemistry courses. An additional 3.5 lecture units from 200-level or higher CHEM courses. Of these 3.5 lecture units, no more than 1.5 units can be from the same theme area* and at least 1.0 lecture unit must be from the 300- or 400-level.
3. At least one second-year course in each of analytical (CHEM 220), inorganic (CHEM 212), organic (CHEM 264), and physical chemistry (CHEM 254).
4. 0.5 lab units beyond Year One appropriate to the lecture units chosen.

The following courses must not count towards the Minor in Chemistry: CHEM 217, 228/228L, 266/266L, 267/267L.

3. An additional 0.5 lab unit from 200-level or higher chemistry courses.

*For chemistry courses from the 200-level or higher, the middle digit, “X”, in the course number designates the theme area. X has the set of values 0 (general interest), 1 (inorganic/materials chemistry), 2 (analytical chemistry), 3 (biological chemistry/biochemistry), 4 (computational/theoretical chemistry), 5 (physical chemistry), 6 (organic chemistry), 7 (polymer chemistry), and 8 (medicinal chemistry).

Rationale: The proposed change: (i) increases by 0.5, the total number of units required to obtain a minor in chemistry; (ii) preserves the requirement that students take courses from several theme areas; and (iii) preserves the requirement that students take 0.5 units of labs beyond year one. However, the proposed changes provide students with more flexibility in choosing chemistry courses and will allow them to choose chemistry courses that better complement their major field of study or better suit their interests.

CHANGES TO FACULTY REGULATIONS  [effective September 1, 2012]

Faculty of Applied Health Sciences
i) Advanced Standing; ii) Residency Requirement; iii) Term Dean’s Honours List

8. Motion: To approve the following changes to the faculty’s regulations in the undergraduate calendar as provided below [Note: unchanged calendar text for each regulation is not included; new text = bold, deleted text = strikeout]:

i) Advanced Standing

Regardless of the number of courses that are presented for transfer, students admitted from another University of Waterloo Faculty or other post-secondary institution will be required to complete a minimum of 50% of their course work while registered in the new academic plan.
within the Faculty of Applied Health Sciences. Students admitted from another academic plan within the University of Waterloo may be granted transfer credit for all acceptable courses and milestones completed at the University of Waterloo at the discretion of the Admissions Committee. Students should be aware that all requirements of the new academic plan must be met in order to graduate with that degree, regardless of the number of transfer credits that are granted.

**Rationale:** Allowing internal transfer students to transfer more than 50% of their completed courses into a new program at the University of Waterloo will ensure that students do not need to repeat learning or lose recognition for high quality courses they have already taken within the institution. Limiting the number of transfer credits for internal transfer students is not beneficial to the many students who explore academic programs and career opportunities as they progress through their undergraduate careers. Students transferring from other institutions will still be required to complete 50% of their coursework in an applied health sciences plan.

**ii) Residency Requirement**

Students in Honours Health studies, Honours and 4 year General Kinesiology programs and Honours Co-op Recreation and Leisure Studies programs must normally complete a minimum of 50% of their degree requirements while enrolled in full-time study (minimum 5.0 units per year) in their program. Normally, students in these plans must successfully complete 5.0 units at the end of year one, and similarly 10.0 units by the end of year two, 15.0 units by the end of year three, and 20.0 units at the end of year four. In addition

**Students in the regular honours recreation and leisure studies and the 4-year general recreation and leisure studies programs may complete their studies on a part-time basis.** Those students admitted to 1A must complete all degree requirements within 12 years of entry into the program. Students admitted with one year or more of advanced standing must complete their degree within 10 years of point of entry.

**Rationale:** Existing rules regarding full-time study were needlessly restrictive.

**iii) Term Dean’s Honours List**

To be included on the Dean’s Honours List at the end of each academic term, the student must:

- Be registered full-time (at least 2.0 units per term)

**Rationale:** Reducing the number of required units to 2.0 recognizes the excellence of students who are on a reduced course load.

**Faculty of Arts**

i) Dean’s Honours List; ii) Credit/No Credit Grading Basis; iii) Double Counting

9. **Motion:** To approve the following changes to the faculty’s regulations in the undergraduate calendar as provided below [Note: unchanged calendar text for each regulation is not included; new text = bold, deleted text = strikeout]:

i) Dean’s Honours List

To be eligible for the Dean’s Honours List a student:

- Must not have any NMRs

**Rationale:** The faculty proposes the removal of the stipulation that students who have a “No Mark Recorded” (NMR) grade be denied the recognition of being placed on the Dean’s Honours List (DHL). An NMR grade is used by an instructor when the student ID is not recognized (i.e., no term work submitted, no attendance), and a 32% is recorded in the average calculations as a result. Students having at least one NMR are not eligible ever to be on the DHL, even if they have an exceptional cumulative average, as the DHL is a cumulative recognition. Students carrying failing
grades and “Failed to Complete” grades, however, are allowed to be awarded the DHL recognition. Thus, it is unfair to students that an NMR grade carries more weight regarding the DHL than either of these other two scenarios.

ii) Credit/No Credit Grading Basis

Credit/No Credit basis: In all normal circumstances, students are expected to take the courses in the Faculty of Arts of their major requirements on a graded basis rather than on a Credit/No Credit (CR/NCR) basis, unless the course is only offered on a Credit/No Credit basis. Any request for exception to this rule is subject to the specific approval or disapproval of the student’s discipline, as well as the course instructor. Some disciplines of the Faculty of Arts permit no credit-graded courses at all among the courses presented in satisfaction of the discipline’s major or Honours requirements. Once a student has received permission to take a major course on a CR/NCR basis, she must communicate the decision in writing to the Arts Faculty Examinations and Standings Committee, using a Petition for Exception to Academic Regulations form, before the end of the two-week add period. In some instances, courses are only offered on a Credit/No Credit basis, and in these cases, special permission is not required.

A CR/NCR grade may be awarded on petition to the Arts Examinations and Standings Committee accompanied by appropriate documentation. The CR/NCR grade is granted only under extraordinary circumstances.

In satisfaction of the minimum degree requirements, students in BA General plans may present up to three academic course units with a grade of Credit (CR) in courses outside their major. Students in BA Honours plans may present up to four academic course units with a grade of Credit (CR) in courses outside their Honours area. Courses taken on a CR/NCR basis will be counted towards the maximum allowable limit of non-graded credits as specified in the Arts Faculty residency requirements.

Note: Students in Computing and Financial Management may not take courses on a CR/NCR basis.

Note: Students in independent studies may take courses on a CR/NCR basis only if previously approved by their program advisor.

Rationale: The existing credit/no credit regulation allows students to selectively choose which course(s) will count in their average at the beginning of an academic term and those that won’t. Students who opt to receive a grade of CR/NCR instead of a numeric grade do so by communicating with the instructor in question and then notifying the Examinations and Standings Committee of the agreement. These students then complete the work, the instructor submits a numeric grade to the Registrar’s Office, who then transforms the grade into a CR or NCR, based on the grade achieved. This practice unjustifiably allows students to “cherry-pick” what will be counted in their averages. This right should be entirely at the discretion of the Examinations and Standings Committee, who, in comparison to instructors, are well versed in all of arts’ regulations and standard practices. The Examinations and Standings Committee will continue to evaluate petitions at the end of each term if the student’s reasons for receiving CR/NCR grades are viable and it is in the best interest of the student.

iii) Double Counting

Double-counting: For any degree granted by the Faculty of Arts, up to three courses may count towards any two plans or sub-plans (e.g., A major/minor combination). Counting the same course towards more than two plans or sub-plans is not allowed under any circumstances.

Double-counting: Arts faculty regulations require that for any combination of academic plans: at least 50% of the courses taken to fulfill the requirements of any plan must be unique to that plan; and a maximum of 2.5 units (five courses) may be counted towards two plans.

The practice of counting a course towards two different plans is known as “doublecounting”. Specializations, such as the language specialization in classical studies,
are regarded as being housed within the main plan, and so are not subject to concerns about double-counting between them. Under no circumstances are students allowed to "triplecount" (i.e., count one course towards three separate plans).

**Rationale:** To replace the current course double-counting regulation with one that is more beneficial to students, because it is more practicable and understandable. Double-counting is difficult to track due to the number of interdisciplinary plans in arts and the numerous combinations students undertake. The issue is often only discovered when reviewing a student's intent to graduate form, which is too late. Practice in arts also varies widely. The highly interdisciplinary nature of some plans makes double-counting inevitable, and considerable advisor time and effort is required to make sure the rules are being correctly and consistently adhered to when reviewing intent to graduate forms.

**Faculty of Mathematics**

i) Admissions; ii) Transfer Students; iii) Co-op Progression

10. **Motion:** To approve the following changes to the faculty's admission requirements and regulations in the undergraduate calendar as provided below:

i) Admissions

The faculty proposes that the "Admission Information Form" (AIF) be a requirement for the Business, Accounting, FARM, and Double Degree (Mathematics & Business) plans. For all other plans the AIF will be strongly recommended, especially for applicants interested in co-op programs.

**Rationale:** The plans listed above are very competitive, have limited enrolment and are in high demand. Thus, the AIF for these plans are extremely important in helping the faculty make difficult admissions decisions and can make the difference whether a student is admitted or not.

ii) Transfer Students

The faculty proposes a requirement that that any student seeking to satisfy the requirements for any plan offered by the Faculty of Mathematics take at least 50% of the courses used to satisfy the requirements for the plan while he or she is a student at the University of Waterloo. The new text is as follows: "Students must normally take at least 50% of the courses used to satisfy the requirements for any plan offered by the Faculty of Mathematics while registered as a student at the University of Waterloo."

**Rationale:** Students may arrive from other universities with enough transfer credits to satisfy plan requirements (for example, a minor) on the day they arrive. Awarding such students credit for a Waterloo plan does not seem reasonable.

iii) Co-op Progression

The faculty proposes changes to the rules relating to co-op progression in math as described below (Note: new text = bold, deleted text = strikeout):

5.1 Students who are eligible to continue in their academic plan may remain in co-op, provided that they are making satisfactory progress towards meeting the faculty's minimum requirements for work terms, PD courses and work reports.

5.2 Students with a cumulative average (i.e., overall GPA) less than 60%, or for whom the total of their excluded course units exceeds one half the total of their passed (and not excluded) course-units, will normally be suspended from the CEGS employment process during their next academic term.

In most instances (with the exception of students with a previously arranged two-work-term commitment), in order to administratively implement the suspension, students will have their system of study changed from co-op to regular, effective their first full-time academic term following the term that led to their suspension. Then, as regular students, they will not be required to pay co-op fees.
during the time they are suspended from co-op. Students who have been suspended from co-op will be permitted, and sometimes encouraged, to enrol in consecutive full-time academic terms.

If students have already secured employment for a co-op work term immediately following the academic term that led to their suspension, they will be expected to honour that employment commitment, and that work term will be eligible for official co-op work-term credit in the event that they are subsequently reinstated to co-op. In addition, students with a two-work-term commitment already in place will normally be expected to return to work for that same employer following their next scheduled academic term (during which they will normally remain enrolled in co-op and pay co-op fees). In other instances, however, employment secured for a term immediately following suspension from the CECSS job-search employment process will not normally be recognized for official co-op work-term credit.

5.2 Students with any of the conditions listed below will no longer be eligible to continue in the co-op program:

- The student is required to withdraw from the faculty
- The student is on academic probation or marginal standing after a full-time academic term for the second time
- Two unemployed or failed work term opportunities
- Three missing or failed PD courses
- Two missing or failed work reports

A student no longer eligible to proceed in the co-op program will be transferred to the most closely matching regular plan for which the student is admissible.

5.3 After one full-time academic term (or equivalent) in a regular plan, suspended students will be eligible to apply for reinstatement to co-op. Provided that students are otherwise eligible for co-op, requests for reinstatement will be approved for applicants who have attained "Good" or "Excellent" academic standing. In all cases, applications for reinstatement must be submitted no later than the end of the first complete week of the student's next scheduled academic term.

5.3 Students with any of the conditions listed below will be considered on probation in the co-op program:

(i) The student is on academic probation or marginal standing after a full-time academic term for the first time
(ii) Any combination of three missing or failed PD courses and/or work reports.

The student must meet with the appropriate co-op advisor to determine conditions necessary to remediate their co-op standing.

The student who is on probation in co-op solely because of condition (i) will be placed in Good Co-op Standing if the student returns to Good or Excellent academic standing after one full-time academic term without violating condition (ii).

The student's access to the Co-op Employment Process (CEP) will be terminated pending completion of remedial action.

5.4 Normally, students who warrant suspension from the CECSS employment process more than once will be permanently removed from co-op.

5.4 Students who are eligible to continue in co-op and are not on probation in co-op will be considered in "Good Co-op Standing".

5.5 Students in co-op plans for which no corresponding regular plan exists will be dealt with following the principles in 5.4 to 5.6 as closely as possible, given the lack of a corresponding regular plan. Since removal from co-op is potentially more significant for such students, their individual circumstances will be considered in making decisions.

5.5 Students who qualify for "Good Co-op Standing" and whose Employer Evaluation on the most recent work term is Excellent or Outstanding will be considered in "Excellent Co-op Standing".

5.6 If a co-op student accumulates a combined total of four grades of NCR for PD courses and work reports, the student will be required to withdraw from the co-op system of study.

5.6 A student may be required to withdraw from co-op in the Faculty of Mathematics if,
in the opinion of the Standings and Promotions (S&P) Committee, the student is unlikely to profit from further participation in the co-op program or is not making satisfactory progress toward fulfilling co-op degree requirements. Presentation of such requests to S&P result in a notification to the student and an opportunity to reply prior to S&P reaching a decision.

13. Co-op Regulations
13.1 Co-op Degree Requirements

Co-operative mathematics students are expected to follow the normal alternating academic/work-term sequence appropriate to their plan from admission through to graduation (see Study/Work Sequence section) ...

13.2 Co-op PD Course and Work Report Regulations

The required schedule for completing the PD course and work report requirements is as follows:

<table>
<thead>
<tr>
<th>By end of work term</th>
<th>Normal number of credited PD courses</th>
<th>Minimum number of credited PD courses</th>
<th>Normal number of credited work reports</th>
<th>Minimum number of credited work reports</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>2</td>
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<td>6</td>
<td>5</td>
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</tbody>
</table>

- If a co-op student fails to submit a work report, he/she will receive a grade of NCR.
- If a co-op student accumulates two grades of NCR for work reports, he/she will be required to withdraw from the co-op system of study.
- If a co-op student accumulates three grades of NCR for PD courses, he/she will be required to withdraw from the co-op system of study.
- If a co-op student accumulates a combined total of four grades of NCR for PD courses and work reports, the student will be required to withdraw from the co-op system of study.

Rationale: Probation provides a more stable way than co-op suspension of protecting a student experiencing trouble academically from the consequences of having to look for a co-op job during an academic term. Adding a co-op standing to the process will make it easier for administrators to separate academic difficulties from difficulties related to co-op.

FOR INFORMATION

Academic Program Reviews

Faculty of Science Non-departmental Programs – See attachment #2.


Curricular modifications

On behalf of Senate, council approved changes to academic plans, new courses, course changes and course inactivations for the faculties of: arts (English language and literature, fine arts, French studies, history, peace and conflict studies, political science, religious studies, Spanish and Latin American studies); environment (development and environment specialization, environment and resource studies, geography and environmental management); mathematics (commerce, computational mathematics, computer science, mathematical studies, mathematics, mathematics/teaching option, statistics and actuarial science); and science (biochemistry minor, biology, chemistry, materials and nanosciences, physics and astronomy, science).

/kjj
May 18, 2011

Geoff McBoyle
Associate Vice-President, Academic
Memo

To: Senate Undergraduate Council  (For approval)
From: Nancy Weiner, Associate Registrar, Admissions
Date: May 10, 2011
Re: Undergraduate Admission Requirements for 2012

For your consideration and approval, additional changes to the 2012 admission requirements since the October 12, 2011 SUC meeting for the following programs:

1. Change in the minimum published overall admissions average:

   Current:  
   An overall average of 75% on the best six grade 12 courses including the required courses is normally the minimum for consideration

   Revised:  
   An overall average of 78% on the best six grade 12 courses including the required courses is normally the minimum for consideration

   Rationale:  
   The minimum 78% better reflects the minimum admissions average used for admission consideration. For example, in fall 2010 the discretionary average being used for admission consideration was 77% with 78% required as the final average and, in fall 2011, the discretionary average being used for admission consideration is 78% with 77% required as the final average.

2. Faculty of Arts: Accounting and Financial Management changes

   Current co-op descriptions:
   - Accounting and Financial Management – Financial Management Co-op
   - Accounting and Financial Management – Public Accounting Co-op

   Revised co-op descriptions:
   - Accounting and Financial Management – Business and Finance Co-op
   - Accounting and Financial Management – CA Co-op

   Rationale:  
   The Accounting and Financial Management program is a co-op only program and all potential co-op employment positions are assigned to two separate co-op job categories. The two descriptions are necessary to distinguish between these distinct co-op categories. The existing Public Accounting Co-op description is no longer accurate due to changes in the CA (Chartered Accountant) profession accreditation process. The co-op placements in the CA Co-op category consist primarily of positions that qualify for CA accreditation purposes. The change in Financial Management Co-op to Business and Finance Co-op is to highlight distinct categories of co-op positions from the CA Co-op category.
3 Faculty of Mathematics:

Current Admissions Information Form (AIF) wording: AIF is recommended

Revised AIF wording: AIF is required for Math/Chartered Accountancy, Math/Business Admin, Math/Financial Analysis and Risk Management, Business Administration(BBA)/Mathematics (BMath) For all other plans, the AIF will be strongly recommended, especially for applicants interested in co-op programs

Rationale:
The plans listed above are very competitive, have limited enrolment and are in high demand. Thus, the admissions information form for these plans are extremely important in helping us make difficult decisions and can make the difference whether a student is admitted or not

4 Faculty of Science: Science and Business changes

Current entry point: Science and Business, Co-op

Revised entry point: Science and Business, Regular and Co-op program

Rationale:
To primarily allow for upper year winter term transfer students and students who are interested in a regular program rather than co-op

If you have any questions, please do not hesitate to contact me at ext 32265 or at nweiner@uwaterloo.ca
Ontario Secondary School Applicants presenting the Ontario High School Curriculum

Ontario secondary school (OSS) students who will be completing the Ontario high school curriculum must present the Ontario Secondary School Diploma (OSSD) including a minimum of six grade 12 U or M courses. These courses must include all required courses as specified for each program.

An overall average of 78% on the best six grade 12 courses including the required courses is normally the minimum for consideration. Higher averages are required for admission to programs in which the demand for places by qualified applicants exceeds the number of places available. The actual minimum averages required for these programs are determined each year on the basis of the number and qualifications of applicants and the number of available spaces.

In some programs, applicants may be considered for early conditional admission based on factors that include their grade 11 academic record, their grade 12 record to date, and other factors noted under "Other Documentation" in the chart.

The University reserves the right to withdraw conditional offers of admission if the applicant fails to meet the requirements specified above or any specific conditions stated on the offer of admission.
### Admission Requirements and Recommendations for Year One Programs 2012

<table>
<thead>
<tr>
<th>Faculty/Program</th>
<th>Requirements</th>
<th>Recommendations</th>
<th>Other Documentation</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All Programs</strong></td>
<td>All programs require six Grade 12 U or M courses including specified courses.</td>
<td><strong>Undergraduate first-year entry programs:</strong> All required courses are OSS Grade 12 U courses unless otherwise specified and must be included in the required set of 6. Required courses are included in the calculation of the admission average. Programs requiring prior university studies: Requirements are as listed.</td>
<td>Information which is used in addition to course requirements is detailed below when applicable. The appropriate information will be requested when an application is acknowledged.</td>
<td><strong>Applied Health Sciences</strong></td>
</tr>
<tr>
<td><strong>Health Studies</strong></td>
<td>• Biology</td>
<td>• Advanced Functions</td>
<td>Special consideration is given on the basis of strength in Biology and Chemistry. Those not admitted to the co-op program are automatically considered for the corresponding regular program. The first co-op work term begins in Year Two.</td>
<td></td>
</tr>
<tr>
<td>Regular and Co-op</td>
<td>• Chemistry</td>
<td>• English (ENG4U)</td>
<td>For students considering the Pre-Health Professions: Socialization; Advanced Functions English (ENG4U) Physics.</td>
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<tr>
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<td>A final grade of at least 70% is normally required in each of the above required courses.</td>
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<td></td>
<td>• Additional U or M courses for a total of six</td>
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<tr>
<td><strong>Kinesiology</strong></td>
<td>• Advanced Functions</td>
<td>• English (ENG4U)</td>
<td>Admission Information Form (AIF) is required. Special consideration is given on the basis of strength in Advanced Functions, Chemistry, and Biology or Physics.</td>
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<tr>
<td>Regular and Co-op</td>
<td>• Chemistry</td>
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</tr>
<tr>
<td></td>
<td>• One of Biology or Physics</td>
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<td>A final grade of at least 70% is normally required in each of the above required courses.</td>
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<tr>
<td></td>
<td>• Additional U or M courses for a total of six</td>
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</tr>
<tr>
<td><strong>Recreation and Leisure Studies</strong></td>
<td>• Any Grade 12 U English</td>
<td>• For all students:</td>
<td>Applicants should be aware that although this is a social science program, courses in research methods and statistics are included in the curriculum. Writing skills are important. Involvement in extra-curricular activities is an important factor in admission decisions. Those not admitted to the co-op program are automatically considered for the corresponding regular program. Limited admission to co-op is also available in Year Two. The first co-op work term begins in Year Two.</td>
<td></td>
</tr>
<tr>
<td>Regular and Co-op</td>
<td>A final grade of at least 70% is normally required.</td>
<td>• one Grade 12 U or M course from Arts, Business Studies, Canadian and World Studies, Classical Studies, French as a Second Language, Interdisciplinary Studies, International Languages, or Social Sciences and Humanities courses.</td>
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<tr>
<td></td>
<td>• Additional U or M courses for a total of six</td>
<td>For students considering the Therapeutic Recreation program:</td>
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<tr>
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<td></td>
<td>• Biology or Exercise Science</td>
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<td>For students considering the Recreation and Business program:</td>
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<tr>
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<td>• Grade 12 M Principles of Financial Accounting</td>
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</tbody>
</table>
### Admission Requirements and Recommendations for Year One Programs 2012

#### Faculty/Program

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Recommendations</th>
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<tr>
<td><strong>Arts</strong></td>
<td>Undergraduate first-year entry programs: All required courses are OSS Grade 12 U courses unless otherwise specified and must be included in the required set of 8. Required courses are included in the calculation of the admission average. Programs requiring prior university studies: Requirements are as listed.</td>
<td>Undergraduate first-year entry programs: Courses listed are OSS Grade 12 U courses unless otherwise specified and are not required for admission but are recommended because students may find this preparation useful during their university studies. Programs requiring prior university studies: Recommendations are as listed.</td>
<td>Information which is used in addition to course requirements is detailed below when applicable. The appropriate information will be requested when an application is acknowledged.</td>
</tr>
</tbody>
</table>

#### Arts (All Programs)

- All programs require six Grade 12 U or M courses including a Grade 12 U English

#### Honours Arts Regular

- For Social Science programs such as Anthropology; Economics; Geography and Environmental Management; Political Science; Psychology; Sexuality, Marriage, and Family Studies; Social Development Studies; or Sociology:
  - Mathematics of Data

#### Arts and Business Regular and Co-op

- In addition to the requirement for all Arts programs specified above, a final grade of at least 70% in any Grade 12 U English is required
- For Economics: Calculus and Vectors is also recommended. However, students may decide to take an introductory calculus course in first year to acquire additional background.

#### Global Business and Digital Arts Regular

- In addition to the requirement for all Arts programs specified above, a final grade of at least 75% in any Grade 12 U English is required
- Mathematics of Data Management is strongly recommended

#### Social Development Studies Regular Renison University College

- In addition to the requirement for all Arts programs specified above, a final grade of at least 70% in any Grade 12 U English is required
- Mathematics of Data Management

- The Admissions Committee considers an application individually. It bases its decision on the overall average, the English grade, and information provided on the Admission Information Form for Grade 12 courses are repeated.
- The highest grade attained will be used for making admission decisions.

- Renison University College and St. Jerome's University have the same admission standards as the University.

- Admission Information Form (AIF) is strongly recommended.

- Entry to General or Honours major programs, including departmental co-op, occurs following Year One and is based on academic performance in Year One or relevant courses in the prospective major. Honours Arts Regular is offered through the University of Waterloo, Renison University College, and St. Jerome's University.

- Selection of the Honours major which is to be combined with Arts and Business occurs following Year One and is based on academic performance in the prospective major in Year One.

- Honours Arts and Business is offered through the University of Waterloo, Renison University College, and St. Jerome's University.

- Those not admitted to the Co-op program are automatically considered for the corresponding Regular program.

- Admission Form (AIF) is strongly recommended.

- These not admitted to Social Development Studies in Year One are automatically considered for Honours Arts Regular through Renison University College.

- Based on academic performance in Year One, admission to General or Honours Social Development Studies at the Year Two level is possible.
### Admission Requirements and Recommendations for Year One Programs 2012

<table>
<thead>
<tr>
<th>Faculty/Program</th>
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<th>Other Documentation</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Accounting and Financial Management</strong></td>
<td>Undergraduate first-year entry programs: All required courses are OSS Grade 12 U courses unless otherwise specified and must be included in the required set of 6. Required courses are included in the calculation of the admission average. Programs requiring prior university studies: Requirements are as listed.</td>
<td>Undergraduate first-year entry programs: Courses listed are OSS Grade 12 U courses unless otherwise specified and are not required for admission but are recommended because students may find this preparation useful during their university studies. Programs requiring prior university studies: Recommendations are as listed.</td>
<td>Information which is used in addition to course requirements is detailed below. Information will be requested when an application is acknowledged.</td>
<td></td>
</tr>
<tr>
<td><strong>Arts (Continued)</strong></td>
<td>Any Grade 12 U English. A final grade of at least 75% is required. Advanced Functions. Calculus and Vectors. Three other U or M courses.</td>
<td>Grade 12 M Principles of Financial Accounting. Grade 12 U Mathematics of Data.</td>
<td>Admission Information Form (AIF) is required. Accounting and Financial Management Admissions Assignment.</td>
<td>Applicants are selected to complete the Accounting and Financial Management Admissions Assignment (AFMA) on the basis of grade 11 final marks and any intern or final grade 12 marks available at the time the AFMA admission selection occurs. Those selected to complete the AFMA are invited and expected to come to the University when the assignment is scheduled. Arrangements will be made for applicants who cannot write the AFMA on campus. Admission is based on secondary school or any post-secondary school achievement, the results of the AFMA, and the Admission Information Form. Consideration will be given to admission at the Year Two level for students who have successfully completed the Year One prerequisites.</td>
</tr>
<tr>
<td><strong>Independent Studies Regular</strong></td>
<td>In addition to the requirement for all Arts programs, a final grade of at least 70% in any Grade 12 U English is required.</td>
<td></td>
<td>Autobiographical Letter. Interview. Letters of Reference.</td>
<td>Applicants should be capable of doing university-level work on their own and should be planning studies that can be done at the University of Waterloo.</td>
</tr>
<tr>
<td><strong>Computing and Financial Management Co-op</strong></td>
<td>Advanced Functions. Calculus and Vectors. Any Grade 12 U English. A final grade of at least 75% is required. One other Grade 12 U course. Two other U or M courses.</td>
<td>Grade 11 U Introduction to Computer Science. Grade 12 M Principles of Financial Accounting.</td>
<td>Admission Information Form (AIF), which includes a teacher reference, is strongly recommended. All applicants are encouraged to write the Euclid Mathematics Contest. Applicants not currently attending an Ontario Secondary School are strongly advised to write the Euclid contest to demonstrate that they have sufficient mathematical background. The Canadian Computing Competition is recommended.</td>
<td>In addition to a strong academic background, other factors considered in the admission process include performance in contests such as the Euclid Mathematics Contest and the Canadian Computing Competition. The number and variety of courses taken, involvement in extracurricular activities in the school and/or the community, and teacher recommendations. Those not offered admission to Computing and Financial Management may be considered for alternative programs in the Faculty of Mathematics.</td>
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</tbody>
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### Admission Requirements and Recommendations for Year One Programs 2012
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<thead>
<tr>
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<tbody>
<tr>
<td>Architecture Co-op</td>
<td>All required courses are OSS Grade 12 U courses unless otherwise specified and must be included in the required set of 8. Required courses are included in the calculation of the admission average. Programs requiring prior university studies: Requirements are as listed.</td>
<td>Undergraduate first-year entry programs: Courses listed are OSS Grade 12 U courses unless otherwise specified and are not required for admission but are recommended because students may find this preparation useful during their university studies. Programs requiring prior university studies: Recommendations are as listed.</td>
<td>Information which is used in addition to course requirements is detailed below when applicable. The appropriate information will be requested when an application is acknowledged.</td>
<td></td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>English (ENG4U) A final grade of at least 75% is normally required. Advanced Functions + Calculus and Vectors + Physics A final grade of at least 70% is normally required in each of these courses. Two other U or M courses</td>
<td>Grade 11 or 12 M Art courses + Independent arts studies + Creative and cultural studies such as visual arts and history</td>
<td>Interview English précis-writing exercise Portfolio Admission Information Form (AIF) is required</td>
<td>Applicants are selected for the interview on the basis of grade 11 marks and any interim or final OSS grade 12 marks available at the time interview selection occurs. These selected for an interview are expected to come to the University. Admission is based on the results of the interview, the portfolio, the English précis-writing exercise, and secondary school achievement.</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>Advanced Functions + Calculus and Vectors + Chemistry + English (ENG4U) + Physics A final grade of at least 70% is normally required in each of these courses. One other U or M courses</td>
<td></td>
<td>Admission Information Form (AIF) is required</td>
<td>In addition to a strong academic background, other factors which will be considered in the admissions process include involvement in extracurricular activities in school and/or in the community; evidence of an interest in engineering; and strong performance in mathematics, science, or engineering-related competitions. These not offered admission to their first-choice program may be considered for other engineering programs that they specify on the Admission Information Form.</td>
</tr>
</tbody>
</table>
### Admission Requirements and Recommendations for Year One Programs 2012

<table>
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<tr>
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<tbody>
<tr>
<td><strong>Environment and Business Co-op</strong></td>
<td><em>(Any Grade 12 U, English) A final grade of at least 70% is normally required)</em>&lt;br&gt;<em>(Five other U or M courses)</em>&lt;br&gt;<em>(One Grade 12 U Mathematics)</em>&lt;br&gt;<em>(One Grade 12 U Science)</em>&lt;br&gt;<em>(Grade 12 M Principles of Financial Accounting)</em>&lt;br&gt;<em>(Analyzing Current Economic Issues (where offered))</em></td>
<td><em>(At least one Grade 12 U or M course from each of)</em>&lt;br&gt;<em>(Canadian and World Studies or Social Sciences and Humanities or the Arts)</em>&lt;br&gt;<em>(Mathematics or Science)</em></td>
<td><em>(Admission Information Form (AIF))</em></td>
<td><em>(Those not admitted to Honours Environment and Business Co-op are automatically considered for Honours Geography and Environmental Management)</em>&lt;br&gt;<em>(The first co-op work term begins in Year Two)</em></td>
</tr>
<tr>
<td><strong>Environment and Resource Studies Regular and Co-op</strong></td>
<td><em>(Any Grade 12 U, English) A final grade of at least 70% is normally required)</em>&lt;br&gt;<em>(Five other U or M courses)</em></td>
<td><em>(One or more Grade 12 U or M Geography courses are strongly recommended)</em>&lt;br&gt;<em>(A second Grade 12 U Mathematics)</em>&lt;br&gt;<em>(Earth and Space Science)</em></td>
<td><em>(Admission Information Form (AIF))&lt;br&gt;</em>(Program Briefing Session)<em>&lt;br&gt;</em>(Transport Canada Category 1 Medical Certification)*</td>
<td><em>(Those not admitted to Honours Geography and Aviation are automatically considered for Honours Geomatics Regular)</em>&lt;br&gt;<em>(Limited admission to co-op is also available in Year Two. The first co-op work term begins in Year Two)</em></td>
</tr>
<tr>
<td><strong>Geography and Aviation Regular</strong></td>
<td><em>(Any Grade 12 U, English) A final grade of at least 70% is normally required)</em>&lt;br&gt;<em>(A Grade 12 U Mathematics)</em>&lt;br&gt;<em>(Four other U or M courses)</em></td>
<td><em>(One or more Grade 12 U or M Geography courses are strongly recommended)</em>&lt;br&gt;<em>(A Grade 12 U Mathematics)</em>&lt;br&gt;<em>(Earth and Space Science)</em></td>
<td><em>(Admission Information Form (AIF))&lt;br&gt;</em>(Program Briefing Session)<em>&lt;br&gt;</em>(Transport Canada Category 1 Medical Certification)*</td>
<td><em>(Those not admitted to Honours Geography and Aviation are automatically considered for Honours Geomatics Regular)</em>&lt;br&gt;<em>(Limited admission to co-op is also available in Year Two. The first co-op work term begins in Year Two)</em></td>
</tr>
<tr>
<td><strong>Geography and Environmental Management Regular and Co-op</strong></td>
<td><em>(Any Grade 12 U, English) A final grade of at least 70% is normally required)</em>&lt;br&gt;<em>(Five other U or M courses)</em></td>
<td><em>(One or more Grade 12 U or M Geography courses are strongly recommended)</em>&lt;br&gt;<em>(A Grade 12 U Mathematics)</em>&lt;br&gt;<em>(Earth and Space Science)</em></td>
<td><em>(Admission Information Form (AIF))&lt;br&gt;</em>(Program Briefing Session)<em>&lt;br&gt;</em>(Transport Canada Category 1 Medical Certification)*</td>
<td><em>(Those not admitted to the co-op program are automatically considered for the corresponding regular program)</em>&lt;br&gt;<em>(Limited admission to co-op is also available in Year Two. The first co-op work term begins in Year Two)</em></td>
</tr>
<tr>
<td>Faculty/Program</td>
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<tr>
<td>Geomatics Regular and Co-op</td>
<td>Undergraduate first-year entry programs: All required courses are OSS Grade 12 U courses unless otherwise specified and must be included in the required set of 6. Required courses are included in the calculation of the admission average. Programs requiring prior university studies: Requirements are as listed.</td>
<td>Undergraduate first-year entry programs: Courses listed are OSS Grade 12 U courses unless otherwise specified and are not required for admission but are recommended because students may find this preparation useful during their university studies. Programs requiring prior university studies: Recommendations are as listed.</td>
<td>Information which is used in addition to course requirements is detailed below when applicable. The appropriate information will be requested when an application is acknowledged.</td>
<td></td>
</tr>
<tr>
<td>International Development Regular</td>
<td>Any Grade 12 U English A final grade of at least 75% is normally required. A Grade 12 U Mathematics A final grade of at least 75% is required. Four other U or M courses.</td>
<td>At least one Grade 12 U course in a second language.</td>
<td>Admission Information Form (AIF).</td>
<td>Those not admitted to the co-op program are automatically considered for the corresponding regular program. Limited admission to co-op is also available in Year Two. The first co-op work term begins in Year Two.</td>
</tr>
<tr>
<td>Knowledge Integration Regular</td>
<td>Any Grade 12 U English A final grade of at least 75% is normally required. Any Grade 12 U Science A final grade of at least 75% is normally required. Any Grade 12 U Mathematics A final grade of at least 75% normally required. Three other U or M courses.</td>
<td></td>
<td>Admission Information Form (AIF).</td>
<td></td>
</tr>
<tr>
<td>Planning Co-op</td>
<td>Any Grade 12 U English A final grade of at least 75% is required. Five other U or M courses.</td>
<td>Grade 12 U or M courses from the following: Canadian and World Studies Mathematics Science, preferably Biology or Earth and Space Science.</td>
<td>Admission Information Form (AIF).</td>
<td>Those not admitted to the co-op program are automatically considered for the corresponding regular program. Limited admission to co-op is also available in Year Two. The first co-op work term begins in Year Two.</td>
</tr>
<tr>
<td>Faculty/Program</td>
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<tr>
<td><strong>Computational Mathematics</strong>&lt;br&gt;Regular and Co-op</td>
<td>Undergraduate first-year entry programs: All required courses are CSS Grade 12 U courses unless otherwise specified and must be included in the required set of 6. Required courses are included in the calculation of the admission average. Programs requiring prior university studies: Requirements are as listed.</td>
<td>Undergraduate first-year entry programs: Courses listed are CSS Grade 12 U courses unless otherwise specified and are not required for admission but are recommended because students may find this preparation useful during their university studies. Programs requiring prior university studies: Requirements are as listed.</td>
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<tr>
<td><strong>Computer Science</strong>&lt;br&gt;Regular and Co-op</td>
<td>Mathematics and Computer Science Joint Program&lt;br&gt;Mathematics and Computer Science Double Degree Co-op</td>
<td>Advanced Functions&lt;br&gt;Calculus and Vectors&lt;br&gt;Any Grade 12 U English&lt;br&gt;One other Grade 12 U course&lt;br&gt;Two other U or M courses</td>
<td>Admission Information Form (AIF) which includes a teacher reference. The AIF is required for Math/Chartered Accountancy, Math/Financial Analysis and Risk Management, Business Admin/Math, and other programs. For all other programs, the AIF is strongly recommended.</td>
<td>Admission Information Form (AIF) which includes a teacher reference. The AIF is required for Math/Chartered Accountancy, Math/Financial Analysis and Risk Management, Business Admin/Math, and other programs. For all other programs, the AIF is strongly recommended.</td>
</tr>
<tr>
<td><strong>Mathematics</strong>&lt;br&gt;Regular and Co-op</td>
<td>Mathematics&lt;br&gt;Mathematics/Chartered Accountancy&lt;br&gt;Mathematics/Business Administration&lt;br&gt;Mathematics/Financial Analysis and Risk Management&lt;br&gt;Business Administration and Mathematics&lt;br&gt;Computer Science&lt;br&gt;Double Degree&lt;br&gt;Business Administration and Computer Science Double Degree Co-op</td>
<td>Advanced Functions&lt;br&gt;Calculus and Vectors&lt;br&gt;Chemistry&lt;br&gt;Any Grade 12 U English&lt;br&gt;One of Biology or Physics&lt;br&gt;One other U or M course</td>
<td>Admission Information Form (AIF) which includes a teacher reference. The AIF is required for Math/Chartered Accountancy, Math/Financial Analysis and Risk Management, Business Admin/Math, and other programs. For all other programs, the AIF is strongly recommended.</td>
<td>Admission Information Form (AIF) which includes a teacher reference. The AIF is required for Math/Chartered Accountancy, Math/Financial Analysis and Risk Management, Business Admin/Math, and other programs. For all other programs, the AIF is strongly recommended.</td>
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### Mathematics
- **Computational Mathematics**
- **Computer Science**
- **Mathematics**
- **Mathematics/Chartered Accountancy**
- **Mathematics/Business Administration**
- **Mathematics/Financial Analysis and Risk Management**
- **Business Administration and Mathematics**
- **Computer Science**
- **Double Degree**
- **Business Administration and Computer Science Double Degree Co-op**

### BioInformatics
- **Regular and Co-op**

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**Senate Undergraduate Council Report to Senate - June 20, 2011**

**Attachment #1**

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**Jerome's application to St. Jerome's University**

**Jerome's academic factors considered include:**

- Participation in contests such as the Euclid Mathematics Contest and the Canadian Computing Competition.
- Involvement in extracurricular activities in the school and/or the community, and teacher recommendations.
- In addition to a strong academic background, other factors considered in the admissions process include performance in contests such as the Euclid Mathematics Contest and the Canadian Computing Competition.

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### Admission Requirements and Recommendations for Year One Programs 2012

<table>
<thead>
<tr>
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<tr>
<td>Undergraduate first-year entry programs:</td>
<td>All required courses are OSS Grade 12 U courses unless otherwise specified and must be included in the required set of 6. Required courses are included in the calculation of the admission average. Programs requiring prior university studies: Requirements are as listed.</td>
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<tbody>
<tr>
<td>Biotechnology/</td>
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<tr>
<td>Chartered Accountancy Co-op</td>
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<tr>
<td>Biotechnology/</td>
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<tr>
<td>Economics Co-op</td>
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<td>Regular</td>
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<td>Environmental Science</td>
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<tr>
<td>Regular and Co-op</td>
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<tr>
<td>Life Sciences</td>
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<tr>
<td>Regular and Co-op</td>
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<td>Physical Sciences</td>
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<td>Regular and Co-op</td>
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<tr>
<td>Science and Aviation</td>
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<tr>
<td>Regular</td>
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<tr>
<td>Science and Business</td>
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<tr>
<td>Regular and Co-op</td>
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<tr>
<td>(All specializations)</td>
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<tr>
<td>Optometry</td>
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</table>

Where an entry program is available co-op and regular, those not admitted to co-op are automatically considered for the corresponding regular program. In some programs, limited admission to co-op is possible in Year Two. The first co-op work term begins in Year Two for all Faculty of Science students.
## Admission Requirements and Recommendations for Year One Programs 2012

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<tbody>
<tr>
<td>Pharmacy Co-op</td>
<td>Successful completion of at least two full years of university-level science with specific course requirements</td>
<td>Letter of reference and personal statement which demonstrates sufficient practical experience and personal suitability are required</td>
<td>Please refer to the School of Pharmacy website regarding admission averages and required university-level courses.</td>
<td></td>
</tr>
<tr>
<td>Social Work - Regular Renison University College</td>
<td>Successful completion of either a three-year or a four-year undergraduate university degree with a B average and at least 6 0 units in the social sciences, including 18 specified courses from the senior curriculum or their equivalents.</td>
<td>Letter of reference and personal statement which demonstrates sufficient practical experience and personal suitability are required</td>
<td>Please refer to the Social Work website regarding required university-level courses.</td>
<td></td>
</tr>
<tr>
<td>Software Engineering (Co-op)</td>
<td>Advanced Functions • Calculus and Vectors • Chemistry • English (ENG4U) • Physics A final grade of at least 70% is normally required in each of these courses. • One other U or M course</td>
<td>Grade 11 U Introduction to Computer Science is highly recommended. Grade 12 U Computer Science would be an asset. Admission Information Form (AIF) is required. Experience in developing well-structured, modular programs is required. As demonstrated by at least one of the following: (1) strong performance in a programming course such as Grade 11 U Intro to Computer Science or Grade 12 U Computer Science or equivalent. (2) strong performance in a programming contest, such as the Canadian Computing Competition. (3) significant work experience. (4) other (must be explained on the Admission Information Form).</td>
<td>In addition to a strong academic background, other factors which will be considered in the admissions process include involvement in extra-curricular activities in school and/or the community; evidence of interest in software engineering, additional OSS Grade 12 courses; and participation in mathematics, science, engineering, or programming competitions. All applicants are encouraged to write the Euclid Mathematics Contest. Those not offered admission to Software Engineering may be considered for alternate engineering programs or for computer science; applicants specify their preferences for alternate programs on their Admission Information Form.</td>
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FACULTY OF SCIENCE NON-DEPARTMENTAL PROGRAMS

Review Process

This was the second review of a set of non-departmental programs in the Faculty of Science. The previous review took place in the fall of 2004. That review listed seven strategic initiatives that needed to be considered: investigate options for directing non-departmental programs; investigate options for more effective student advising; ensure space for non-departmental student clubs; increase the profile of some units so that students are aware of them before applying; consider replacing the Biotechnology/Economics program with a Biotechnology specialization in the Science and Business program; develop means of informing students about possible scholarships and awards; hold an annual meeting between the Associate Dean, Undergraduate Studies, and Co-operative Education and Career Services (CECS). All of these issues were acted upon.

For this self study two detailed electronic surveys were carried out; one of alumni and the other of students currently registered in non-departmental programs. The results of these surveys are included in the document.

The self study for this review was completed August 2010; the site visit was conducted December 6 and 7, 2010; the review team report was received January 25, 2011; and the Faculty’s and Dean’s responses were submitted April 25, 2011.

Characteristic of the Programs

Historical Overview

The Faculty of Science was established in 1959. At the time of this review it had 182 faculty members (62 full professors, 39 associate professors, 25 assistant professors, 11 lecturers) and 169 staff members. The Faculty’s annual research funding is approximately $47 million which is a third of the University of Waterloo’s (UW’s) total. As of January 2010, the Faculty had 4,302 undergraduates, 494 full-time graduate students and 18,000 alumni in 85 different countries.

The Faculty of Science offers a wide breadth and diversity of undergraduate programs. Academic programs in Biochemistry, Biology, Chemistry, Earth Sciences, and Physics are examples and are offered by one of four Departments in the Faculty, and most are available in both the regular and co-operative (co-op) system of study.

The Faculty of Science also offers a number of four-year Honours programs that are administered centrally by the Faculty of Science Undergraduate Office and are the subject of this review. They are:

- Biotechnology/Chartered Accountancy (co-op)
- Biotechnology/Economics (co-op)
- Computational Sciences (co-op and regular)
- Environmental Sciences/Ecology (co-op and regular)
- Science and Business (co-op and regular)
- Honours Science (regular)
- Three-Year General Science (regular)
- Joint Honours Science-Arts Major (BSc)
Other programs are offered through the Faculty of Science Undergraduate Studies Office such as Joint Honours Science (BSc), Bachelor of Independent Studies (BIS), and Science and Aviation. However, since no student has yet graduated from these programs they are not part of this review.

Biotechnology/Chartered Accountancy began in 1998-99 and is a joint undertaking of the School of Accountancy (renamed the School of Accounting and Finance) and the Faculty of Science. It is the only undergraduate science program that is cost-recovery. Since 2006 it has had higher than normal fees. The enhanced fees begin in Year 2 of the program. The Year 2 fees are $7,921 compared to $2,967 for Science regular and $3,558 for Science co-op.

The Biotechnology/Economics program began in 1999-2000. This program replaced the Honours Biology/Business Economics program that had existed since 1991.

The Computational Science program began in 2001-02. A Scientific Computing Option was available prior to this time but required fewer computing courses. It was discontinued in 2008-09 because it attracted few students.

The Environmental Sciences programs were introduced in 1991-92, as Environmental Sciences Program 1 and Environmental Sciences Program 2. Program 1 emphasized environmental impact assessment, environmental analysis, and water. Program 2 had an atmospheric science emphasis. Programs 1 and 2 became Environmental Program/Ecology Specialization and Environmental Program/Global Change Specialization respectively in 1998-99. In 2004, the Environmental Program/Ecology Specialization became the Environmental Sciences/Ecology program and the Environmental Program/Global Change Specialization was renamed Atmospherics and Planetary Sciences. This latter program was discontinued and re-emerged in 2008 as a specialization in Earth Sciences. The Environmental Sciences/Ecology program was discontinued in 2009-10, and in its place emerged two new departmental-based Environmental Sciences programs, one in Biology and the other in Earth and Environmental Sciences.

The Honours Science program came into existence under its current name in 1998. Its predecessor was Honours Science Program 1 (Non-Specialized) which had been in existence since 1973-74. The Program 1 designation was complemented by Programs 2 to 5 (majors in Biology, Chemistry, Earth Sciences, and Physics) but were eventually dropped.

The current Science and Business program, with or without options and with or without co-op, began in 1997-98. Previously the Honours Science and Business program without options had been in existence since 1985-86.

In 1999, the Joint Honours Science and Arts Major (BSc), where students had to meet the combined rules of the Science Honours program and the joint Honours rules of the Arts discipline, was approved.

The Three-Year General BSc has existed, with only minor variations, since the early 1960s.

The Faculty of Science recognizes that for many, a Science degree is a stepping stone to further post-secondary education, often focused on professional programs such as medicine, optometry, pharmacy, and dentistry. The preparation for professional school as well as the increasing interest in business-oriented careers and the desire to have flexible curricula have all led to increasing interest in non-departmental programs to the point where approximately a
third of the incoming students into the Faculty of Science in recent years has gravitated towards these programs.

Generally, students in all Honours programs can access, with few exceptions, most courses in Science.

Students in the first year of any non-departmental program are advised by four advisors in the Science Undergraduate Office and the Associate Dean, Undergraduate Studies. From second year onwards, only students in Honours Science, Three-Year General Science and Joint Honours programs are advised by the Science Undergraduate Office. The Associate Director of the Science and Business Resource Office serves the Biotechnology/Chartered Accountancy, the Biotechnology/Economics, and the Science and Business students, while faculty members in the Departments serve the other programs listed in the review.

Program Objectives

The Faculty of Science’s mission and vision, as of 2008 is:

The mission: As a community of scientists, the Faculty of Science is committed to transforming local and international education, discovery and knowledge transfer. The Faculty of Science is committed to teaching scientific knowledge in a manner that encourages academic excellence, creativity and the ability to address practical problems. Departmental/School curricula are designed to provide a balance between sound theoretical frameworks and practical expertise so that graduates of the Faculty are prepared to contribute broadly to the global scientific community and Canadian society and to engage in lifelong learning.

The vision: The vision is to be recognized globally as a preferred destination for students, researchers and partners seeking exceptional opportunities to learn and engage in scientific research, discovery and innovation.

The Faculty of Science has identified the following priority initiatives that will enable it to create the environment to attract and keep the calibre of talent it seeks in its students:

- Encourage innovative teaching in a variety of formats including creative use of technology
- Deliver a lively, state-of-the-art environment for learning with improved access to technology and teaching support staff
- Undertake continuous curriculum renewal to respond to the advancing nature of the disciplines
- Enhance recruitment efforts with emphasis on attracting the brightest, high quality graduate and undergraduate students with an appetite for discovery
- Increase the availability and diversity of financial support available to graduate and undergraduate students. Establish prestigious awards specific to Science students
- Foster excellent student life by providing support and space for engagement beyond the classroom
• Advance the quality of the student experience by improving access to faculty members and instructors in an environment well-resourced and conducive for learning science
• Develop new opportunities to increase graduate enrolment by the introduction of specialized career-based Master of Science programs in selected areas of expertise.

Academic Programs Offered

• BSc in Biotechnology/Chartered Accountancy (co-op)
• BSc in Biotechnology/Economics (co-op)
• BSc in Computational Science (regular and co-op)
• BSc in Environmental Sciences/Ecology (regular and co-op)
• BSc Honours Science (regular)
• BSc in Science and Business (regular and co-op [as of fall 2009 this program is solely co-op])
• BSc Three-Year General Science (regular)
• BSc Joint Science – Arts Major (regular and co-op)

Students

Since 2003 non-departmental programs have attracted 34% to 38% of all applicants to Science. Honours Science has consistently been the largest by a significant margin making 21% to 25% of the total applicant pool in Science as well as averaging about 18% of the first year incoming class. The Environmental Sciences program has not enjoyed much visibility, with an annual average pool since 2003 of 88 applicants, resulting in an annual average class size of 11 students. However, starting in fall 2010, it became a significantly revamped program with an enrolment of 24 confirmed students.

The Science and Business program has seen a decline in applicants and enrolment in the last few years. In 2007, there were 571 applicants of whom 115 entered first year. By 2009, the numbers had reduced to 454 applicants and 76 first-year students. Science and Business has been capped at 100 students, but for the last few years this target has not been reached.

The limited enrollment caps in the Biotechnology/Chartered Accountancy and Biotechnology/Economics programs together with the higher admission average requirements have allowed a higher degree of control of predicting and managing enrolment. The average admission numbers each year have been 25 in the Biotechnology/Economics program and 10 in the Biotechnology/Chartered Accountancy program.

The enrolment in Computational Sciences has been on a steady decline, from 27 students enrolled in 2003 to one in 2009.

Most (84% to 91%) of the applicants to UW’s Science programs since 2003 came from Ontario with only four to six per cent being international students.

Some of the strongest students academically admitted into the Faculty of Science enrol in non-departmental programs. Since 2003, the number of entering students having high school averages of 80% or better has been increasing from a low of 68% in 2004 to a high of 87% in
The large jump from 73% in 2007 to 84% in 2008 suggests that efforts made to increase the visibility of these programs were successful.

Over the period 2003 to 2009, 96.7%, 81%, 75.9%, 72.4%, and 61.2% of students admitted to Biotechnology/Chartered Accountancy, Biotechnology/Economics, Science and Business (co-op), Honours Science, and Science and Business (regular) respectively have had a high school average of 80% or better. The actual admission grades, averaged over 2003 to 2009 inclusive, for Biotechnology/Chartered Accountancy, Biotechnology/Economics, Science and Business (co-op), Honours Science, and Science and Business (regular) were 94%, 87.5%, 84.1%, 84%, and 82.8% respectively.

UW has significantly increased the number of entrance scholarships awarded to incoming students since the last review of non-departmental programs. In 2003, there were 11 awards totalling $15,500 for students entering non-departmental programs. This increased to 203 awards, totalling $226,250, in 2009. Most of these awards were in the $1,000 to $2,000 range.

Because of enrollment caps and different admission requirements there is a cascading deflection system in the Faculty of Science in non-departmental programs from Biotechnology/Chartered Accountancy to Biotechnology/Economics to Science and Business to Honours Science. Many deflected students, to the extent possible, effectively “shadow” his/her desired program from within the Honours Science program.

Students enrolling at the beginning of their studies are not normally admitted to the Three-Year General Science program but could be placed there if they have not met the requirements to remain in an Honours program. However, students are admitted to this program if they are taking the degree fully online. Many of these students are mature students who require a degree for a variety of purposes. A third category is students who chose to graduate because they are fast tracking to professional schools.

Over the period 2003 to 2009 inclusive, 2,283 students, 34% of all students entering the Faculty of Science, enrolled in non-departmental programs. Of these 2,283, 53.7% entered Honours Science; 30.4% entered Science and Business; 6.8% entered Biotechnology/Economics; and the remaining 9.1% were distributed over the Environmental Sciences/Ecology, Biotechnology/Chartered Accountancy, and Computational Science programs. On average, less than 20 students enrol annually in the latter three programs.

Since 2005, Science has focussed much of its energy on internationalization on its China 2 + 2 program, where a number of top ranked Chinese universities have partnered with Science. Some of these students have been attracted to the non-departmental programs. Two China 2 + 2 students entered non-departmental programs in 2005 and the number has increased to 12 in 2008 and 13 in 2009.

For the 2009-10 academic year, non-departmental co-op programs enrolled 400 plus students making up approximately 27% of all Science co-op students, and enrolled about 1,100 regular students who make up 40% of all regular students in the Faculty of Science.

The average first year science class is 180 students, and a first year lab is 35 students.

For the three terms, spring 2009 to winter 2010 inclusive, the total student enrollment count in co-op programs in the Faculty of Science was 3,960, of which 26.6% was in non-departmental programs.
Co-op placements have been mainly in the Greater Toronto Area, Waterloo, and elsewhere in Ontario. A small number of placements have occurred elsewhere in Canada and overseas in such countries as Pakistan, India, and China.

Over the period 2005 to 2009 inclusive, co-op employers ranked over 90% of non-departmental program co-op students as “good” or better. Approximately 70% of senior co-op students in Biotechnology/Economics, Science and Business, Computational Science, and Environmental Sciences/Ecology were ranked as “excellent” or “outstanding” by their co-op employers over the period 2005-09. On the other hand, only 38.5% of Biotechnology/Chartered Accountancy senior co-op students were ranked “excellent” or ‘outstanding”. At the junior co-op level, 68.4% of Biotechnology/Economics students, 62.8% of Science and Business students, 50% of Environmental Sciences/Ecology students, 42.1% of Computational Science students, and 31.4% of Biotechnology/Chartered Accountancy students were ranked as “excellent” or “outstanding”.

Most co-op placements, over the period 2005-09, were ranked by the co-op students as 7 or better on a 10-point scale where 10 is the highest. Ninety per cent of senior and junior students in Biotechnology/Chartered Accountancy ranked their placements as 7 or better while approximately 80% of students in the Biotechnology/Economics, Science and Business, and Computational Science programs gave a ranking of 7 or better. Only approximately 73% of Environmental Sciences/Ecology co-op students ranked their placements as 7 or better.

From spring term 2004 to fall term 2009 inclusive, Biotechnology/Chartered Accountancy co-op students had 100% employment every term. Over the same time period, Environmental Sciences/Ecology, Science and Business, and Computational Science had co-op placement rates of 98.5%, 96.3%, and 96% respectively. Although Biotechnology/Economics had a placement rate for fall and winter terms over the same period of 98%, the rate for the spring term fell to 87%.

Upper year non-departmental program students had access to 138 awards totalling $186,734 in 2003-04. This number increased to 161 awards in 2009-10 totalling $227,898.

Even though students from non-departmental programs make up about 36% of the full-time and well over half of the part-time students in the Faculty, on average they attract only about 25% of the scholarship funding and about 17% of the bursary funding. This discrepancy is hard to explain.

Most students complete their degree in the expected time frame – four years for an Honours Regular program and five for a co-op program.

Considering the 2003-04 student cohort, a low of 76% of students from the Honours Science program and a high of 93% of students from the Environmental Sciences/Ecology program ended up with a degree at the end of their studies. The high number of students withdrawing from Honours Science program could in part be explained by students leaving to pursue professional studies.

The average annual number of students graduating from non-departmental programs, from 2003 to 2009 inclusive, was 150 of whom 14% were on the Dean’s Honours List. The Biotechnology/Chartered Accountancy program graduated 54 students of whom 61.1% were in the Dean’s Honours List. Similar data for the other programs over the same time period were: Biotechnology/Economics with 26 graduates of whom 15% were on the Dean’s Honours List;
Computational Science, over six years, graduated 44 students with 25% on the Dean’s Honours List; Environmental Sciences/Ecology had 54 graduates of whom 9.2% were on the Dean’s Honours List; Honours Science had 845 graduates with 11.7% on the Dean’s Honours List; and Science and Business graduated 362 students of whom 27.6% were on the Dean’s Honours List.

An email survey of current students in non-departmental programs was conducted. Emails were sent to 1,810 students and 186 (10%) responded. Most responses (35.8%) came from Honours Science students followed by Science and Business students (27.7%), and 10.4% from Three-Year General Science students. The remainder of responses (26.8%) came from students from seven different plans. Of the 186 responses, 60.8% came from second and third year students and 18.8% from students of fourth year and beyond.

Most current students in evaluating departmental-based courses, Faculty offered Science labelled courses, and Science and Business workshop courses rated Biology and Earth Sciences courses highest. On a 5-point scale where 5 is the highest, 74% and 66% of students gave a 4 or 5 to the Biology and Earth Sciences courses respectively. Physics courses, on the other hand, had only 41% of students rating them as a 4 or 5.

Biology and Earth Sciences instructors were considered the best in the Faculty at conveying key topics effectively while Physics instructors had a lower score.

Students considered the Physics labs to be substandard in quality. Physics, in response to this problem, has undertaken a major overall of its undergraduate curriculum.

The overall appraisal of the quality of the courses offered by the Faculty of Science is generally encouraging, given that more than 50% gave a combined rating of 4 and 5 for all course types, except for those of Physics. In addition, most students found their courses to be intellectually challenging, with Chemistry and Physics courses judged the most challenging.

Student satisfaction with the co-op process, variety of positions, and quality of co-op placements were generally positive with ratings of 4 and 5 out of 5 being submitted by 41%, 48%, and 48% of students respectively.

Professional Development (PD) courses were not judged positively.

Students were asked what their career aspirations were. Thirty-three per cent indicated an interest in pursuing training in a professional program such as medicine, pharmacy, optometry, dentistry, and accountancy. Only 21% intended to enter the work force immediately and only 19% indicated an interest in pursuing graduate studies.

At least one third of students indicated that the following skills had been “improved” or “significantly improved” as a result of their experience in the Faculty of Science. The skills are: oral communication; written communication; time management; leadership; computing; problem solving; creative thinking; critical judgment/analysis; and team work. Those that were developed and improved the most were time management, problem solving, and critical judgment/analysis.

Another survey was emailed to all alumni who graduated from Science in the period 2005-09 for whom there were good email addresses. Of those who responded, 233 graduated from non-departmental programs.
Of these 233 graduates, 26% and 24% had pursued graduate studies or a professional school respectively at some time after receiving their BSc degree. The participation rate in graduate studies by alumni from non-departmental programs is about half that from Science departmental programs (52%). On the other hand, the participation rate for professional studies is about the same for both groups.

The highest participation in graduate study was from Biotechnology/Economics graduates (50%) followed by Science and Business (34%). Most Biotechnology/Chartered Accountancy alumni followed their BSc immediately afterwards by enrolling in a Master of Accountancy or a MSc program, the latter typically being in Biology or Biochemistry.

The highest participation on professional study by alumni from non-departmental programs was from Honours Science and Environmental Sciences/Ecology programs – 63% and 31% respectively. 29% of alumni from the Three-Year General program entered professional studies.

With the exception of the Three-Year General program, the majority of Science alumni from non-departmental programs indicate that their current jobs are “closely related” or “somewhat related” to their Science undergraduate program. The percentages varied from 100% for Biotechnology/Chartered Accountancy alumni to 62% for alumni from Honours Science. Less than half (41%) of alumni of the Three-Year General program had a current position that was “related” or “somewhat related” to their undergraduate program.

Most of the rest of the survey focused on educational outcomes. Most alumni from non-departmental programs agreed that their UW Science education had given them a) a general understanding of the key concepts and methodologies of their discipline; b) computer skills; c) the ability to use scholarly reviews and primary scientific data; d) problem solving skills; e) the ability to communicate both orally and in writing in their scientific discipline; f) an understanding of the limits of their knowledge; g) the tools and attitudes to become lifelong and independent learners.

The positive responses to the survey questions indicate that their undergraduate education had been far more valuable than simply learning technical competencies in preparation for a career.

Those who had graduated with a co-op degree agreed that the co-op experience had a) clarified their academic and career goals; b) given them enhanced skills related to their career goals; c) provided the opportunity to learn from professionals in a specific field; d) provided the opportunity to integrate academic and work experience to improve their post-graduation employment opportunities.

Summary of Surveys

From these two surveys 14 initiatives to improve the non-departmental programs emerged

Initiative 1: Develop a wider variety of courses especially in the spring term.

Initiative 2: Commit to better-maintained, more up-to-date laboratories, and more hands-on lab experience.

Response: Initiatives 1 and 2 above are wholly dependent on human and financial resources, and in the current economic climate, maintaining the current offerings and the effectiveness of
laboratory experience is a top priority. When the opportunity presents itself, more courses and more offerings will be pursued.

**Initiative 3:** Make more career advice available.

*Response:* The Centre for Career Action has recently partnered with the Faculty of Science to carry out a one-year duration pilot project to increase its exposure to Science students—a initiative that is certainly timely and that promises to greatly benefit students from non-departmental programs.

**Initiative 4:** CECS should be encouraged to explore jobs for regular students.

*Response:* A recommendation to explore effective strategies to track the summer and permanent employment paths of the regular Science students will be brought by the Associate Dean of Science, Undergraduate Studies, to the attention of the Director of the Centre for Career Action for discussion during the spring 2011 term.

**Initiative 5:** Strive for small class sizes.

**Initiative 6:** Reduce the use of multiple-choice question examinations.

**Initiative 7:** Provide more opportunities for oral and written communication.

*Response:* Initiatives 5 to 7 all result from the high student/instructor ratio. In the current economic climate, there is no realistic prospect that the above issues can be easily remedied. Nevertheless, Science instructors continue to find creative ways to enhance the classroom experience and the Faculty of Science fully expects this to continue indefinitely.

**Initiative 8:** Encourage higher teaching quality and commitment from instructors.

*Response:* The Dean, and the Chairs and Directors of the various Departments and Schools in Science continue to encourage faculty members, lecturers, and instructors to aspire to excellent teaching. The Associate Dean of Science, Undergraduate Studies, will encourage Departments in Science during a spring 2011 Administrative Committee meeting to consider developing departmental teaching awards, which could also serve to identify nominees for the Excellence in Science Teaching Award competition.

**Initiative 9:** Improve the command of English of instructors and teaching assistants.

*Response:* Chairs and Directors in Science remain sensitive to this issue and there is no reason to suggest this will not be the case going forward.

**Initiative 10:** Create more awareness of Science at UW to the outside world.

*Response:* The Associate Dean of Science, Undergraduate Studies, continues to engage in productive discussions with the Centre for Career Action. The awareness-building will be progressive as both Science students and the Centre for Career Action staff interact over time.

**Initiative 11:** Expose undergraduate students in their courses to more primary scientific literature.

**Initiative 12:** Provide more opportunities to develop leadership skills.
Initiative 13: Develop more opportunities to develop the feeling of community within Science.

Response: Some of the above recommendations were also made in the previous self study, but progress has been limited. There are some intractable issues that are directly tied to fiscal controls and a very busy professoriate. The Faculty of Science is keenly aware of these issues and is committed to being as responsive as possible.

Initiative 14: Review whether the co-op professional development courses are meeting their objectives.

Response: Review of the WatPD courses will be undertaken on an ongoing basis as part of the institutional commitment to being a leader in experiential learning.

Program specific issues that were derived from the two surveys are as follows:

Biotechnology/Chartered Accountancy

Initiative 15: Add more biotechnology courses in the senior year.

Response: There is no flexibility to follow through on this recommendation, for the reasons stated above.

Biotechnology/Economics

Initiative 16: Expose students to pharmaceutical technology through the School of Pharmacy.

Response: There has already been and there continues to be discussions occurring between Pharmacy and Science’s various biotechnology programs concerning the development of new courses.

Initiative 17: Integrate Biotechnology and Economics more effectively.

Response: The integration of the two disciplines is an ongoing concern, and the Associate Director of the Science and Business program is committed to improve the situation, which is most readily addressed through coordination of the content of the workshop courses.

Initiative 18: Distinguish the program from that of Science and Business.

Response: The recruitment literature and other communications’ initiatives make the distinction between the two programs clear. Students wishing more flexibility are guided to the Science and Business program.

Initiative 19: Offer more electives.

Response: The Biotechnology/Economics program has limited potential to increase the number of electives due to its multidisciplinary nature focussed in Biotechnology and Economics.

Computational Science

Initiative 20: Re-assess the curriculum requirement of exposure to three different sciences.

Initiative 21: Strive to increase enrolment.
Response: The above initiatives are moot in light of the decision to deactivate the Computational Science program.

*Environmental Sciences/Ecology*

*Initiative 22:* Articulate more clearly the programs learning outcomes.

*Response:* This program has been discontinued.

*Honours Science*

*Initiative 23:* Explore the feasibility of having a co-op stream in the program.

*Response:* CECS is currently handling the highest number of co-op students in Waterloo’s history, a challenge made even more daunting in light of the current economic climate. Although a co-op Honours Science would be an attractive addition to the Faculty’s offerings, moving forward with this initiative at this time is unrealistic.

*Faculty*

The average annual undergraduate course load for faculty members is approximately three term courses although the course load does vary across the Faculty.

Because most instructors for non-departmental program courses are housed in the four Departments of the Faculty they are reviewed when their home Departments are evaluated. Therefore they are not included in this report.

*Overall Comments by Review Team*

The overall impression gained by the review team during the site visit is that the non-departmental programs in the Faculty of Science are functioning very well. Students from seven of the non-departmental programs reviewed expressed overall satisfaction with their program and the recommendations presented below are not intended to correct major failings but to further enhance the student experience.

The reviewers applaud in particular the strong spirit of co-operation that seems to exist between academic Departments as this appears to facilitate the successful implementation of extremely flexible non-departmental programs such as Honours Science, as well as tightly prescribed programs such as Biotechnology/Chartered Accountancy. Given the importance of developing effective approaches to interdisciplinary education, especially in science where increasing societal complexity requires graduates with a range of scientific tools and skills, the Faculty of Science has successfully explored a range of options. The creation and implementation of programs and systems that facilitate the mobility of students and provide access to a wide range of courses and individually tailored programs is commendable. Processes have been developed to accommodate issues such as oscillations in course enrolment. The Associate Dean for Undergraduate Studies and staff deserve credit for the design and implementation of effective administrative structures that allow efficient management of these programs.

In response to the question of adequate resourcing of non-departmental program students, the review team feels that overall these students are treated in a similar way to all other students in the Faculty. However, given the flexibility of course choice and difficulty of tracking students...
in both the Honours Science and General Science programs, additional resources could be provided to the Associate Dean’s office to enhance counselling and guidance for these students.

**Concerns/Opportunities for Improvement**

Each of the programs examined as part of the review process will be addressed individually.

**Biotechnology/Chartered Accountancy**

The major strength of this program is that it offers students a unique opportunity to prepare themselves for careers as chartered accountants in the growing science and technology business sector.

Student reactions to the program are generally positive. They enjoy the combination of accountancy and science classes identifying the variety in course content as a positive aspect of the program. They also value the opportunity to explore both discipline areas as they decide on their future career preferences. However, the Biotechnology/Chartered Accountancy program is very tightly prescribed and there are few options for elective choices. Some students feel that the program emphasizes chartered accountancy more than science but others are satisfied with the balance between components. The small size of the program is viewed as both a benefit and a drawback. The benefit is that students develop very close relationships with their peer group, but feel that they “fall through the cracks” when it comes to course scheduling and exam timetabling. An imbalance between chartered accountancy and science courses in any one term is viewed as a problem.

*Recommendation 1:* Introduce a peer mentorship program whereby senior students interact and mentor junior students in the program.

*Response:* The Associate Director of the Science and Business program will monitor the implementation of a mentoring program and report on its success to the Science undergraduate studies Committee at the start of the fall 2012 term.

*Recommendation 2:* Establish an annual event early in the academic year during which students in all years can meet with each other and also with instructors and advisors.

*Response:* The Associate Director of the Science and Business program will develop a plan (student committee? focus group? etc.) to understand why Biotechnology/Chartered Accountancy and Biotechnology/Economics students believe networking with peers and alumni is insufficient, and remedy the situation.

**Biotechnology/Economics**

The combination of Biotechnology with Economics in an undergraduate science program is unique and very relevant given the inherent connection between the two discipline areas. The major strength of this program is that it provides students with an integrated education in the fields of biotechnology and the business field of economics, in preparation for careers in the expanding field of biotechnology.

Feedback from students currently registered in the Biotechnology/Economics program identified positive aspects of the program as:

- The challenges the program provides: this is not run-of-the-mill science.
• Workshops – which are great for developing soft skills.
• Strong network of students.

Students identified the following areas for improvement:

• There should be more mathematical/quantitative skills development in early years of the program. Biostatistics course could be replaced by a Math course as students currently cover statistics in three courses (introductory statistics, economic statistics, biostatistics).
• Teaching and delivery of workshops have changed (upper-level workshops) and students feel there is a duplication of the material already covered in lower years.
• There is a need to examine case studies in areas other than pharmaceuticals; applications are also important in environmental and agri-business fields, and students would like to know more about these applications.
• There is a need to include ethical issues related to biotechnology in the program.
• Resources: Students need more career advice and feel second rate to Biotech/CA. They would benefit from introduction of a mentorship program.

Recommendation 3: Introduce peer-peer mentorship program and create more opportunities for interactions with alumni.

Response: The Associate Director of the Science and Business program, assisted by the Science Student Success Officer, will develop a plan to establish a Biotechnology/Economics peer mentoring program early in the fall 2011 term.

Recommendation 4: Review program content to enhance quantitative skills of students prior to third year.

Recommendation 5: Incorporate more explicit discussion/coverage of ethics’ issues.

Response: The Associate Director of the Science and Business program will strike an advisory committee at the start of the fall 2011 term to review the structure, content, and anticipated outcomes of the Biotechnology/Economics program and bring forward to Science Undergraduate Studies Committee in the December 2011 meeting, a proposal for any changes, if warranted.

Computational Science (regular and co-operative)
The major strength of this program is that it offers students an opportunity to learn and apply their computational skills within selected fields of science. For the few students who do enter the program it provides an appropriate integration of computational and discipline-specific learning and, for some, the program provides the tools and background to progress to graduate level study. Most students select this program for the opportunities it provides to take Computer Science courses that they would otherwise be unable to take.

One of the major issues to address with this program is that it attracts few students. There may be several reasons for the observed reduction in student enrolment including the recent change to a common entry point for science students that may reduce the visibility of the program to incoming students, and the program name which is not easy to differentiate from Computer Science programs offered by the Faculty of Mathematics. Marketing of this program
to high school students may not be very effective because of the lack of clarity of the program name.

Feedback from students currently registered in the Computational Science program identified positive aspects of the program as:

- The close relationship with the program advisors who are senior faculty. They feel like “first class citizens”.
- The program meets their individual needs and allows them entry into computer science courses.
- The program allows students to take a science program without having to do labs, and the program provides appropriate non-lab-based co-op opportunities.

The challenges faced by students in the program include:

- Dealing with course conflicts and scheduling issues, particularly with computer science courses.
- Difficulty of integrating the computer science and science cultures.
- Lack of interaction with other students in the program.

Although the Computational Science program does appear to address the needs of the few students currently in the program, the low enrollment raises the question as to the viability of this program in the long term. That said, the program does not appear to require any additional faculty resources, other than guidance and advisement of students.

Recommendation 6: The Faculty of Science should explore a number of options for the Computational Science program including (i) termination of the program, (ii) alternate modes of delivery (as an Option or Minor), and (iii) advertisement and careful revision of the program structure and/or content. The latter option is particularly relevant given recent changes to the Physics curriculum in areas of Computational Science.

Response: Inactivate the Computational Science program prior to the next admissions cycle. Students currently enrolled in the program will be allowed to graduate from this program.

Recommendation 7: The Faculty should consider a name change for the Computational Science program to more clearly reflect the program content and differentiate it from Computer Science.

Response: The above recommendation is moot in light of the response to recommendation 6.

Environmental Sciences/Ecology (regular and co-operative)

The recent changes to the Environmental Science program have enhanced connections between discipline areas, improved scheduling and continuity between different levels of the program. These changes will better prepare students for future careers in the multi-disciplinary environmental sciences fields as well as enhance the numbers of students attracted to these programs.

Feedback from students currently registered in the Environmental Sciences programs identified the following positive aspect of the program:
• The diversity of learning opportunities in the program and co-op opportunities.

The challenges faced by students in the program include:
• Scheduling of courses is really difficult, particularly in first year when lab work is particularly heavy.
• Program structure leaves little room to do a Minor unless summer courses are taken.
• Lack of association with any one area or department; for example, students are excluded from the Biology student society.
• The website should be enhanced to help students find appropriate information.

Substantial changes to the Environmental Sciences program offered by the Faculty of Science have already been made and should result in enhanced quality and increased enrolment. However, the review team recommends that the following issues should be considered:

**Recommendation 8:** Enhance promotion and advertisement of the new Environmental Science/Ecology Specialization and Environmental Sciences/Geoscience Specialization programs within the University and to high school students.

**Response:** Environmental Science Directors in the Department of Biology and the Department of Earth and Environmental Sciences, together with the Coordinator of Recruiting and Marketing, will meet to review current plans to promote the new Environmental Science programs and to explore additional ways to enhance promotion. New initiatives should be complementary to and seamless with existing recruitment activities, the meeting should occur at least annually and should inform ongoing efforts to attract healthy enrolments in the Environmental Science programs.

**Recommendation 9:** Assist students in the development of an Environmental Science student society.

**Response:** Environmental Science Directors in the Department of Biology and the Department of Earth and Environmental Sciences will convene a meeting with all Environmental Sciences students to explore potential strategies to address their needs and interests. This meeting will occur in the fall 2011 term and strategies will be implemented as early as possible. The Directors will report progress to the Science Undergraduate Studies Committee at the November 2011 meeting.

**Honours Science**

The Honours Science program is aimed toward students who are interested in a flexible science program that allows them to tailor their course selection according to their individual needs and interests. As there are few courses with program-based enrolment restrictions, many Honours Science students choose to “shadow” departmental programs without having to take all of the courses prescribed for a Major. This provides a great deal of flexibility for the students and allows them to comfortably select courses from different discipline areas as long as they fulfill any prerequisite requirements. The program is particularly attractive to students who are unsure of the area of science in which they want to focus when they enter University and also to students who intend to enroll in professional schools.

Feedback from students currently registered in the Honours Science program identified positive aspects of the program as:
• Flexibility – the program allows students to gain all prerequisites necessary for post graduate programs as efficiently as possible.
• Ownership - students are able to design and plan their own program.
• Overall – “the program is great”.

The challenges faced by students in the program include:
• Students in departmental programs are perceived to be preferentially selected for employment opportunities in labs. Honours Science students do not have the opportunity to gain employment experience through co-op placements.
• Lack of career advice. Honours Science students feel that the career advice and job opportunities provided for them are inadequate.
• Lack of program information for prospective/incoming students. The flexibility of the program can be confusing for students as there is a seemingly endless number of course choices.
• Inadequate opportunities to conduct research and to develop professional relationships with faculty in upper years of the program.

Overall the Honours Science program seems to be running very well and students and faculty members are satisfied with the structure, organization, and delivery of the program. The following recommendations should be viewed as means to enhance the quality of the educational experiences.

**Recommendation 10:** Enhance opportunities for student-faculty interactions within the program. First-year students would benefit from an informal/social event at which they could meet and talk with professors from different discipline areas.

**Recommendation 11:** Enhance opportunities for peer-to-peer interactions throughout the program.

**Response:** The Faculty’s Student Success Officer will develop a mentoring program for Honours Science students early in the fall 2011 term. In addition the Student Success Officer with the Science Society Executive will coordinate a campaign to encourage honours Science and Three-Year General Science students to form a student club.

**Recommendation 12:** Create a senior level research-oriented course or workshop that all Honours Science students must take. This course/workshop would create a “capstone” experience for Honours Science students.

**Response:** The Associate Dean of Science, Undergraduate Studies, will establish a task force to explore the feasibility of a capstone experience for Honours Science students. This task force will be assembled at the start of the fall 2011 term. The Associate Dean will report the findings of the task force to the Science Undergraduate Studies Committee no later than the December 2011 meeting, and if feasible, develop plans to offer the capstone course at the earliest time possible.

**Recommendation 13:** Introduce a mandatory annual meeting for each student with a program advisor.
Response: In the spring 2011 term, the Academic Services and Admissions Officer in the Science Undergraduate Office will assess the feasibility of developing and implementing a strategy to ensure that in the first year of the program. All first-year Honours Science students meet with an academic advisor, or at least become aware of certain serious situations when they should speak with an advisor. If feasible, implementation will begin in the fall 2011 term.

Science and Business

One of the strengths of the Science and Business program is in the opportunities it provides for students to develop their interests in science while at the same time develop expertise in the field of business. However, perhaps the greatest strength is the series of workshops that form the “core” of the program opportunity and allow students to progressively learn and develop practical skills. These workshops employ a case study methodology and are run by faculty or adjunct faculty members that are practicing business professionals. A recent graduate of the Science and Business program is hired on an annual contract each year as a project manager to assist with the running of the program and with outreach activities that include the creation of three magazines per year written by students and sent to alumna, high schools, and businesses. Selected undergraduate students are also identified as “Program Ambassadors” who provide peer-to-peer guidance for junior students.

One of the greatest challenges faced by the Science and Business program is the recent decline in enrolment.

Feedback from students currently registered in the Science and Business program identified positive aspects of the program as:

- The opportunity to combine science and business in a co-op program provides added “marketability” upon graduation.
- Workshops are viewed by students as the most valuable aspect of their program.
- The “community feel” of the Science and Business program – opportunities to develop personal connections with peers and professors are highly valued.
- The Associate Director of the program provides caring oversight of the program.

The challenges faced by students in the program include:

- The imbalance between science and business content which emphasizes science in the first two years of the program.
- Scheduling elective courses to obtain a Minor.
- Scheduling exams for courses offered by two Faculties.

Overall the Science and Business program seems to be running very well and students and faculty are satisfied with the structure, organization, and delivery of the program. The greatest challenge to the future success of the program is in student recruitment and the following recommendations focus on this issue.

Recommendation 14: Substantially enhance promotion of the program to prospective high school students. Program Ambassadors may be encouraged to make visits to high schools, talking to both science and business classes.
Response: The Associate Director of the Science and Business program and the Coordinator for Recruiting and Marketing will explore the feasibility of an on-campus experience for prospective Science and Business students. A plan will be developed by early in the fall 2011 term, for implementation at the appropriate time in the recruiting cycle.

Recommendation 15: Increase visibility of the program on the University website.

Response: Science will continue to participate fully in ongoing efforts to coordinate and market “X” and Business programs across campus. The Associate Director will periodically report progress to the Science Undergraduate Studies Committee.

Recommendation 16: Survey current Science and Business students to identify what attracted them to the program and to identify possible barriers to recruitment.

Response: The Associate Director of the Science and Business program, with the assistance of the Coordinator of Recruiting and Marketing, will develop a survey or bring together a focus group to explore possible barriers to more successful recruitment into the Science and Business program. This information gathering should take place in mid-June. The results of this initiative will be reported to Science Undergraduate Studies Committee at the December 2011 meeting, and a strategy to use this information will be developed for the recruitment process early in the winter 2012 term for the earliest possible implementation into the next recruitment cycle.

Recommendation 17: Assess the impact of the co-op only option on recruitment.

Response: Students once again will be admitted to a regular version of the Science and Business program starting in the fall 2011 term.

Three-Year General Science
The strength of the Three-Year General Science program is that it serves a variety of purposes. It allows students the flexibility to work towards a science degree on a part-time basis, fully or in part through the Online Learning system. This is beneficial to individuals who are already in the workforce and wish to enhance their academic standing or change career paths. It also provides a valuable “shadow” their Honours program by taking the appropriate courses and then apply for readmission to Honours when their grades improve. The Three-Year General Science program also allows students continuing on to professional schools to obtain a University of Waterloo degree and become alumni.

The strengths of this program also impose challenges to the successful administration and support of the program. The student body is very diverse and constantly changing and has a broad range of needs.

Feedback from students currently registered in the General Science program identified the following positive aspect of the program:

- It provides the opportunity to stay at the university while working to get back into an honours program.

The challenges faced by students in the program include:
• Obtaining appropriate information about the requirements of the General Science program and the processes that need to be followed to get admission to courses, to transfer course credits, and to obtain course overrides.
• Inadequate information regarding the organization of courses and course loads.
• The perception that General Science students are third-class citizens and do not get the same level of attention that other students do.

Overall the structure and organization of the Three-Year General Science program is working well and it accomplishes what is required of the program by the diverse group of students it serves. However, some enhancements to the administration of the program are recommended.

Recommendation 18: Appoint a General Science Advisor responsible for the advisement and guidance of students in the program.

Response: The Associate Dean of Science, Undergraduate Studies, along with the Academic Services and Admissions Officer, will review the structure of advisement responsibilities associated with the Three-Year General Science program. This review will occur prior to the fall 2011 term, and any changes that result will be implemented no later than the beginning of the fall 2011 term.

Recommendation 19: Establish a pro-active system of communication with General Science students to inform them of issues such as changes to their academic status, re-admission processes, and courses and course load options available to them.

Recommendation 20: Inform students in all Faculty of Science programs of options available to them to take reduced course loads to enable them to work effectively.

Response: The Academic Services and Admissions Officer, in consultation with the Associate Dean of Science, Undergraduate Studies, will develop a web page that expressly discusses many of the issues that appear to be especially relevant to students in the Three-Year General Science program. Much of this information is already available on the web, and this information could be captures and amplified so that it becomes more specific to the Three-Year General Science program. Development of the web page will be complete by the end of the fall 2011 term.

Recommendation 21: Identify ways to enhance the perceived status of General Science students within the Faculty.

Response: The Faculty’s Student Success Officer will develop a peer mentoring program for Three-Year General Science students early in the fall 2011 term. This initiative could piggy back on the development proposed above for the Honours Science program.

Joint Science-Arts Major

The review committee examined the information provided in the “Self Study Report” but did not speak to any joint Science-Arts Honours students. The data clearly indicate that joint programs meet the aspiration and needs of many students. Students seem able to navigate between the two components of their programs.

Recommendation 22: The Faculty of Science maintains support for students who aspire to a joint program.
Response: The Faculty of Science will continue to support students in their pursuit of joint programs involving an Arts major.

Administration of Non-Departmental Programs

The review team considers that Dr. Coniglio, the Associate Dean of Undergraduate Studies in the Faculty of Science should be commended for his interest in, and dedication to, developing and maintaining the most effective learning experience possible for the non-departmental program students in the Faculty of Science. The review committee found a strong team ethos among the persons who support the work of the Associate Dean for Undergraduate Studies. This team deserves credit for effectively administering to the needs of Non-Departmental Program students, as there are some differences when compared to departmental students. For instance, staff members recognize and provide support for the greater flexibility that Non-Departmental Programs students require. Among the more problematic aspects that the team has to deal with are tracking student progress and encouraging students who involuntarily have been moved to the General Science program. Although the advisory group is proactive in dealing with such students, it is often difficult to follow-up because of the reticence of these students. It appears that current business systems force people in the Associate Dean’s operation to do a substantial amount of manual tracking and to intervene to get students into appropriate courses.

Recommendation 23: Provide more resources to the Associate Dean for Undergraduate Studies. A careful analysis of workloads of the Academic Services Advisors should be made. If the analysis shows that these advisors are overburdened, then steps should be undertaken to hire additional personnel.

Response: The Faculty of Science will soon be hiring a Science Student Success Officer (SSSO) to support student success in all of its forms. The SSSO will be charged with developing and implementing Faculty-level success initiatives, as well as participating in institutionally-developed initiatives from the central Student Success Office. This position will be operational in the spring 2011 term.
Two Year Progress Report - Department of Geography and Environmental Management

Overview

As part of its 2007 Strategic Plan, the Department of Geography and Environmental Management identified a number of initiatives and activities that would be the focus of its efforts over the subsequent seven years. The department’s name was changed from Department of Geography to The Department of Geography and Environmental Management (GEM). The new name reflects the department’s focus on the human, physical, and technical dimensions of environmental management.

Academic Plans

The department offers numerous undergraduate plans in Geography and Environmental Management - BES (honours co-op, honours regular, and 3yr general), Geography and Environmental Management in Arts - BA (honours co-op, honours regular, honours - Arts and Business regular, general), Geomatics (honours co-op and regular) and Geography and Aviation, as well as additional minors, specializations, options, and 2+2 programs with international partners. At the graduate level, the department offers MA, MES, MSc, and PhD degrees in partnership with the Department of Geography and Environmental Studies at Wilfrid Laurier University, through the Waterloo-Laurier Graduate Program in Geography. GEM also offers an MAES degree in Tourism Policy and Planning through a partnership with the Department of Recreation and Leisure Studies at UW.

Faculty Renewal

The overall faculty complement in GEM has not changed appreciably over the past few years, with a current FTE of 20.9. The department has made two new appointments to replace retirements. In November 2008, a lecturer was appointed to a three year term in the department to teach courses in Geographic Information Systems within the GEM and Geomatics plans. It will be important to ensure that this teaching capacity is maintained at the end of the appointment. In September 2010, an assistant professor was appointed to the SHARCNET Chair in Geomatics, a two year research chair position focussed on the development and application of global climate models to the study of climate change impacts and adaptations. This position will transition into a regular tenure-track appointment at the conclusion of the two year research chair period.

Addressing Goals from the Program Review

In the last couple of years, the department has undertaken a number of initiatives designed to address the goals that were outlined in the 2007 program review. In 2007-08 the department undertook an undergraduate curriculum review for content and learning objectives, with a focus on key competencies as outlined by UW and provincial documents. The review resulted in a number of refinements to course offerings in each of the department’s undergraduate specializations. Ongoing adjustments to the curriculum are made each year, as issues arise.

The department has also been working to build the new plans in both Geomatics and Aviation. Ongoing recruiting efforts and refinements to the curricula of these programs have resulted in steady growth. The Geomatics plan reached its target for first-year intake in the fall of 2010. With the economic downturn of the last couple of years, the Aviation program has seen some reduction in enrolment. However, interest in the program remains strong. Over the long term, the program is expected to meet its admission target each year.

The MSc and MAES programs were approved in 2008. The department continues to expand its international profile through both research and educational partnerships with international institutions. The 2+2 program with Nanjing University, in which students spend the first two years at Nanjing, and the final two years at Waterloo, has been expanded to add programs with Wuhan University and The China University of Geosciences at Beijing. We have been very pleased with the quality of the students participating in this program. A number of these 2+2 students have continued on to graduate studies at UW.
The department played a central role in the establishment of the UW Interdisciplinary Centre on Climate Change (IC3). The founding Director of the Centre, Dr. Claude Duguay, is a professor in GEM.

The department continues to expand its reputation as a leader in geomatics research and teaching on the UW campus, a goal that was outlined in the 2007 program review. The department was awarded a SHARCNET Research Chair in Geomatics in 2010. Enrolment in undergraduate geomatics courses has increased from about 508 in the 2006-2007 academic year, to 1128 in the 2009-2010 academic year. Demand more than doubled in those three years and continues to grow.

The department has reviewed its teaching of methods and techniques in human and physical geography. In 2008, the department realigned and expanded its curriculum to offer two courses in methods and techniques at the third year level. GEOG 393 is focussed on research methods in human geography. GEOG 394 is focussed on research methods in physical geography. One of either GEOG 393 or 394 is required for the Geography and Environmental Management and Geomatics degrees.

Challenges and Future Plans

Increasing Enrolment

Over the past few years, the department has witnessed rapid enrolment growth in both the undergraduate and graduate programs. Undergraduate enrolment of GEM majors has grown from 311 in Sept 2006 to 577 in Sept 2010. The department has also made progress on the retention of students within ENV and UW. There has been a marked increase in recent years in the number of students transferring into GEM from other programs. The department has now begun tracking transfers. To date in the 2010-11 academic year, at least 70 students have initiated transfers into GEM plans. Current enrolment in GEM plans is estimated at approximately 630. Courses offered by the department continue to grow in popularity. As a result, the total number of students in GEOG courses has grown from about 3834 in 2007 to about 5400 in 2010.

Enrolment has also increased in graduate programs. Over the past five years, total enrolment in GEM graduate programs has increased from a historical steady state average of 71 in Fall 2006 to 116 in Fall 2010. This exceeds the steady-state target of 106 that was outlined in the 2007 program review. It appears that enrolment will continue to grow beyond the 2007 steady state target, as the total Winter 2011 grad enrolment is now 128.

Response

This dramatic increase in enrolment has resulted in significant increases in teaching and graduate advising loads for faculty within the department. The department will be undertaking a review of curriculum, course enrolment, and teaching and advising loads with the goal of more effectively managing these challenges while maintaining a high quality educational experience for the students enrolled in our programs.

Other Initiatives

In 2007, a retirement in human geography was not replaced. At that time, the department made a decision to reduce its profile in historical, cultural, and critical geography, while focussing its efforts in human geography on environment and development. However, in 2009, the Local Economic Development program was moved from the Department of Geography and Environmental Management to the School of Environment, Enterprise, and Development. These events have necessitated a review of the Human Geography specialization with the goal of redefining and refocusing the teaching and research in this field. This review will be complete by August 2011, and will include the discussion of possible new coursework masters programs in Sustainable Tourism and Climate Change. In addition, the department will assess the potential development of a coursework masters program in Geomatics. This study will also be complete by August 2011.
Executive Council Priorities, 2011-12

Within the framework of the 6th Decade Plan, the following more specific foci for 2011-12 will be considered:

- Improving communication with various stakeholders on campus and off;
- Continuing to identify and obtain additional sources of new income;
- Using best practices, identify leaders, both faculty and staff, and arrange for mentoring and enhancement of their leadership skills;
- Hiring new faculty and staff complement using best practices;
- Developing the Student Success Office including activities related to first-year transition and students-at-risk;
- Starting a process of reducing the high student/faculty ratio;
- Attracting international students, both undergraduate and graduate, but from a broader geographical base;
- Developing means of refreshing “co-op”;
- Streamlining course and degree offerings and standardizing procedures in both undergraduate and graduate programs;
- Developing measurements of research impact, developing a suitable data base, and communicating the results to various stakeholders.

Geoff McBoyle
24 May, 2011
FOR APPROVAL

Process for Transition to Clinical Professorial Ranks by Continuing Clinical Lecturers

Motion: To approve the proposed process [see Attachment 1].

Summary:

Policy 76, Faculty Appointments and Policy 77, Tenure and Promotion of Faculty Members were amended to provide for clinical professoriate [approved by Senate (March 28, 2011) and the Board of Governors (April 5, 2011)].

The process gives faculty currently appointed as continuing clinical lecturers an opportunity to transition to clinical professorial ranks. An evaluation process will be used to determine where to place each applicant along the clinical professorial career track. A faculty member who moves under this process to the tenure track but is not awarded tenure may return to the rank of continuing clinical lecturer.

The process is the result of consultations undertaken by the faculty association and discussions by the Faculty Relations Committee and has been approved by the Faculty Relations Committee (unanimous) and the university president.
Process for Transition to Clinical Professorial Ranks by Continuing Clinical Lecturers

This process is available only in 2012 and 2013. The minimum outcome possible is a first probationary-term appointment at the rank of assistant clinical professor.

A continuing clinical lecturer has a one-time option to ask for consideration to be offered a tenure-track/tenured position as follows:

i) a first probationary-term appointment at the rank of assistant clinical professor
ii) a first probationary-term appointment at the rank of associate clinical professor
iii) a second probationary-term appointment at the rank of assistant clinical professor
iv) a second probationary-term appointment at the rank of associate clinical professor
v) a tenured appointment at the rank of associate clinical professor, or
vi) a tenured appointment at the rank of clinical professor.

Application for consideration. A decision to ask for consideration must be communicated in writing to the school Director by January 3, 2012 or January 2, 2013. The candidate shall meet with the Director to discuss the procedures to be followed. The School will provide advice and mentoring on how to prepare a candidate’s brief.

Candidate’s brief. By February 1, 2012 or February 1, 2013, the candidate shall submit a brief supporting the consideration and indicating which type of appointment the candidate is seeking. The brief must include a curriculum vitae, copies of relevant scholarly work, a summary of the candidate’s contributions in scholarship, teaching and service, and any other relevant information the candidate feels may be useful to the School Tenure and Promotion Committee (STPC) and Faculty Tenure and Promotion Committee (FTPC). The document “Tenure and Promotion in the Clinical Professorial Ranks - Innovative Clinical or Professional Practice” should be consulted for an explanation of “innovative clinical or professional practice.”

Annual performance reviews. The Director shall provide the STPC with copies of all written assessments made of the candidate within the school.

Consideration file. The consideration file for a candidate consists of: all evidence considered by the STPC and the FTPC; the STPC assessment of the candidate's performance in teaching, scholarship and service; the outcome of deliberations by the STPC and the FTPC. The file shall also include the numerical record of votes taken, plus any written statements, including reasons, by STPC or FTPC members who do not agree with the majority recommendation.

Conflict of interest. A member of a tenure and promotion committee who has a conflict of interest in a particular case shall declare the conflict and shall be absent from the portion of committee meetings dealing with that case. If the Committee Chair has a conflict of interest, the committee shall elect another of its members to serve as Chair pro tem during the absence of the Chair.

Challenges. Prior to consideration of a case, a candidate may challenge in writing any member or members of an STPC or FTPC for bias, apprehension of bias or perceived conflict of interest. The committee, excluding the member challenged, shall decide whether the challenge is well-founded. If so, the challenged member shall not attend those portions of committee meetings dealing with the specific
case. If the committee decides that a challenge is not well-founded, the challenged member shall participate, but the challenge becomes part of the record for any subsequent consideration or appeal.

**Procedures at the school level.** The STPC shall meet to consider the application, shall prepare an assessment of the candidate's performance in teaching, scholarship and service, and shall decide which type of appointment to recommend. The assessment should state clearly, and in detail, the evidence considered, the criteria applied to the evidence, the evaluation of the candidate in each of the three areas and the emphasis placed on each area.

If there is a strong possibility that the STPC might recommend a tenured appointment, external opinions of the candidate's scholarly contributions shall be sought; normally at least three external reviews are obtained. External referees shall be both external to UW and at arm’s-length from the candidate.

The candidate will be asked to provide the names of at least three arm’s-length external referees who can assess his/her scholarship. The STPC shall consider the candidate's list of referees and normally will suggest additional names. After consulting with the Dean, the STPC Chair shall inform the candidate of the pool of potential referees. The candidate may challenge, in writing to the STPC, a potential referee for bias, apprehension of bias, perceived conflict of interest or unsuitability. If the STPC and the candidate do not agree on the pool of potential referees, at least half of the referees contacted must be from those approved by the candidate.

Letters soliciting comments from referees shall be sent by the Dean. Referees shall be sent copies of Policy 77 and this process, and shall be asked to assess the candidate's scholarly work and, if possible, to compare it with the scholarly achievements of others recently tenured at their own institutions or others of similar standing. Informal contacts with potential external referees by the Director, STPC or FTPC members, or the candidate are inappropriate.

If members of the STPC express significant reservations that could result in the recommendation of an appointment at a level lower than that sought, the STPC Chair shall provide the candidate with a complete copy of the file, together with a written explanation of the nature of the reservations in sufficient detail to allow the candidate to respond. The file shall include all internal or external letters of assessment with the names of the authors and other identifying references deleted, unless the authors have expressly consented to being identified. Within ten working days of delivery of the file, the candidate shall provide her/his written response (including any relevant new evidence) to the STPC Chair for distribution to the STPC. The candidate may also choose to appear before the STPC and may choose to be accompanied by a UW academic colleague. The STPC shall not finalize its recommendation until the candidate has been given the opportunity to respond, as described above.

When the STPC has completed its deliberations, the STPC Chair shall inform the candidate in writing of the outcome and the basis for it. The STPC Chair shall forward the file to the Dean for consideration by the FTPC unless the candidate chooses to withdraw it within 5 working days of notification of the outcome.

**Procedures at the faculty level.** The FTPC shall consider the recommendations of the STPC to ensure that the STPC has acted carefully and appropriately in its deliberations and that its recommendations are sound.
The FTPC shall base its deliberations primarily on the report forwarded by the STPC. The STPC Chair (or delegate) normally will present the STPC recommendations to the FTPC and will be available to answer questions, but shall not otherwise participate in the proceedings.

If members of the FTPC express significant reservations that could result in the recommendation of an appointment at a level lower than that sought, the Dean shall provide the candidate with a complete copy of the file, together with a written explanation of the nature of the reservations in sufficient detail to allow the candidate to respond. The file shall include all internal or external letters of assessment with the names of the authors and other identifying references deleted, unless the authors have expressly consented to being identified. Within ten working days of delivery of the file, the candidate shall provide her/his written response (including any relevant new evidence) to the Dean for distribution to the FTPC. The candidate may also choose to appear before the STPC and may choose to be accompanied by a UW academic colleague. The FTPC shall not finalize its recommendation until the candidate has been given the opportunity to respond, as described above.

When the FTPC has completed its deliberations, the Dean shall inform the candidate in writing of the outcome and the basis for it. The Dean will consider the file unless the candidate chooses to withdraw it within 5 working days of notification of the outcome.

**Outcome of consideration.** The Dean will consider the recommendations of the STPC and FTPC and determine whether to:

i) offer the candidate a probationary-term appointment as set out above, or

ii) forward the file to the President for consideration of a tenured appointment.

If the President supports the granting of tenure, he/she shall inform the candidate, recommend approval to the Board of Governors, and subsequently report the granting of tenure to Senate for information.

A candidate who accepts a probationary-term appointment will be governed by Policy 76 regarding probationary-term reappointment and by Policy 77 regarding tenure and promotion with the exception that if he/she is not reappointed or granted tenure he/she can return to a continuing clinical lecturer appointment.

A candidate may choose to not accept an offer and will then retain her/his status as a continuing clinical lecturer.

**Appeal.** If the offer by the Dean is for a level lower than that sought or the decision of the President is negative, the candidate may appeal following the process set out in section 7 of Policy 77. The tribunal shall decide by majority vote on the basis of the evidence submitted to it which of the six positions is to be offered to the candidate. The decision of the tribunal is final.