FACULTY OF ARTS AND SCIENCE
FACULTY BOARD

A meeting of Faculty Board will be held on Friday, January 29, 2016 at 3:30 p.m. in the School of Kinesiology and Health Studies – KNS100

AGENDA

1. Adoption of the Agenda

2. Approval of the Minutes
   The Minutes of December 11, 2015 have been posted.

3. Business Arising from the Minutes

4. Arts and Science Undergraduate Society Report

5. Dean’s Report

6. Question Period

7. Communications

8. Curriculum Committee Omnibus Report – Appendix A - for approval
   Ms. Stephenson will move “that the Omnibus Report Part III be approved.”

9. New Graduate Diploma in Biomedical Informatics and a Professional Master’s in Biomedical Informatics – Appendix B – for approval
   Ms. Regan will move “that the proposal for a New Graduate Diploma in Biomedical Informatics and a Professional Master’s in Biomedical Informatics be approved.”

10. Report of the Nominating Committee – Appendix C – for approval
    Ms. Fachinger will move “that the nominees being brought forwarded by the Nominating Committee be appointed.”

11. New Undergraduate Certificate in Media Studies – Appendix D – for approval
    Ms. Stephenson will move “that the proposal for a New Undergraduate Certificate in Media Studies be approved.”

12. Report of New Offerings of Existing Courses – Appendix E - for information

13. School of Kinesiology and Health Studies – Bachelor of Physical and Health Education (BPHE) – for information

14. Other Business

Richard Ascough                    Patrick Costigan
Chair                              Secretary
Faculty Board                      Faculty Board
## COURSE ADDITIONS

<table>
<thead>
<tr>
<th>Dept.</th>
<th>Course Subject</th>
<th>Course Catalog Number</th>
<th>New Course Title</th>
<th>Transcript Title</th>
<th>New Course Description</th>
<th>New Course Notes</th>
<th>New Prerequisite</th>
<th>New Exclusion</th>
<th>New Equivalency</th>
<th>Learning Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FREN</strong></td>
<td>FREN</td>
<td>392</td>
<td>3.0</td>
<td>Paris Through Literature, Painting, Cinema, and Photography</td>
<td>Paris: Literature, Painting, Cinema and Photography</td>
<td>Students will explore Paris through the diverse, creative and anecdotal perspectives offered by writers, filmmakers, painters, photographers and other artists. Such figures have played important roles in significant literary and artistic trends and movements and have portrayed Paris in a variety of perspectives. etc. Formerly FREN 290 -</td>
<td>NOTE Only offered online. Consult Continuing and Distance Studies. NOTE Taught in English together with FRST 290/3.0. Students concentrating in French submit written assignments, tests, and examinations in French.</td>
<td>[FREN 230/3.0 and FREN 241/3.0] or [FREN 212/6.0 and FREN 220/6.0] or by the permission of the department</td>
<td>No more than 3.0 units from FREN 290/3.0; FRST 290/3.0; IDIS 290/3.0</td>
<td><strong>120 (480;72P)</strong></td>
</tr>
<tr>
<td><strong>GEOL</strong></td>
<td>GEOL</td>
<td>342</td>
<td>Yes</td>
<td>Special Topics in Geology</td>
<td>Special Topics in Geology</td>
<td>Course offered by visiting faculty on Geological Sciences topics related to their research interests. Consult the departmental homepage for further details of specific course offerings each academic year.</td>
<td>Level 3 in a GEOL plan, or permission of the Department.</td>
<td></td>
<td></td>
<td><strong>120 (36L;84P)</strong></td>
</tr>
<tr>
<td><strong>GPPL</strong></td>
<td>GPHY</td>
<td>330</td>
<td>3.0</td>
<td>Transportation Geography</td>
<td>Transportation Geography</td>
<td>This course provides a systematic examination of urban transportation in the context of general economic, social and spatial trends. Particular focus is placed on the role of the built environment in explaining travel behavior. The aim is to provide a fair understanding of transportation planning and policy issues &amp; explore potential solutions.</td>
<td>Level 3 or permission of the Department.</td>
<td></td>
<td></td>
<td><strong>120 (36L;84P)</strong></td>
</tr>
<tr>
<td><strong>GPPL</strong></td>
<td>GPHY</td>
<td>349</td>
<td>3.0</td>
<td>GIScience and Public Health</td>
<td>GIScience and Public Health</td>
<td>This course examines contemporary applications of geographic information science (GIScience) and geographic information systems (GIS) in public health, including disease mapping, environmental hazards, spatial epidemiology, and problems of accessibility to and siting of health services.</td>
<td>GPHY 243/3.0 and GPHY 247/3.0, or permission of the Department.</td>
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<td></td>
<td><strong>120 (24L;24P;72P)</strong></td>
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<tr>
<td>Dept.</td>
<td>Course Subject</td>
<td>Course Catalog Number</td>
<td>New Course Units</td>
<td>New Course Title</td>
<td>Transcript Title</td>
<td>New Course Description</td>
<td>New Prerequisite</td>
<td>New Exclusion</td>
<td>Learning Hours</td>
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<tr>
<td>PHIL</td>
<td>PHIL</td>
<td>275</td>
<td>3.0</td>
<td>Thinking Gender, Sex and Love</td>
<td>Thinking Gender, Sex and Love</td>
<td>What is at stake in how we think about gender, sex and love? How do these concepts inform each other? What else defines them? Using classic and contemporary philosophical texts we examine presuppositions and alternative possibilities. Old and new insights are explored. Emphasis is on careful reading and critical thinking skills.</td>
<td>Completed 3.0 more units or 6.0 units in PHIL</td>
<td></td>
<td>120 (36L;84P)</td>
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<tr>
<td>PHYS</td>
<td>PHYS</td>
<td>260</td>
<td>3.0</td>
<td>The Physics of Light and Colour</td>
<td>The Physics of Light &amp; Colour</td>
<td>Students will develop an appreciation for the physical and chemical processes that control light and colours. Students will learn the basic principles of light emission and propagation, image formation, the workings of optical devices and detectors, colour theory and colour perception, colour in art, colour in nature, and colours in astronomy.</td>
<td>PHYS 104/6.0 or PHYS 106/6.0 or PHYS 117/6.0 or PHYS 118/6.0 or BIOL 102/3.0 or BIOL 103/3.0 or CHEM 112/6.0 or GEOL 102/3.0 or GEOL 104/3.0 or GEOL 106/3.0 or GEOL 107/3.0 or PSYC 100/6.0.</td>
<td>none</td>
<td>108 (36L;72P)</td>
<td></td>
</tr>
<tr>
<td>PHYS</td>
<td>PHYS</td>
<td>316</td>
<td>3.0</td>
<td>Methods in Mathematical Physics I</td>
<td>Methods in Math. Physics I</td>
<td>Methods of mathematics important for physicists. Complex arithmetic, series expansions and approximations of functions, Fourier series and transforms, vector spaces and eigenvalue problems, ordinary differential equations and Green’s functions.</td>
<td>(MATH 221/3.0 or MATH 227/3.0 or MATH 280/3.0) and (MATH 225/3.0 or MATH 231/3.0 or MATH 232/3.0)</td>
<td>No more than 1 course from MATH 334/3.0; MATH 338/3.0; PHYS 316/3.0; PHYS 312/6.0</td>
<td>120 (36L;12T;72P)</td>
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<tr>
<td>PHYS</td>
<td>PHYS</td>
<td>317</td>
<td>3.0</td>
<td>Methods in Mathematical Physics II</td>
<td>Methods in Math. Physics II</td>
<td>A continuation of PHYS 316. Partial differential equations, functions of a complex variable and contour integration, and special topics such as probability and statistics, group theory and non-linear dynamics.</td>
<td>PHYS 316/3.0</td>
<td>No more than 1 course from MATH 228/3.0; MATH 326/3.0; PHYS 317/3.0; PHYS 312/6.0</td>
<td>120 (36L;12T;72P)</td>
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<tr>
<td>PSYC</td>
<td>PSYC</td>
<td>375</td>
<td>3.0</td>
<td>Comparative Cognition: Animal Learning Laboratory</td>
<td>Animal Learning Laboratory</td>
<td>This course covers recent research in comparative cognition at an advanced level. Emphasis will be placed on critically evaluating scientific controversies in specific topics, such as episodic memory in animals, mechanisms of spatial navigation, and value-based decision-making. Laboratory sessions will explore the principles discussed in lectures.</td>
<td>[PSYC 203/3.0 and (PSYC 205/3.0 if taken in F2015 or onward)] or Level 3 in a BCHM, BIOL or LISC Plan</td>
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<td>126 (18L;18Lb;12O;78P)</td>
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### New Courses

<table>
<thead>
<tr>
<th>Department</th>
<th>Course Subject</th>
<th>Course Catalog Number</th>
<th>New Course Units</th>
<th>New Course Title</th>
<th>New Course Description</th>
<th>New Prerequisite</th>
<th>New Exclusion</th>
<th>Learning Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOCY</td>
<td>SOCY</td>
<td>300</td>
<td>3.0</td>
<td>Sociology of Cities</td>
<td>Sociology of Cities More than 50% of the world’s population now lives in cities and most of biggest sociological issues are urban in location and character. Understanding cities is therefore crucial to understanding contemporary societies. This course is an intensive introduction to Urban Sociology with particular emphasis on world cities.</td>
<td>A grade of C- in SOCY122/6.0 or (BISC 100/3.0 and BISC 101/3.0)</td>
<td>No more than 3.0 units from SOCY 301/3.0-001 (2009-2015); SOCY 300/3.0</td>
<td>120 (36L;84P)</td>
</tr>
<tr>
<td>SOCY</td>
<td>SOCY</td>
<td>310</td>
<td>3.0</td>
<td>Visual Culture</td>
<td>Visual Culture A lecture-format course devoted to the sociological understanding of visual culture in contemporary society. The course integrates the critical development of key social theories of visuality from Descartes to Baudrillard and beyond. It addresses the sociological significance of visual culture in terms of ideology, hegemony and visual discourse.</td>
<td>A grade of C- in SOCY122/6.0 or (BISC 100/3.0 and BISC 101/3.0)</td>
<td>No more than 3.0 units from SOCY 302/3.0-001 (2014-2015); SOCY 310/3.0</td>
<td>120 (36L;84P)</td>
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### Course Deletions

<table>
<thead>
<tr>
<th>Dept.</th>
<th>Course Subject</th>
<th>Course Catalog Number</th>
<th>Existing Course Units</th>
<th>Existing Course Title</th>
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<tbody>
<tr>
<td>FREN</td>
<td>FREN</td>
<td>290</td>
<td>3.0</td>
<td>Paris Through Literature, Painting, Cinema, and Photography</td>
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<tr>
<td>PHYS</td>
<td>PHYS</td>
<td>312</td>
<td>6.0</td>
<td>Mathematical Methods in Physics</td>
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</tbody>
</table>

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<thead>
<tr>
<th>Department</th>
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</thead>
<tbody>
<tr>
<td>SOCY</td>
<td>SOCY</td>
<td>325</td>
<td>3.0</td>
<td>Contemporary Social Theories 1</td>
</tr>
<tr>
<td>SOCY</td>
<td>SOCY</td>
<td>326</td>
<td>3.0</td>
<td>Contemporary Social Theories 2</td>
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### COURSE REVISIONS

<table>
<thead>
<tr>
<th>Dept.</th>
<th>Changes to:</th>
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<th>Course Catalog Number</th>
<th>Existing Course Units</th>
<th>Existing Course Title</th>
<th>Existing Exclusion</th>
<th>New Exclusion</th>
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<tr>
<td>CHEM</td>
<td>Exclusions</td>
<td>CHEM</td>
<td>313</td>
<td>3.0</td>
<td>Quantum Mechanics</td>
<td>None</td>
<td>ONE-WAY EXCLUSION  May not be taken with or after PHYS 344/3.0</td>
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<tr>
<th>Dept.</th>
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<th>Existing Course Description</th>
<th>New Course Description</th>
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<tbody>
<tr>
<td>COMP</td>
<td>Course Description, Course Title</td>
<td>CISC</td>
<td>282</td>
<td>3.0</td>
<td>Fundamentals of Web and Mobile Applications</td>
<td>Fundamentals of Web Development</td>
<td>Fund. Web Development</td>
<td>This course surveys current best practices for implementing attractive, usable, secure and maintainable web and mobile applications. Other issues considered include: accessibility, platform and browser independence, licensing of intellectual property, scalability, user privacy, and using web technologies in mobile development.</td>
<td>This course surveys current best practices for implementing attractive, usable, secure and maintainable web applications. Other issues considered include: accessibility, platform and browser independence, licensing of intellectual property, scalability, user privacy, and using web technologies in mobile development.</td>
</tr>
<tr>
<td>COMP</td>
<td>Course Description, Course Title</td>
<td>CISC</td>
<td>110</td>
<td>3.0</td>
<td>Elementary Computer Animation</td>
<td>Creative Computing</td>
<td>Creative Computing</td>
<td>Introduction to tools and techniques for creating 2D computer animations. Introduction to animation software (e.g., Flash) and scripting languages (e.g., ActionScript). Involves a project in the student's area of interest, such as fine art, education, or commerce.</td>
<td>Introduction to fundamental programming concepts in the context of visual, interactive media. Students may develop applications in any domain (e.g., fine art, education, commerce, physical or social sciences) while learning about algorithms, program design, logic, program control flow, functions, testing etc.</td>
</tr>
<tr>
<td>COMP</td>
<td>Course Description</td>
<td>COGS</td>
<td>300</td>
<td>3.0</td>
<td>Programming Cognitive Models</td>
<td></td>
<td>Systems and techniques for developing computational models of human cognitive processes. Symbolic artificial-intelligence and neural-network approaches. Students will become familiar with the programming language LISP, and use it in implementing some aspects of cognitive models.</td>
<td>Systems and techniques for developing computational models of human cognitive processes. Symbolic artificial-intelligence and neural-network approaches. Students will become familiar with programming technology suitable for the implementation of aspects of cognitive models.</td>
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</table>
### Faculty of Arts and Science Curriculum Committee Omnibus Report III

**January 29th, 2016**

<table>
<thead>
<tr>
<th>Dept.</th>
<th>Changes to:</th>
<th>Course Subject</th>
<th>Course Catalog Number</th>
<th>Existing Course Units</th>
<th>Existing Course Title</th>
<th>Existing Course Notes</th>
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<th>Existing Prerequisite</th>
<th>New Prerequisite</th>
<th>Existing Corequisite</th>
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<tr>
<td><strong>COMP</strong></td>
<td>Corequisite</td>
<td>CISC</td>
<td>124</td>
<td>3.0</td>
<td>Introduction to Computing Science II</td>
<td></td>
<td></td>
<td>MATH 111/6.0 or MATH 121/6.0 or MATH 122/6.0 or MATH 110/6.0 or MATH 112/6.0 or MATH 120/6.0 or MATH 123/3.0 or MATH 124/3.0 or MATH 126/6.0</td>
<td>CISC 102/3.0 or MATH 111/6.0 or MATH 121/6.0 or MATH 122/6.0 or MATH 110/6.0 or MATH 112/6.0 or MATH 120/6.0 or MATH 123/3.0 or MATH 124/3.0 or MATH 126/6.0</td>
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<tr>
<td><strong>COMP</strong></td>
<td>Prerequisite</td>
<td>CISC</td>
<td>497</td>
<td>3.0</td>
<td>Social, Ethical and Legal Issues in Computing</td>
<td>Level 4 and registered in a COMP Major or BMCO or COCA or COGS or COMA or CSCI or SODE Specialization Plan and (CISC 365/3.0 or COGS 300/3.0).</td>
<td>Level 4 and registered in a COMP Major or BMCO or COCA or COGS or COMA or CSCI or SODE Specialization Plan and (CISC 365/3.0 or COGS 300/3.0) and an overall GPA of 1.90 and GPA of 2.6 from 30 CISC units.</td>
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<tr>
<td><strong>COMP</strong></td>
<td>Course Note, Prerequisite</td>
<td>COGS</td>
<td>201</td>
<td>3.0</td>
<td>Cognition and Computation</td>
<td>RECOMMENDATION: Some programming experience (such as CISC 101/3.0 or CISC 110/3.0)</td>
<td>PSYC 221/3.0 or COGS 100/3.0</td>
<td>COGS 100/3.0 or PSYC 100/6.0 or PSYC 221/3.0</td>
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<tr>
<td><strong>COMP</strong></td>
<td>Prerequisite</td>
<td>COGS</td>
<td>400</td>
<td>3.0</td>
<td>Neural and Genetic Cognitive Models</td>
<td>COGS 300/3.0</td>
<td></td>
<td>CISC 235/3.0 or ELEC 27B/4.0</td>
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<th>Existing Course Title</th>
<th>Existing Grading</th>
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<tr>
<td><strong>DRAM/MUSC</strong></td>
<td>Grading</td>
<td>MUSC</td>
<td>160, 260, 360, 460 162, 262, 362, 462 166, 266, 366, 466 178, 278, 378, 478 263, 363, 463 261, 361</td>
<td>1.5</td>
<td>Choral Ensemble, Symphony Orchestra, Jazz Ensemble, Unspecified Chamber Ensemble, Keyboard Accompaniment</td>
<td>Pass/Fail</td>
<td>Graded</td>
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<tr>
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<tr>
<td>GEOL</td>
<td>Corequisite</td>
<td>GEOL</td>
<td>488</td>
<td>3.0</td>
<td>Geology of North America</td>
<td>This 12-day, intensive field course focuses on field and laboratory techniques using a wide array of geophysical site investigation and exploration methods. Review lectures on instrument theory and principles of exploration program design. The course culminates in an exercise to design and implement an integrate</td>
<td>This 9-day, intensive field course focuses on field and laboratory techniques using a wide array of geophysical site investigation and exploration methods. Review lectures on instrument theory and principles of exploration program design. The course culminates in an exercise to design and implement an integrated geophysical site investigation.</td>
</tr>
<tr>
<td>GEOL</td>
<td>Course Description</td>
<td>GEOL</td>
<td>419</td>
<td>3.0</td>
<td>Geophysics Field School</td>
<td>Characterization of major ore deposit types using mineralogical, petrological, geochemical and geophysical attributes. Design and evaluation of ore deposit models and exploration programs, including ore processing and environmental issues. Laboratory work integrates techniques to evaluate paragenetic sequences, ore grades and engineering issues.</td>
<td>Characterization of major ore deposit types using mineralogical, petrological, geochemical and geophysical attributes. Design and evaluation of ore deposit models and exploration programs, including ore processing and environmental issues. Laboratory work integrates techniques to evaluate paragenetic sequences, ore grades and engineering issues.</td>
</tr>
<tr>
<td>GEOL</td>
<td>Course Description</td>
<td>GEOL</td>
<td>362</td>
<td>3.0</td>
<td>Petrology Applied to Ore Deposits</td>
<td>Characterization of major ore deposit types using petrological, geochemical and geophysical engineering sciences. Tectonic setting, age, rock composition, geometry, mineralogy and textures, geochemical and geophysical signatures. Metallogenic epochs and provinces. Design and evaluation ore deposit models and exploration programs, including ore proce</td>
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<th>Learning Hours</th>
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<tbody>
<tr>
<td>GPPL</td>
<td>GPHY</td>
<td>101</td>
<td>Learning Hours</td>
<td>3.0</td>
<td>Human Geography</td>
<td>114 (18S;12T;48O;36P)</td>
</tr>
</tbody>
</table>
### Faculty of Arts and Science Curriculum Committee

**Omnibus Report III**

January 29th, 2016

<table>
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<tr>
<th>Dept.</th>
<th>Course Subject</th>
<th>Course Catalog Number</th>
<th>Changes to Existing Course Units</th>
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<tbody>
<tr>
<td>GPPL</td>
<td>GPHY</td>
<td>332</td>
<td>3.0</td>
<td>Cities, Regions and Planning in Capitalist Societies</td>
<td>Cities and Planning for Sustainable Development</td>
<td>Cities and Planning</td>
<td>Contemporary urban and regional development from the perspective of marxist political economy. Emphasis on the geography of industrial and regional restructuring, more flexible forms of manufacturing and service provision, and the economic and social restructuring of cities.</td>
<td>Contemporary community planning and urban development from the perspectives of social sciences, planning and real estate development. Emphasis on understanding actors in the process and creating projects that are socially, environmentally and economically sustainable. Informed by international perspectives, but focused on Canadian cities.</td>
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<tbody>
<tr>
<td>GPPL</td>
<td>GPHY</td>
<td>336</td>
<td>3.0</td>
<td>Geography, the Environment and Human Health</td>
<td>Geographical approaches to the relationship between human health and environment. Individual and population health outcomes of physical and social environmental influences and the development of policy responses.</td>
<td>Geographical study of the relationship between human health and environment. Individual and population health outcomes of physical and social environmental influences and the development of policy responses.</td>
<td>Examines the relationship between human health and physical, and social environments. Focus is influence of local environmental conditions on population health outcomes within the North American urban context. Policy and programming options for improving local conditions are explored.</td>
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<tr>
<td>Dept.</td>
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<tr>
<td>PHIL</td>
<td>Prerequisite</td>
<td>PHIL</td>
<td>201</td>
<td>3.0</td>
<td>Philosophy of Medicine</td>
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<td>Life, Death, and Meaning</td>
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<td>261</td>
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<td>263</td>
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<td>270</td>
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<th>Existing Course Title</th>
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<tr>
<td>PHYS</td>
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<td>PHYS</td>
<td>495</td>
<td>3.0</td>
<td>Introduction to Medical Physics</td>
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<td></td>
<td>PHYS 344/3.0 and (PHYS 312/6.0 or MATH 338/3.0) and (PHYS 350/3.0 or PHYS 352/3.0). Level 3 or 4 and registration in an ASPH, MAPH or PHYS Plan.</td>
<td>108 (36L;7P)</td>
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### DEGREE PLAN REVISIONS

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<td>COMP</td>
<td>COMA-P-BCH/COMA-I-BCH</td>
<td>G. 6.0 units from MATH 110/6.0 or MATH 111/6.0 or (MATH 112/3.0 and MATH 212/3.0)</td>
<td>G. 6.0 units from MATH 110/6.0 or (MATH 111/6.0 and CISC 102/3.0)</td>
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<th>Existing Additional Requirements</th>
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<tr>
<td>GPPL</td>
<td>GISC-C-GIS</td>
<td>Option Courses, Additional Requirements</td>
<td>2.A. 12.0 units from CISC 101/3.0; CISC 121/3.0; GEOL 463/3.0; GEOL 464/1.5; GPHY 325/3.0; GPHY 342/3.0; GPHY 344/3.0; GPHY 346/3.0; GPHY 347/3.0; GPHY 348/3.0; GPHY 372/3.0; GPHY 418/3.0; MATH</td>
<td>2.A. 12.0 units from CISC 101/3.0; CISC 121/3.0; CLST 351/3.0; GEOL 463/3.0; GEOL 464/1.5; GPHY 310/3.0; GPHY 325/3.0; GPHY 342/3.0; GPHY 344/3.0; GPHY 346/3.0; GPHY 347/3.0; GPHY 348/3.0; GPHY 372/3.0; GPHY 415/6.0; GPHY 418/3.0; MATH</td>
<td>4. A maximum of 3.0 units in MATH may be used towards the Certificate.</td>
<td>4. A maximum of 3.0 units in MATH may be used towards the Certificate.</td>
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<td>Only 3.0 units from GPHY 415/6.0 will be counted towards the Certificate in Geographical Information Science (GISC).</td>
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### GPPL

**Existing Course Lists**
- GPHY 101/3.0; GPHY 227/3.0; GPHY 228/3.0; GPHY 229/3.0; GPHY 250/3.0; GPHY 254/3.0; GPHY 257/3.0; GPHY 258/3.0; GPHY 259/3.0; GPHY 309/3.0; GPHY 319/3.0; GPHY 325/3.0; GPHY 327/3.0; GPHY 328/3.0; GPHY 332/3.0; GPHY 336/3.0; GPHY 337/3.0; GPHY 338/3.0; GPHY 339/3.0; GPHY 351/3.0; GPHY 352/3.0; GPHY 354/3.0; GPHY 357/3.0; GPHY 358/3.0; GPHY 359/3.0; GPHY 362/3.0; GPHY 365/3.0; GPHY 368/3.0; GPHY 370/3.0; GPHY 401/3.0; GPHY 402/3.0; GPHY 403/3.0; GPHY 501/3.0; GPHY 502/3.0; GPHY 503/6.0; IDIS 302/3.0

**New Course Lists**
- GPHY 101/3.0; GPHY 227/3.0; GPHY 228/3.0; GPHY 229/3.0; GPHY 250/3.0; GPHY 254/3.0; GPHY 257/3.0; GPHY 258/3.0; GPHY 259/3.0; GPHY 309/3.0; GPHY 319/3.0; GPHY 325/3.0; GPHY 327/3.0; GPHY 328/3.0; GPHY 332/3.0; GPHY 336/3.0; GPHY 337/3.0; GPHY 338/3.0; GPHY 339/3.0; GPHY 351/3.0; GPHY 352/3.0; GPHY 359/3.0; GPHY 362/3.0; GPHY 365/3.0; GPHY 368/3.0; GPHY 370/3.0; GPHY 401/3.0; GPHY 402/3.0; GPHY 403/3.0; GPHY 501/3.0; GPHY 502/3.0; GPHY 503/6.0; IDIS 302/3.0

### PHYS

#### Core Courses

**Existing Core Courses**
- ASPH-P-BSH
  - H. 27.0 units in PHYS 312/6.0, PHYS 313/3.0, PHYS 315/3.0, PHYS 321/3.0, PHYS 344/3.0, PHYS 345/3.0, PHYS 350/3.0, PHYS 372/3.0

**New Core Courses**
- H. 27.0 units in PHYS 313/3.0, PHYS 315/3.0, PHYS 316/3.0, PHYS 317/3.0, PHYS 321/3.0, PHYS 344/3.0, PHYS 345/3.0, PHYS 350/3.0, PHYS 372/3.0, PHYS 312/6.0

#### Core Courses

**Existing Core Courses**
- PHYS-P-BSH
  - H. 24.0 units in PHYS 312/6.0, PHYS 313/3.0, PHYS 321/3.0, PHYS 344/3.0, PHYS 345/3.0, PHYS 350/3.0, PHYS 372/3.0

**New Core Courses**
- H. 24.0 units in PHYS 313/3.0, PHYS 315/3.0, PHYS 316/3.0, PHYS 317/3.0, PHYS 321/3.0, PHYS 344/3.0, PHYS 345/3.0, PHYS 350/3.0, PHYS 372/3.0, PHYS 312/6.0

#### Core Courses

**Existing Core Courses**
- PHYS-M-BSH
  - F. 6.0 units from PHYS 312/6.0 or (MATH 228/3.0 and MATH 338/3.0)

**New Core Courses**
- F. 6.0 units from (PHYS 316/3.0 and PHYS 317/3.0) or (MATH 228/3.0 and MATH 338/3.0) or (PHYS 312/6.0)

---

**PSYC**

- **Changes to:** Option Courses, Additional Requirement
- **Degree Plan Code:** PSYC-G-BA
- **Existing Option Courses:** A. 24.0 units from PSYC at the 200 level or above; COGS 300/3.0; COGS 352/3.0; COGS 353/3.0; INTS 306/3.0; STAT 263/3.0
- **New Option Courses:** A. 24.0 units from PSYC at the 200 level or above; STAT_Options; COGS 300/3.0; COGS 352/3.0; COGS 353/3.0; INTS 306/3.0
- **Existing Additional Requirements:** None.
- **New Additional Requirements:** A maximum of 3.0 units may be taken from STAT_Options.
**Dept.** | **Changes to:** | **Degree Plan Code** | **Existing Option Courses** | **New Option Courses** | **Existing Supporting Courses** | **New Supporting Courses** | **Existing Additional Requirements** | **New Additional Requirements** | **Existing Notes** | **New Notes**
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
PSYC | Supporting Courses, Note | PSYC-M-BSH | A. 12.0 units from (BIOL 102/3.0 and BIOL 103/3.0); CHEM 112/6.0; (CISC 121/3.0 and CISC 124/3.0); MATH at the 100 level; (PHYS 104/6.0 or PHYS 106/6.0 or PHYS 117/6.0 or PHYS 118/6.0 or PHYS 107/6.0) | A. 12.0 units from (BIOL 102/3.0 and BIOL 103/3.0); [CHEM 112/6.0 or (CHEM 113/3.0 and CHEM 114/3.0)]; (CISC 121/3.0 and CISC 124/3.0); MATH at the 100 level; (PHYS 104/6.0 or PHYS 106/6.0 or PHYS 117/6.0 or PHYS 118/6.0 or PHYS 107/6.0) | None. | 6. C. CHEM 113/3.0 and CHEM 114/3.0 are not sufficient for pre-med Chemistry requirements.

**Dept.** | **Changes to:** | **Degree Plan Code** | **Course List** | **Existing Course Lists** | **New Course Lists**
--- | --- | --- | --- | --- | ---
PSYC | Course Lists | BIPS-P-BSH/PSYC-M-BAH/PSYC-M-BSH | PSYC_Labs, PSYC_Labs_BIPS and PSYC_Cluster_A-BSH | PSYC_Labs _Psychology Laboratory Courses_ PSYC 305/6.0; PSYC 323/3.0; PSYC 334/3.0; PSYC 360/3.0; PSYC 371/3.0; PSYC 380; PSYC 385/3.0; PSYC 399/3.0 (2008-2009); PSYC 495/3.0; PSYC 570/3.0; PSYC 575/3.0 | PSYC_Labs _Psychology Laboratory Courses_ PSYC 305/6.0; PSYC 323/3.0; PSYC 334/3.0; PSYC 360/3.0; PSYC 371/3.0; PSYC 380; PSYC 385/3.0; PSYC 399/3.0 (2008-2009); PSYC 495/3.0; PSYC 570/3.0; PSYC 575/3.0 PSYC_Labs _Psychology Laboratory Courses_ PSYC 305/6.0; PSYC 323/3.0; PSYC 334/3.0; PSYC 360/3.0; PSYC 371/3.0; PSYC 380; PSYC 385/3.0; PSYC 399/3.0 (2008-2009); PSYC 495/3.0; PSYC 570/3.0; PSYC 575/3.0 PSYC_Labs _Psychology Laboratory Courses_ PSYC 305/6.0; PSYC 323/3.0; PSYC 334/3.0; PSYC 360/3.0; PSYC 371/3.0; PSYC 380; PSYC 385/3.0; PSYC 399/3.0 (2008-2009); PSYC 495/3.0; PSYC 570/3.0; PSYC 575/3.0 PSYC_Labs _Psychology Laboratory Courses_ PSYC 305/6.0; PSYC 323/3.0; PSYC 334/3.0; PSYC 360/3.0; PSYC 371/3.0; PSYC 380; PSYC 385/3.0; PSYC 399/3.0 (2008-2009); PSYC 495/3.0; PSYC 570/3.0; PSYC 575/3.0 PSYC_Cluster_A _Brain, Behaviour and Cognitive Science_ PSYC 305/6.0; PSYC 321/3.0; PSYC 332/3.0; PSYC 335/3.0; PSYC 360/3.0; PSYC 371/3.0; PSYC 380/3.0; PSYC 385/3.0; PSYC 399/3.0 (2008-2009); PSYC 495/3.0; PSYC 570/3.0; PSYC 575/3.0 PSYC_Cluster_A _Brain, Behaviour and Cognitive Science_ PSYC 305/6.0; PSYC 321/3.0; PSYC 332/3.0; PSYC 335/3.0; PSYC 360/3.0; PSYC 371/3.0; PSYC 380/3.0; PSYC 385/3.0; PSYC 399/3.0 (2008-2009); PSYC 495/3.0; PSYC 570/3.0; PSYC 575/3.0

Respectfully Submitted,
Jenn Stephenson
Chair, Curriculum Committee
This template is to be used when seeking approval for new Graduate programs of study leading to a degree. New program submissions must receive the approval of the Graduate Studies Executive Council (GSEC) prior to being externally reviewed. The submission, external review, and the internal response to the review will, as a package, be submitted by GSEC to the Senate Office for referral to the Senate Committee on Academic Development (SCAD), which will then make its recommendations to Senate. Academic Units are strongly advised to contact the Director of the Office of the Vice-Provost and Dean SGS or the appropriate Associate Dean in the SGS with any questions that arise during this proposal development. Refer also to the UQUAP website for more information.

NOTE: the textboxes in this template will expand as needed.

Part A – General Summary

| Name of Proposed Program: | Graduate Diploma in Biomedical Informatics  
| Professional Master’s in Biomedical Informatics |
| Unit(s): | School of Computing and Department of Biomedical and Molecular Sciences |
| Proposed Start Date: | Graduate Diploma in Biomedical Informatics - May 2017  
| Professional Master’s in Biomedical Informatics - May 2017 |

| Contact Information (1) | Contact Information (2) |
| Name: | Dr. Janice Glasgow  
| Name: | Dr. Louise Winn |
| Title: | Professor and Research Chair in Biomedical Computing  
| Title: | Professor |
| Unit: | School of Computing  
| Unit: | Department of Biomedical and Molecular Sciences |
| E-mail: | janice@cs.queensu.ca  
| E-mail: | winnl@queensu.ca |

Executive Summary (1 page maximum suggested – Minimum font size 11 pp)

Briefly summarize the rationale for introducing this new program and how it fits with the academic goals of the Faculty/School and University. Briefly describe: the educational goals and learning outcomes; internal or external collaboration required to deliver this program; how the relevant stakeholders (e.g. faculty, staff, students) were consulted in preparing the proposal; and additional resources required to deliver this program.

Rationale

The School of Computing and the Department of Biomedical and Molecular Sciences (DBMS) are collaborating on the development of new graduate programs in Biomedical Informatics. The programs will focus on training future data scientists who can translate data into knowledge that may transform how health care is approached and delivered. The programs are aimed at students with training in biology, life sciences, biochemistry, medical sciences and related disciplines, who are interested in designing and implementing quantitative and computational methods that solve challenging problems across the entire spectrum of biology and medicine, and who wish to develop the skills required for a range of exciting careers in medicine, research and development or industry.
Fit with Academic Goals of Faculties & the University

Research in medicine and the life sciences has become increasingly dependent on tools for the analysis of large and complex data sets. These tools include methods for database design and management, statistical analysis, data mining, and image analysis. The School of Computing is currently a leader in Biomedical Computing, offering a unique undergraduate program in the field and carrying out world class research in the areas of bioinformatics, computer-aided surgery, medical imaging, computer-assisted intervention, medical diagnosis, drug discovery and computational neuroscience.

DBMS is a distinguished academic centre engaged in a wide range of research endeavours including anatomical sciences, bacteriology, biochemistry, cancer biology, cardiovascular sciences, cell biology, developmental biology, immunology, molecular biology, genomics, neuroscience, pharmacology, physiology, reproductive biology, toxicology and virology. The breadth and depth of research has a strong foundation in multi-disciplinary discovery. Each year, the faculty are involved in educating thousands of undergraduate and higher degree students enrolled in numerous programs across several faculties at Queen’s University and beyond. Prominent in this regard are the educational efforts in the highly regarded Life Sciences and Biochemistry undergraduate programs, in medical education and in stellar graduate programs.

DBMS and the School of Computing are partnering in the development of new graduate programs in Biomedical Informatics. These opportunities will fill gaps in training highly qualified personnel with the skill set to apply computer science to multiple biological and medical datasets, including genomics and imaging, to uncover, understand and integrate biological relationships to better understand the biology underlying human diseases or traits such as drug response.

At the level of the institution, the Queen’s University 2012-2017 Strategic Research Plan seeks to promote “alternative operating structures, including collaborative and interdisciplinary models such as research centres and institutes, to enable researchers to respond quickly to embrace new opportunities”. Our programs directly align with several University research objectives; in particular, the promotion of collaborative and interdisciplinary initiatives between faculty across the University (objective 3), the enhancement of research partnerships which expand the University’s research strengths (objective 4), and the support of research outcome, translation and transfer (objective 6). Our programs will contribute to Queen’s overall goal of “distinguish[ing] itself as one of the most research intensive institutions within Canada, with a focus on excellence, leadership and impact at a national and international level”. Additionally, the Programs are consistent with the University’s Strategic Framework as they align with the Student Learning Experience by providing expanded opportunities for graduate studies through new credentials that are interdisciplinary and the Academic Plan through inter-departmental cooperation.

Both the Graduate Diploma (GDip) and Master’s programs are very much aligned with components of the University’s Strategic Mandate Agreement with the Ministry of Training, Colleges and Universities. These laddered credentials (GDip requirement being a subset of the Master’s) offer students multiple options for advanced study.

Teaching and Learning: the proposed programs capture institutional strengths in program delivery methods that expand learning opportunities for students and improve the learning experience and career preparedness. They also support teaching and learning by focusing on technology-enhanced learning that provides students with experiential learning opportunities that improves student learning outcomes/experiences.

Program Offerings: the proposed programs build on Institutional Strength in the area of program offerings: Arts & Science: Science and also Medicine. The proposed programs also align with the University’s areas for growth including Health and Society and Science and Technology.

The programs align with the Faculties of Arts and Science and Health Sciences by facilitating interdisciplinary research and will meet the challenge for Queen’s faculty to develop collaborative and integrated programs of teaching and research by working across discipline, faculty, and institutional boundaries. The graduate training visions of the School of Computing and DBMS are consistent with the research mission put forth by the Faculties of Arts and
Science and Health Sciences and Queen’s University as a whole.

Queen’s has the means and opportunity to build on existing excellence and innovation in the emerging field of Biomedical Computing, as well as on-going cross-disciplinary collaborations. The proposed programs will be unique within Canada (see Section 9.2) and will serve a growing market of health care scientists and decision makers who require advanced knowledge regarding the management and analysis of large and complex data sets.

**Educational Goals & Learning Outcomes**

The Diploma and Master’s programs in Biomedical Informatics are primarily aimed at recently graduated students in biology, biochemistry, and life and medical sciences. The focus of these programs will be on the application of existing tools and techniques for managing and analysing biomedical data and will have the entrance requirement of a BSc. (Honours) in the life sciences, biochemistry, biology or related field. The Diploma program will consist of the coursework equivalent of 12 units (4-3CU) in which one course includes a written biomedical informatics paper. The Professional Master’s program will consist of the same 12 credit units required for the Diploma plus an additional 6 units (2-3CU) in coursework and a biomedical informatics project (1-6CU) for a total of 24 credit units in the Master’s. The Diploma will provide advanced standing to those who later enrol in a Master’s degree and may also be used to ladder into other existing Master’s programs in DBMS (up to 12 credit units - to be approved by the Graduate Coordinator or program committee). Course requirements will be specialized in the area of biomedical computing, and consist of courses such as Research Methods for Biomedical Informatics and Data Science, which introduce such topics as programming skills and tools as well as data analysis, mining and applications. Several related courses currently exist and will be tailored to the students in the program. Three new 3-credit unit (CU) courses are being developed for the program. Master’s students will be allowed to take elective courses in the discipline they wish to pursue for their project. The main goal of the GDip is to train students to have command of knowledge in the area of biomedical informatics so that they can apply computational tools to analyze the data in their disciplines. The Master’s program will add to this by providing opportunities and mentorship for students to conduct projects in biomedical and molecular science and develop skills in database development and management, data analysis of complex biomedical databases, advanced techniques in computing and/or biomedical or molecular sciences.

**Collaboration**

The programs will draw on core faculty expertise in the School of Computing and DBMS. Core faculty from Computing include: Randy Ellis (Queen’s Research Chair in Computer-Aided Surgery), Gabor Fitchtinger (Cancer Care Ontario Research Chair), Janice Glasgow (Queen’s Research Chair in Biomedical Computing), Parvin Mousavi, James Stewart, Selim Akl and Dorothea Blostein. These researchers have extensive experience in biological and medical applications, and have ongoing collaborations at Queen’s and elsewhere with researchers in the areas of Surgery, Neuroscience, Anesthesiology, Biomedical and Molecular Sciences, Physiology, Cardiology, Pharmacology, Electrical and Computer Engineering, Urology, Anatomy, Radiology and Pathology. External collaborations include researchers at the National Institute of Health (USA), Harvard University, John Hopkins University, Medialio University of Vienna, University of British Columbia, Western University, Princess Margaret Hospital (Toronto), and others. In addition, the School of Computing has experts in such related areas as big-data analysis (Pat Martin) and data mining (David Skillicorn).

Core faculty from DBMS will include Michael Adams (Head of the Department), James Reynolds, Gunnar Blohm, Christopher Mueller, and Louise Winn. These researchers are engaged in a broad spectrum of biomedical research, using techniques to address questions concerning single molecules, cellular/microbial function, organ-systems, and whole-animal biology. Dr. Qingling Duan (Queen’s National Scholar in Bioinformatics) is jointly appointed to the Department of Biomedical and Molecular Sciences and the School of Computing.

The combined expertise in biomedical and computing applications is essential to the process of giving meaning to data and the collaborative nature of the proposed biomedical informatics programs. Additionally, collaboration and course development will also include faculty in Mathematics, Biology, Pathology and Molecular Medicine, Cell Biology and Neuroscience.
**Additional Resources**

Resources to support the proposed programs include additional TAs to support the faculty teaching the program’s laboratory components ($20,000), administrative/recruitment support ($10,000) and a specialized computer laboratory ($30,000 the first year and ongoing support at $10,000 per year for steady state) that will accommodate up to 20 students. There will also be start-up costs for program evaluation ($5,000) and marketing ($20,000) plus ongoing costs of ($10,000) a year for marketing research facilities and administrative support.

**Consultation**

During the development of this proposal, several stakeholders within the University were consulted, including students, faculty members, Graduate Program Chairs, Department Heads, the Graduate Studies Executive Council, employers and the Deans of the faculties involved in this program. Support for the proposed programs is strong and, as outlined in 9.1, a student survey indicated a high demand for both programs. In connection with the development of courses and research projects for the students, we have consulted with the departments of Biology, Mathematics and Statistics, Pathology and Molecular Medicine, Clinical Trials, Public Health and the Centre for Neuroscience.
Part B – Evaluation Criteria

Part B is to be completed by the Unit/Faculty.

In accordance with Queen’s University Quality Assurance Processes (QUQAP), the criteria should be regarded as the minimum criteria upon which the new program submission will be assessed. Further information can be found in the Senate Policy on Quality Assurance.

1. Introduction

1.1 Describe how the Program is consistent with the University’s mission and values as well as the academic goals of the Faculty(ies) and Unit(s).

DBMS and the School of Computing are partnering in the development of new graduate programs in Biomedical Informatics. These opportunities will fill gaps in training highly qualified personnel with the ability to apply computer science to multiple biological and medical datasets (including genomics and imaging) to uncover, understand and integrate biological relationships. The aim is to better understand the biology underlying human diseases or traits such as drug response.

The Queen’s University 2012-2017 Strategic Research Plan seeks to promote “alternative operating structures, including collaborative and interdisciplinary models such as research centres and institutes, to enable researchers to respond quickly to embrace new opportunities”. Our programs directly aligns with several University research objectives; in particular, the promotion of collaborative and interdisciplinary initiatives between faculty across the University (objective 3), the enhancement of research partnerships which expand the University’s research strengths (objective 4), and the support of research outcome, translation and transfer (objective 6). Our programs will contribute to Queen’s overall goal of “distinguish[ing] itself as one of the most research intensive institutions within Canada, with a focus on excellence, leadership and impact at a national and international level”. Additionally, the Programs are consistent with the University’s Strategic Framework as they align with the Student Learning Experience by providing expanded opportunities for graduate studies through new credentials that are interdisciplinary and the Academic Plan through inter-departmental cooperation. Both the Diploma and Master’s programs are also very much aligned with components of the University’s Strategic Mandate Agreement with the Ministry of Training, Colleges and Universities. Both capture institutional strengths in program delivery methods that expand learning opportunities for students and improve the learning experience and career preparedness. They also support teaching and learning by focusing on technology-enhanced learning that provides students with experiential learning opportunities that improves student learning outcomes.

The programs align with the faculties of Arts and Science and Health Sciences by facilitating interdisciplinary research and will meet the challenge for Queen's faculty to develop collaborative and integrated programs of teaching and research by working across disciplines, faculties, and institutional boundaries. The graduate training vision of the School of Computing and DBMS is consistent with the research mission put forth by the faculties of Arts and Science and Health Sciences and by Queen’s University as a whole. Queen’s has the means and opportunity to build on existing excellence and innovation in the emerging field of Biomedical Computing, as well as on-going cross-disciplinary collaborations. The proposed programs will be unique within Canada (see Section 9.2) and will serve a growing market of health care professionals who require advanced knowledge regarding the management and analysis of large and complex data sets.
The objectives of the Diploma in Biomedical Informatics (GDipBI) are:

1. To train students to have command of knowledge in the area of biomedical informatics so that they can apply computational tools to analyze the data in their disciplines.
2. To expose students to the current issues in biomedical informatics.
3. To train students to develop the skills and attributes necessary, including professional and transferable skills, to achieve their future career objectives as researchers, educators and professionals.

The objectives of the Master of Biomedical Informatics (MBI) are:

1. To train students to have command of knowledge in the area of biomedical informatics so that they can apply computational tools to analyze the data in their disciplines.
2. To expose students to the current issues in biomedical informatics.
3. To train students to develop the skills and attributes necessary, including professional and transferable skills, to achieve their future career objectives as researchers, educators and professionals.
4. To provide opportunities and mentorship for students to conduct projects in biomedical and molecular science and develop skills in database development and management, data analysis of complex biomedical databases, advanced techniques in computing and/or biomedical or molecular sciences;
5. To develop students’ communication skills to enable them to articulate their work clearly and efficiently in a variety of forums.

Anticipated Learning Outcomes:

Diploma in Biomedical Informatics (GDip [BI]):

1. Depth and breadth of knowledge in anatomical sciences: Graduating diploma students will demonstrate a sound command of knowledge in the area of biomedical informatics.
2. Research and scholarship: Graduating diploma students will have a good understanding of current methods in biomedical informatics.
3. Application of knowledge: Graduating diploma students will have the ability to make informed judgments on complex issues in the area of biomedical informatics.
4. Professional capacity/autonomy: Graduating diploma students will possess the qualities and transferable skills necessary for employment including the self-confidence to take initiatives and responsibilities during decision-making situations. Graduating students will also develop the intellectual independence to actively engage in continuing professional development, the ethical behaviour consistent with academic integrity, and the use of appropriate guidelines and procedures for responsible conduct of research. Students will also have the ability to appreciate the broader implications of applying knowledge to biomedical informatics.
5. Communication skills: Graduating diploma students will have the ability to clearly articulate their ideas and their opinions both orally and in written format to colleagues and instructors.
6. Awareness of limits of knowledge: Graduating diploma students will gain an appreciation for the breadth of ever-expanding information found in all science and accept that there are always different ways of interpreting science. Graduating diploma students will also have the ability to accept and act on constructive criticism that will elevate their critical thinking skills, sharpen their problem solving skills and further their
creative achievement.

Master of Biomedical Informatics (MBI):

1. **Depth and breadth of knowledge in biomedical and molecular sciences**: Graduating MBI students will demonstrate a sound command of knowledge in the area of biomedical informatics which will support the student’s future academic activities or professional practice within government, private or civil society sectors (e.g. medical professional, biotechnology companies, Health Canada regulatory affairs, clinical trial groups). Graduating students will also demonstrate a critical awareness of the current issues in biomedical informatics.

2. **Research and scholarship**: Graduating MBI students will have a firm understanding of current methods in biomedical informatics and the ability to utilize them to test a specific, novel research hypothesis. Graduating students will have an understanding of the current literature so as to make informed conclusions on the interpretation of their findings.

3. **Application of knowledge**: Graduating MBI students will have the ability to make informed judgments on complex issues in the area of biomedical informatics. Through the application of the scientific process, graduates will demonstrate competence in the research process by using available current literature to guide and critically analyze a novel research hypothesis.

4. **Professional capacity/autonomy**: Graduating MBI students will possess the qualities and transferable skills necessary for employment and/or continued education. These include: the self-confidence to take initiatives and responsibilities during decision-making situations. Graduating students will also possess the intellectual independence to actively engage in continuing professional development, the ethical behaviour consistent with academic integrity, and the use of appropriate guidelines and procedures for responsible conduct of research. Students will also have the ability to appreciate the broader implications of applying knowledge to new contexts.

5. **Communication skills**: Graduating MBI students will have the ability to clearly articulate their research findings, their ideas, and their opinions both orally and in written format to colleagues as well as non-professionals.

6. **Awareness of limits of knowledge**: Graduating MBI students will demonstrate an appreciation for the limitations of their research methods and potential biases of their interpretations of results.

1.3 **Explain how the learning outcomes will be achieved (e.g. course work, teaching and research seminars, independent research, laboratory and technical training, internships, practica, major research papers, and thesis)**

Diploma in Biomedical Informatics (GDipBI): The objectives will be achieved through rigorous coursework including completion of assignments and, where appropriate, examinations. Students will also participate in specialized workshops to learn about existing computational tools and methodologies related to biomedical informatics.

Master of Biomedical Informatics (MBI): The objectives will be achieved through rigorous coursework including completion of assignments and, where appropriate, examinations. Students will attend research seminars and participate in research projects involving the analysis of real-world data. Students will also participate in specialized workshops to learn about existing computational tools and methodologies related to biomedical informatics.
1.4 Identify and provide descriptions for any Fields associated with the new Program(s). [degree programs only]

N/A

1.5 Address the appropriateness of the proposed nomenclature (e.g., MA, MSc, MEng). [degree programs only]

The proposed name, Master of Biomedical Informatics (MBI) clearly reflects the proposed area of advanced training and is consistent with the naming of other applied Master’s degrees. The focus of the program is on learning professional skills for computational analysis. Given that the program is focused on biomedical informatics and applications, and is aimed at non-computing students, it is unique when compared with other Queen’s graduate programs. There are no similar programs currently offered at Queen’s.

The Graduate Diploma in biomedical informatics (GDip [BI]) is consistent with other diploma programs.

2. Program Regulations

2.1 Admission Standards - Provide the Program’s admission standards, including degree, diploma or certificate and course requirements and any other specific standards with reference to the learning outcomes and expectations of the Program. Provide the rationale for standards that are in addition to those set by the School of Graduate Studies. If applicable, indicate policies/procedures to encourage applications from qualified under-represented groups (e.g. Aboriginal people, visible minorities or persons with disabilities).

To be considered for admission to the Graduate Diploma or the MBI, an applicant must hold a minimum of a BSc (Honours) degree in biology, life sciences, biochemistry, medical sciences and related disciplines from a recognized university or equivalent. The minimum acceptable average for admissions to these programs is B+ in the third and fourth years of the student’s undergraduate program (all courses considered). Students applying from outside of North America whose native language is not English are required to submit TOEFL scores. Although the program is aimed at recent graduates from undergraduate programs, applicants from professional programs such as medicine and nursing are also welcome.

Applications will be welcome from qualified under-represented groups.

2.2 Language Requirements - If applicable, indicate any language requirements and provide rationale for standards that exceed the minimum set by the School of Graduate Studies.

There are no language requirements for these programs that exceed those set by the School of Graduate Studies.

The minimum standards are for the TOEFL iBT (Test of English as a Foreign Language Internet-based Test):

<table>
<thead>
<tr>
<th>Section</th>
<th>Score (/30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Writing Test</td>
<td>24</td>
</tr>
<tr>
<td>Speaking Test</td>
<td>22</td>
</tr>
<tr>
<td>Reading Test</td>
<td>22</td>
</tr>
<tr>
<td>Listening Test</td>
<td>20</td>
</tr>
</tbody>
</table>

For an overall minimum score of 88 (out of 120).
3. Program Structure and Requirements

Describe the Program under the following headings (where applicable)

3.1 General Program Requirements – Specify the program duration (max 24 months for Master’s; 48 months for PhD), total number of courses, and examinations (e.g. comprehensive, thesis defense, competency) required to complete the degree. Comment on requirements for progress reports, and advisory committee meetings.

A. Graduate Diploma in Biomedical Informatics (GDip [BI]): Four months, full time

It is anticipated that the Graduate Diploma Program will begin in May 2017 and span 4 months total. The graduate diploma program will consist of four courses each worth 3 credit units (4-3CU) including a final biomedical informatics paper which is part of CISC-897*:

1) CISC-897* (3 credit units): Research Methods in Computer Science
2) BMIF-801* (3 credit units) – Programming Skills and Tools for Processing of Biomedical Data
3) BMIF-802* (3 credit units) – Biomedical Data Analysis
4) BMIF-803* (3 credit units) – Data Mining and Applications

B. Master of Biomedical Informatics (MBI): 12 months, full-time

Students in the Diploma program will be permitted to ladder coursework successfully completed within the Diploma program into the Master’s program (i.e. obtain advanced standing in the Master’s program).

The MBI is a 12 month, full-time program beginning in May 2017. The program will consist of:

- The equivalent of 24 credit unit courses, including those from the Graduate Diploma Program (12CU) as well as advanced courses in computing, biology and health science.
- BMIF 898 Master’s Project (6CU). A biomedical informatics project is undertaken under the supervision of a School member. The presentation of a seminar to describe the project is required.
- Two additional 3 credit unit courses from a list of elective courses presented below (total: 6CU).

No progress reports or advisory committee meetings will be required since these are not thesis-based programs. However, the program director will provide advice to students and will ensure that academic progress is on track.

3.2 Course Requirements – In Table 1 below, list core (required) courses (including project or thesis), optional courses (e.g. select X from the following list) and elective courses (indicate level and disciplines). Specify by field (academic plan) if appropriate. Identify those courses that are also offered to undergraduate students and are listed in the undergraduate calendar. Explain the rationale for including them in the graduate Program and confirm that at least 2/3 of courses taken to fulfill degree requirements are offered exclusively at the graduate level.

Table 1. Course requirements (add additional rows as needed)

<table>
<thead>
<tr>
<th>Course/Credit (number and name)</th>
<th>(C)ore, (O)ptional or (E)lective</th>
<th>Diploma (GDip) or MBI</th>
<th>Undergraduate Enrolment (Y/N)</th>
<th>Proposed Instructor(s)</th>
<th>Academic Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>CISC-897* Research Methods in Computer</td>
<td>C</td>
<td>GDip MBI</td>
<td>N</td>
<td>Janice Glasgow</td>
<td>School of Computing</td>
</tr>
</tbody>
</table>

For MSc students must select 2 elective courses.
| Science (3CU) | BMIF-801* (3CU) | Newly developed for these programs Programming Skills and Tools for Processing Biomedical Data | C | GDip MBI | N | Qingling Duan | School of Computing |
| BMIF-802* (3CU) | Newly developed for these programs Biomedical Data Analysis | C | GDip MBI | N | TBD | School of Computing |
| BMIF-803* (3CU) | Newly developed for these programs Data Mining and Applications | C | GDip MBI | N | TBD | School of Computing |
| BMIF-898 Master's Project (6CU) | | C | MBI | N | Program coordinator | School of Computing |
| CISC-832* (3CU) | Data Base Management Systems | E | MBI | N | Pat Martin | School of Computing |
| CISC-859* (3CU) | Pattern Recognition | E | MBI | N | Dorothea Blostein | School of Computing |
| CISC-873* (3CU) | Data Mining | E | MBI | N | David Skillicorn | School of Computing |
| CISC-881* (3CU) | Bioinformatics | E | MBI | N | Qingling Duan | School of Computing |
| CISC-886* (3CU) | Cloud Computing | E | MBI | N | Pat Martin | School of Computing |
| BMED-809* (3CU) | Principle of Drug Discovery and Development | E | MBI | N | Kanji Nakatsu | DBMS |
| BMED-810* (3CU) | Protein Structure and Function | E | MBI | Y | Alan Mak | DBMS |
| BMED-811* (3CU) | Advanced Molecular Biology | E | MBI | Y | Chris Mueller | DBMS |
| BMED-813* (3CU) | Advances in Neuropharmacology | E | MBI | N | James Reynolds | DBMS |
| BMED-815* (3CU) | Mechanistic Toxicology | E | MBI | N | Louise Winn | DBMS |
| BMED-854* (3CU) | Cardiovascular Sciences | E | MBI | Y | Michael Adams | DBMS |

**Note: In consultation with the graduate coordinator, MBI students will be able to choose from a number of additional graduate offerings from DBMS and other units across campus (i.e. Biology, psychology, pathology and molecular medicine etc.).**
3.3 Course Descriptions - For each graduate course that is part of the proposed Program, provide a
calendar description and append the complete course outline including methods of evaluation; also
indicate if the course currently exists.

Core for GDip and MBI

CISC-897* Research Methods in Computer Science (3CU)
This course provides an introduction to the primary and secondary sources of information in the
computing science literature. The course includes work aimed at improving research skills. Students
are required to submit and present a paper on a topic that relates to their research. Prerequisite: none

BMIF-801* Programming Skills and Tools for Processing Biomedical Data (3CU)
The objective of this course is to provide graduating health science students hands-on training in
computer programming languages and tools to familiarize them with the principles and practice of
cutting edge technologies for bioinformatics used in biomedical and molecular sciences research.
Prerequisite: none

BMIF-802* Biomedical Data Analysis (3CU)
The objective of this course is to provide graduating health science students hands-on training in the
analysis of biomedical datasets to familiarize them with the principles and practice of cutting edge
technologies for bioinformatics used in biomedical and molecular sciences research. Prerequisite: none

BMIF-803* Data Mining and Applications (3CU)
The objective of this course is to provide graduating health science students with hands-on training in
data mining to familiarize them with the principles and practice of cutting edge technologies for
bioinformatics used in biomedical and molecular sciences research. Prerequisite: none

Core for MBI

BMIF-898 Master's Project (6CU)
A major programming project is undertaken under the supervision of a School member. The
presentation of a seminar to describe the project is required.

Electives (MBI students select 2)

CISC-832* Data Base Management Systems (3CU)
Theory and practice of modern data base systems; data as a model of reality; architecture of current and
proposed systems. Networks models, entity data model and relational models of data. Data
independence, security, data base integrity, contention handling, data definition languages, data
manipulation languages and their relation to current and proposed systems. Readings from current
research literature. Two term-hours; lectures. Two term-hours; lectures. PREREQUISITE: Permission
of the School. (Pat Martin)

CISC-859* Pattern Recognition (3CU)
An introduction to statistical and structural pattern recognition. Feature extraction and the feature
description: string, tree and graph grammars; attributed grammars; stochastic grammars. Error
correcting parsing; parsing of stochastic languages. Assignments include practical experience in
application areas such as character recognition and document image analysis. Three term-hours;
lectures and seminars. PREREQUISITE: Permission of the School. (Dorothea Blostein)

CISC-873*  Data Mining (3CU)
Study of the extraction of concepts from large high-dimensional datasets. Statistical foundations;
techniques such as supervised neural networks, unsupervised neural networks, decision trees,
association rules, Bayesian classifiers, inductive logic programming, genetic algorithms, singular value
decomposition, hierarchical clustering. Three term hours; lectures and seminars. PREQUISITE:
Permission of the School. (Dorothea Blostein)

CISC-881*  Bioinformatics (3CU)
This inter-disciplinary course for students in the computational and life sciences looks at the
application of computing techniques to molecular biology. Topics may include: DNA data analysis
(genomics), secondary and tertiary structure analysis (nucleic acids and proteins), molecular scene
analysis, evolutionary trees (phylogenetics), and computing with DNA. Three term hours; lectures and
seminars. PREQUISITE: Permission of the School. EXCLUSION: Jointly with BCHM-875*.
(Qingling Duan)

CISC-886*  Cloud Computing (3CU)
Cloud computing is a distributed computing paradigm where computing resources are provided in an
on-demand manner. The goal of the courses is to introduce students to key concepts and techniques
from cloud computing. The course focuses on issues such as system architectures, resource allocation
and management, and approaches and systems for the storage, management and processing of data in
cloud environments. (Pat Martin)

BMED-809*  Principles of Drug Discovery and Development (3CU)
An advanced course in which various aspects of the drug discovery and development process, from
molecules to community, will be studied. The course comprises lectures, discussion and student
seminars, based on recent literature. Topics encompass medicinal chemistry approaches to drug
discovery, receptor theory, mechanisms of drug action, drug metabolism, pharmacokinetics,
pharmacogenetics, drug resistance, clinical trials, and regulatory affairs. 3 hour seminar. (Kanji
Nakatsu)

BMED-810*  Protein Structure and Function (3CU)
This course presents an integrated approach to the study of protein function. Topics include proteomic
techniques in protein profiling, mass spectrometry, 2-D gel electrophoresis, yeast 2-hybrid analysis,
protein chips, protein purification, imaging, surface plasmon resonance, calorimetry, bioinformatics
and protein evolution, protein modifications and processing, interpretation and applications of 3-D
structure, protein structure-function relationships. Three lecture hours per week; Offered jointly with
BCHM-410* with additional work required. PRE-REQUISITES: BCHM-310 or 315*/316*/317* or
permission of the instructor. EXCLUSION: BCHM-410* (Alan Mak)

BMED-811*  Advanced Molecular Biology (3CU)
This course concentrates on the molecular biology of mammalian models particularly mechanisms
involved in human diseases. The human genome project, forensic analysis, DNA diagnostics of human
diseases, models of transcriptional and growth regulation and cancer, DNA repair, RNA processing and
translation are all discussed. Emphasis on recent findings and course materials will be drawn from
BMED-813* Advances in Neuropharmacology (3CU)

Recent advances in understanding neurotransmission and pharmacology in the central nervous system will be discussed. The current literature describing progress in understanding molecular, cellular and behavioural aspects of brain function, and the impact of drugs and disease, will be examined. Winter; seminars and tutorials. Given in years ending with an uneven number. PREREQUISITE: Permission of the Graduate Program required. Restricted enrollment. (Chris Mueller)

BMED-815* Mechanistic Toxicology (3CU)

An advanced, problem-based course focusing on current approaches to the study of mechanisms of chemical toxicity. Winter; 3 hour seminars and tutorials. Given in years ending with an even number. PREREQUISITE: PHAR-416* or equivalent. Permission of the Graduate Program required. (James Reynolds)

BMED-854* Cardiovascular Sciences (3CU)

An advanced inter-disciplinary course studying the anatomy, pharmacology and physiology of the cardiovascular system at the molecular and cellular level. The course is comprised of lectures, discussion and student seminars based on recent literature. Winter term, 3 hour seminar. PREREQUISITE: Undergraduate degree in Life Science or equivalent or permission from department. (Michael Adams)

For a complete list of course descriptions and outlines, please see Appendix 1: Course Descriptions.

3.4 Exam Requirements – Describe the structure of comprehensive and Master’s/Doctoral thesis examinations and supports in place to prepare students.

N/A

3.5 Program Timelines – In a table or figure, summarize the expected progress through the Program by term, to degree completion.

![Diagram showing the timeline for Diploma and MBI completion with specific coursework and project milestones for May, August, Sept, Dec, Jan, and April.](attachment:image)
3.6 **Part-Time Studies** - If the Program is offered on a part-time basis describe how the delivery differs from that of the full-time Program and summarize the pathway to completion.

N/A

3.7 **Progress Evaluation** - Describe the frequency and method of monitoring student progress, ensuring timely achievement of milestones, and how progress evaluation will be administered.

These are course-based programs. All for-credit courses will include assessments of student progress, which may include individual and team assignments, projects, presentations, final examinations, and final grades will be assigned in all. The programs are classroom-based during which complete courses will be delivered and graded. The program director will thus have frequent indicators of student progress and the ability to intervene in the event that difficulties are identified. The biomedical informatics project will be undertaken under the supervision of a School member who will provide feedback on progress. The presentation of a seminar to describe the project is required and will be graded by Faculty.

3.8 **Other** - Comment on any special matters and innovative features (e.g., the Program will be fully accredited by Canadian Association of Schools of Nursing).

The innovative feature of the program(s) is that they combine computational sciences with both medical and biological sciences.

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### 4. Program Content

#### 4.1 Explain how the curriculum addresses the current state of the discipline and fields of study.

Biomedical Informatics is a relatively new field and as such, the curriculum has been designed from a conceptual framework identified by the core team of the program to encompass elements that have been identified as essential to those who wish to work in the area of biomedical informatics. Please see Section 9.2 for more details.

#### 4.2 Identify any unique curriculum or program innovations or creative components.

The proposed graduate programs are unique in that they comprise both bioinformatics and medical informatics and involve collaborations with computational sciences and biomedical sciences. Please see Section 9.2 for more details.

#### 4.3 **Academic Integrity and Intellectual Property** - Explain how the Program educates students on the importance and role of academic integrity and matters of intellectual property.

In addition to the University’s Academic integrity web site, [http://www.queensu.ca/academicintegrity/index.html](http://www.queensu.ca/academicintegrity/index.html), including an online module, the academic regulations for this program will be clearly laid out for students during the opening session of the program. As part of this orientation, the Faculty will draw the students’ attention to this issue and to sources of information relating to the potential consequences of breaches of academic integrity.

There are resources on academic integrity available that will be utilized and students will be reminded of their accountability to the School of Graduate Studies. [http://www.queensu.ca/exph/academic-resources/academic-integrity](http://www.queensu.ca/exph/academic-resources/academic-integrity)

All syllabi will outline expectations of the course, including adherence to the academic integrity standards.
5. Assessment of Teaching and Learning

5.1 Degree Level Expectations (DLE)* – In Table 3 below, summarize how the Program’s structure and requirements address each DLE listed as well as any additional program-specific DLEs (Refer to Graduate Degree Learning Outcomes GDLE, page 34 of QUQAP for more information about graduate DLEs).

<table>
<thead>
<tr>
<th>DLE</th>
<th>Learning Outcomes</th>
<th>Relevant Courses, Academic Requirement</th>
<th>Indicators of Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Depth and breadth of knowledge</strong></td>
<td>Diploma students will demonstrate a strong command of knowledge in the area of biomedical informatics which will support the student’s future academic activities or professional practice within government, private or civil society sectors (e.g., biotechnology companies, Health Canada regulatory affairs, clinical trials). Diploma students will also demonstrate an awareness of the current issues in biomedical informatics.</td>
<td>The diploma in biomedical informatics requires the completion of 12 credit units at the graduate level (at the minimum). CISC-897* (3CU), BMIF-801* (3CU), BMIF-802* (3CU), BMIF-803* (3CU).</td>
<td>Successful completion of all course requirements, including all assessments. Students will ‘learn by doing’ throughout the program. Many courses in the program will have a project component and interactive laboratories. In these projects, the students will work with real problems and data, which will give them the invaluable experience of applying concepts discussed in class to real-life settings. Another type of experiential learning is achieved with cases from real organizations that contain the messiness and imperfections of real problems and real data and illustrate the importance of the organizational context for analytics projects. Such cases can include an analytical component or be used solely to illustrate an important management challenge.</td>
</tr>
<tr>
<td><strong>Research and scholarship</strong></td>
<td>Diploma students will have a robust understanding of current methods and literature in the area of biomedical informatics. Diploma students will have an understanding of the current literature.</td>
<td>Biomedical informatics paper which is part of CISC-897*.</td>
<td>Successful completion of the biomedical informatics paper component of CISC-897* that is reviewed and evaluated by the course instructor.</td>
</tr>
<tr>
<td><strong>Application of knowledge</strong></td>
<td>Diploma students will have the ability to make informed judgments on complex issues.</td>
<td>Required coursework.</td>
<td>Reasoned response to questioning during course presentations that demonstrate a</td>
</tr>
<tr>
<td>Knowledge Area</td>
<td>Description</td>
<td>Evidence</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>Communication skills</strong></td>
<td><strong>Diploma students will have the ability to clearly articulate their ideas, and their opinions both orally and in written format to colleagues as well as instructors.</strong> Where appropriate, courses will require teams / individuals to undertake projects or assignments based on real world analytics problems. These will typically involve presentation of the results either in a written report, a presentation to the class, or both.</td>
<td>Positive feedback from course instructors on quality of required presentations.</td>
<td></td>
</tr>
<tr>
<td><strong>Autonomy and professional capacity</strong></td>
<td><strong>Diploma students will possess the qualities and transferable skills necessary for employment, including the self-confidence to take initiatives and responsibilities during decision-making situations.</strong> Diploma students will also develop the intellectual independence to actively engage in continuing professional development; the ethical behaviour consistent with academic integrity and the use of appropriate guidelines and procedures for responsible conduct of research. Students will also have the ability to appreciate the broader implications of biomedical informatics. <strong>Mentoring by colleagues and other faculty members.</strong> Although not required, we encourage students to participate in “Expanding Horizons professional skills development program for graduate students” and serve as student representatives on various committees.</td>
<td>Demonstrated ability to present required course presentations and field questions. Successful completion of diploma paper that is reviewed and evaluated by the course instructor.</td>
<td></td>
</tr>
<tr>
<td><strong>Awareness of Limits of knowledge</strong></td>
<td><strong>Students will gain an appreciation for the breadth of ever-expanding information found in all science and accept that there are always different ways of interpreting science.</strong> Diploma students will also have the ability to accept and act on constructive criticism. <strong>Seminar presentations and mentoring by instructors.</strong></td>
<td>Reasoned response to questioning during required course presentations that demonstrate a knowledge and understanding of the potential contributions of other interpretations, methods, and disciplines.</td>
<td></td>
</tr>
</tbody>
</table>
5. Assessment of Teaching and Learning

5.1 Degree Level Expectations (DLE)* – In Table 3 below, summarize how the Program’s structure and requirements address each DLE listed as well as any additional program-specific DLEs (Refer to Graduate Degree Learning Outcomes GDLE, page 34 of QUQAP for more information about graduate DLEs).

Table 3. Mapping curriculum and degree level expectations (DLEs) (add rows as needed) FOR MBI

<table>
<thead>
<tr>
<th>DLE</th>
<th>Learning Outcomes</th>
<th>Relevant Courses, Academic Requirement</th>
<th>Indicators of Achievement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth and breadth of knowledge</td>
<td>Graduating MBI students will demonstrate a sound command of knowledge in the area of biomedical informatics which will support the student’s future academic activities or professional practice within government, private or civil society sectors (e.g. biotechnology companies, Health Canada regulatory affairs, clinical trials). Graduating students will also demonstrate a critical awareness of the current issues in biomedical informatics.</td>
<td>The MBI requires the completion of 24 units at the graduate level (at the minimum), including those from the Diploma Program (12U) as well as advanced courses in computing, biology and health science (therefore an additional 12 credit units on top of those from the Diploma are required). A biomedical informatics project.</td>
<td>Successful completion of all course requirements. Students will ‘learn by doing’ throughout the program. Many courses in the program will have a project component and interactive laboratories. In these projects, the students will work with real problems and data, which will give them the invaluable experience of applying concepts discussed in class to real-life settings. Another type of experiential learning is achieved with cases from real organizations that contain the messiness and imperfections of real problems and real data and illustrate the importance of the organizational context for analytics projects. Such cases can include an analytical component or be used solely to illustrate an important management challenge. Positive feedback from Program coordinator. Demonstrated depth of knowledge in bioinformatics as evidenced by performance in required seminars in courses, including ability to field questions related to bioinformatics. Positive feedback from instructors and supervisor on progress.</td>
</tr>
<tr>
<td>Research and scholarship</td>
<td>Graduating MBI students will have a firm understanding of current methods in biomedical informatics and the ability to</td>
<td>Biomedical informatics project.</td>
<td></td>
</tr>
<tr>
<td><strong>Application of knowledge</strong></td>
<td>Graduating MBI students will have the ability to make informed judgments on complex issues in the area of biomedical informatics. Through the application of knowledge, graduates will demonstrate competence in the research process by using available current literature to guide and critically analyze a novel research hypothesis.</td>
<td>Required coursework. Biomedical informatics project.</td>
<td>Successful performance in all courses.</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td><strong>Communication skills</strong></td>
<td>Graduating MBI students will have the ability to clearly articulate their research findings, their ideas, and their opinions both orally and in written format to colleagues as well as non-professionals.</td>
<td>Where appropriate, courses will require teams / individuals to undertake projects or assignments based on real world analytics problems. These will typically involve presentation of the results either in a written report, a presentation to the class, or both. Major research project.</td>
<td>Positive feedback from instructors on quality of required presentations.</td>
</tr>
<tr>
<td><strong>Autonomy and professional capacity</strong></td>
<td>Graduating MBI students will develop the qualities and transferable skills necessary for employment, including the self-confidence to take initiatives and responsibilities during decision-making situations. Graduating students will also possess the intellectual independence to actively engage in continuing professional development; the ethical behaviour consistent with academic integrity and the use of appropriate guidelines and</td>
<td>Mentoring by supervisor, colleagues and other faculty members. Although not required, we encourage students to participate in “Expanding Horizons professional skills development program for graduate students” and serve as student representatives on various</td>
<td>Demonstrated ability to present lectures and field questions. Successful project design and management. Successful presentation of project results and conclusions. Successful completion of research project paper that is reviewed and evaluated by the program coordinator and research supervisor.</td>
</tr>
<tr>
<td>Awareness of Limits of knowledge</td>
<td>Graduating MBI students will demonstrate an appreciation for the limitations of their research methods and potential biases of their interpretations of results.</td>
<td>Seminar presentations and mentoring by instructors.</td>
<td>Reasoned response to questioning during presentations that demonstrate a knowledge and understanding of the potential contributions of other interpretations, methods, and disciplines.</td>
</tr>
</tbody>
</table>
### 5.2 Describe how the proposed methods of assessing student achievement relate to the Program learning outcomes and degree level expectations.

Students at the graduate level in both programs will require skills to express themselves in a variety of media to ensure that they have job-ready skills necessary to develop an argument and defend their position. Use of both oral and written methods of assessment will help them to develop their communication skills.

**The methods of assessing student achievement in the Diploma program include:**

1. Performance in Course Work: Course work will involve a combination of assessment methods, including assignment writing, literature searches, critical thinking and problem solving. The assessment will establish that the student demonstrates a sound command of knowledge in the area of biomedical informatics, which will support the student’s future career activities.

2. Biomedical Informatics Paper: The ability to prepare a well-written paper requires students to develop and defend their research approach, process results, and prepare conclusions and recommendations. This component of the assessment process will also address all learning outcomes and DLEs.

**The methods of assessing student achievement in the MBI program include:**

1. Performance in Course Work: Course work will involve a mix of assessment methods including assignment writing, literature searches, critical thinking and problem solving. The assessment will confirm that the student demonstrates a sound command of knowledge in the area of biomedical informatics, which will support the student’s future academic activities or professional practice within government, private or civil society sectors (e.g. biotechnology companies, Health Canada regulatory affairs, clinical trials).

2. Quality of Biomedical Informatics Project: This component of assessment will address the student’s understanding of current methods in bioinformatics and the ability to utilize them to test a specific research hypothesis.

### 5.3 Outline the plans for documenting and demonstrating the level of performance of students (must be consistent with the OCAV’s Graduate Degree Level Expectations). [Refer to Graduate Degree Learning Outcomes GDLE, page 34 of QUQAP]

The Graduate Diploma Program requires 4 for-credit courses (4- 3CU), each of which will require assignments and/or class presentations. One 3-credit unit course (CISC-897*) will include a biomedical informatics paper requirement. The MBI Program requires the completion of 24 units at the graduate level, including those from the Diploma Program (12CU) as well as two advanced courses (3CU each) selected from computing and biomolecular sciences and a biomedical informatics project (6CU). Content covering all GDLE will be incorporated and evaluated in the various courses identified above. The School of Graduate Studies policy requires a minimum of a B- in all courses that are part of the GDip or Master’s program – [http://www.queensu.ca/calendars/sgsr/Course_Work_Requirements.html](http://www.queensu.ca/calendars/sgsr/Course_Work_Requirements.html)

Students will be given multiple opportunities in classwork to demonstrate their ability to search for knowledge, synthesize knowledge, adapt to the local context and write and speak coherently. Each course professor will use rubrics to identify the key aspects of each assessment so that students understand the assessment process. Assessments will be linked back to the core concepts so that over the course of their diploma or degree the students are able to learn and adapt knowledge to their own discipline and appreciate perspectives from other disciplines. Student progress through the program...
will be monitored through a committee of faculty members to ensure students are assisted in the successful completion of their diplomas or degrees. Where the committee identifies challenges to successful completion, students will be directed to appropriate services, such as the Writing Centre, the Centre for Teaching and Learning, and School of Graduate studies workshops and seminars.

### 6. Mode of Delivery

#### 6.1 Explain how the proposed mode(s) of delivery meets the Program learning outcomes and the degree level expectations. Comment on the relationship between mode of delivery and accessibility requirements.

Core courses will use one or more of the following delivery modes tailored to the goals of individual components.

**Conventional Lecture Format:** For background and principles courses.  
[Learning outcomes: breadth of knowledge, research and scholarship]

**Experiential Learning:** Students will ‘learn by doing’ throughout the program. Many courses in the program will have a project component and interactive laboratories. In these projects, the students will work with “real-world” problems and data, which will give them the invaluable experience of using concepts discussed in class to develop Work-place solutions.  
[Learning outcomes: Application of knowledge, Communication skills, Autonomy and professional capacity]

**Case analysis:** Another type of experiential learning will involve the study of cases drawn from existing organizations, which contain the messiness and imperfections of real problems and real data, and illustrate the importance of the organizational context for analytics projects. Such cases will include an analytical component or be used solely to illustrate an important management challenge.  
[Learning outcomes: Application of knowledge, Awareness of limits of knowledge, Communication skills, Autonomy and professional capacity]

**Projects and Project Presentations:** Where appropriate, courses will require teams / individuals to undertake projects or assignments based on real-world analytics problems. These will typically involve presentation of the results either in a written report, a presentation to the class, or both.  
[Learning outcomes: Application of knowledge, Awareness of limits of knowledge, Communication skills, Autonomy and professional capacity]

#### 6.2 Distance Delivery - Where students may take the same Program or elements of it in two different modes of delivery, indicate how consistency in Program requirements and standards will be assured. Describe how a learning community will be fostered, how regular interactions with faculty, students, etc., will be assured, and comment on access to materials, resources, and technology.

N/A
7. Anticipated Enrolment

7.1 Describe the recruitment strategy for the Program to ensure a strong applicant pool. Indicate how many new students the Program will attract to Queen’s, and how many students must be accommodated by other departments/units. Indicate which departments/units will be affected and how.

Projected Enrollments

Cohorts in the initial 1 to 3 years of the program(s) are anticipated to be approximately:

Year 1: Graduate Diploma 10
Year 1: MBI 5

Year 2: Graduate Diploma 15
Year 2: MBI 10

Year 3: Graduate Diploma 20
Year 3: MBI 15

By year 3, we anticipate both programs will have reached steady states of enrolment. The target market for this program is recent university graduates with training in biology, life sciences, biochemistry, medical sciences and related disciplines.

It should be emphasized that the program will automatically undergo a program review within five years, according to Queen’s University’s Senate policy to assess its long-term financial sustainability and academic quality.

Recruitment Strategy

To achieve our long-term enrolment goals we will undertake the following activities:

Information Sessions: the School of Computing and DBMS will host several on-campus information sessions throughout the year that will typically run for 60 minutes with timing split between a formal presentation and an informal networking session with students. Typically the sessions will provide students with a general overview of the program, followed by a Q&A and networking with past participants and administration staff.

As a potential student pool is located in other parts of Canada, information sessions will also be held on-line in both the lunchtime and early evening time slots. This will allow potential students to attend an information session at a time convenient to them. Each of these sessions will also be recorded to allow students to view them at their convenience via the internet. The main target markets are high-quality university graduates with training in biology, life sciences, biochemistry, medical sciences and related disciplines. The programs are aimed at students who have a strong background in these areas but are seeking knowledge on computational tools to better analyze and interpret data in their fields of expertise. The programs will also benefit students who wish to later apply to medical school.

Social Media Campaign: the Faculty will target students through its established Twitter and Facebook accounts.
7.2 In Table 4 below, summarize the projected intake and enrolments by year (by degree level and field as appropriate) until steady-state is reached.

Table 4. Intake and enrolment in Master’s and Doctoral Programs*

<table>
<thead>
<tr>
<th>Year</th>
<th>Grad Diploma Intake</th>
<th>Grad Diploma Enrolment</th>
<th>MBI Intake</th>
<th>MBI Enrolment</th>
<th>Total Enrolment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>15</td>
<td>5</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>20</td>
<td>10</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>3</td>
<td>20</td>
<td>20</td>
<td>15</td>
<td>15</td>
<td>35</td>
</tr>
<tr>
<td>4</td>
<td>20</td>
<td>20</td>
<td>15</td>
<td>15</td>
<td>35</td>
</tr>
<tr>
<td>5</td>
<td>20</td>
<td>20</td>
<td>15</td>
<td>15</td>
<td>35</td>
</tr>
<tr>
<td>6</td>
<td>20</td>
<td>20</td>
<td>15</td>
<td>15</td>
<td>35</td>
</tr>
<tr>
<td>7</td>
<td>20</td>
<td>20</td>
<td>15</td>
<td>15</td>
<td>35</td>
</tr>
</tbody>
</table>

8. Resources

Provide evidence that the Academic Unit(s) has the necessary resources to implement and deliver the proposed new Program under the following headings (where applicable). Budget Module and template must be completed.

8.1 Faculty - Comment on the adequacy of the faculty complement to teach and/or supervise in the Program and by field as appropriate AND complete Table 5 below. Submit completed CV modules for all faculty listed.

Please see Appendix 2: Faculty CV’s

Table 5. Faculty associated with the proposed Program (add rows as needed)

<table>
<thead>
<tr>
<th>Faculty Member</th>
<th>Rank/Status (Tenured, tenure track, continuing adjunct, term adjunct, special appointment, emeritus, etc.)</th>
<th>Field</th>
<th>Home Unit</th>
<th>Total Undergrad Teaching (% responsibility for course indicated in brackets)</th>
<th>Total Grad Teaching (incl new Program) (% responsibility for course indicated in brackets)</th>
<th>Supervisory Privileges in New Program</th>
<th>Total Theses Supervised (M/D)</th>
<th>Current Theses Supervised (M/D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selim Akl</td>
<td>Tenured</td>
<td>N/A</td>
<td>S of C</td>
<td>0</td>
<td>0</td>
<td>NA</td>
<td>28/18</td>
<td>2/3</td>
</tr>
<tr>
<td>Dorothea Blostein</td>
<td>Tenured</td>
<td>N/A</td>
<td>S of C</td>
<td>1-3CU (100%)</td>
<td>1-3CU (100%)</td>
<td>NA</td>
<td>23/4</td>
<td>0/0</td>
</tr>
<tr>
<td>Randy Ellis</td>
<td>Tenured</td>
<td>N/A</td>
<td>S of C</td>
<td>2-3CU (100%)</td>
<td>0</td>
<td>NA</td>
<td>19/7</td>
<td>2/1</td>
</tr>
<tr>
<td>Gabor Fichtinger</td>
<td>Tenured</td>
<td>N/A</td>
<td>S of C</td>
<td>2-3CU (100%)</td>
<td>0</td>
<td>NA</td>
<td>9/1</td>
<td>4/4</td>
</tr>
<tr>
<td>Janice Glasgow</td>
<td>Tenured</td>
<td>N/A</td>
<td>S of C</td>
<td>1-3CU (100%)</td>
<td>1-3CU (100%)</td>
<td>NA</td>
<td>27/6</td>
<td>0/0</td>
</tr>
<tr>
<td>Parvin Mousavi</td>
<td>Tenured</td>
<td>N/A</td>
<td>S of C</td>
<td>2-3CU (100%)</td>
<td>0</td>
<td>NA</td>
<td>14/2</td>
<td>1/3</td>
</tr>
</tbody>
</table>
8.2 Staff - Comment on the adequacy of the staff complement to support the Program (administrative, technical, IT, laboratory, etc.).

The courses for both proposed programs will be taught by existing faculty members and adjuncts as either part of their workload or as overload. The overload costs estimated at $60,000 annually will be covered by program revenues. Three new courses, equivalent to 3 credit units each are being developed by existing faculty. Since the courses will be dependent on labs, there will also be a TA requirement ($20,000) to support the faculty teaching the program’s laboratory components, administrative/recruitment support ($10,000) and a specialized computer laboratory that would accommodate up to 20 students ($30,000 the first year and ongoing support of $10,000 per year at steady state). There would also be start-up costs for program evaluation ($5,000) and marketing ($20,000) plus ongoing costs of $10,000 a year for marketing.

A detailed overview of the programs proposed budget is attached in Appendix 3 Proposed Budget.

8.3 Space Requirements - Describe the work space, laboratory space, office, classroom and equipment needed to support students’ scholarship and research activities.

Since the courses will be dependent on labs, there will also be a requirement for a specialized computer laboratory that would accommodate up to 20 students ($30,000 the first year and ongoing support of $10,000 per year at steady state).

8.4 Information Technology - Describe the information technology needed to support students’ scholarship and research activities. Indicate the resource implications for hardware, software/internet, audio-visual, telecommunications, etc.

As stated above, since the courses will be dependent on labs, there will also be a requirement for a specialized computer laboratory that would accommodate up to 20 students ($30,000 the first year and ongoing support of $10,000 per year at steady state). These resource requirements were discussed with Bo Wandschneider, Associate Vice Principal, Information Technology – CIO, on October 13, 2015.

8.5 Library - Provide information about library support holdings, availability of and access to library resources relevant to the proposed Program(s).

The Library collects information resources in all formats to support teaching, learning and research across the range of programs offered by the School of Computing and the Department of Biomedical and Molecular Sciences. The Engineering and Science Library houses the majority of print resources in the discipline of science and engineering and the Bracken Health Science Library in the area of health science while relevant materials may be located across the library system, depending on each
researcher’s area of focus.

In addition to the extensive holdings of print books to support the program, the Library’s growing collection of **electronic books** contains hundreds of works of interest to researchers in computing, biology, life science and medical science. Examples of note include:

- **Books 24x7 IT Pro Collection**: full-text of recent texts and manuals on information technology topics published by commercial and technical imprints
- **Books@OVID**: full-text access to medical, nursing and pharmacy texts from a variety of publishers
- **SIAM**: Society for Industrial and Applied Mathematics eBook collection
- **SpringerLink- EBooks**: full text of books in mathematics and computer science, health and life sciences, and other multidisciplinary areas;

These resources are supplemented by the acquisition of electronic books from major publishers such as IEEE, Wiley, Cambridge University Press and Oxford University Press.

Most, if not all, major **reference works** have been available in electronic format, greatly enhancing access to their content. The Library provides access to over 600 indexing and abstracting databases in all disciplines. Important online indexes to the literature of this discipline include:

- **BIOSIS Preview**: all areas of life science including biochemistry, biotechnology, microbiology, molecular genetics, neuroscience, pharmacology, public health, toxicology, zoology.
- **Cold Spring Harbor Protocols**: Manuals for research methods and techniques in molecular and cellular biology, genetics, bioinformatics, protein science, and imaging.
- **Compendex**: comprehensive abstract database for scientific and technical research for engineering journals and conference proceedings.
- **INSPEC**: abstract database covering journals in electrical and electronic engineering, communications, computer science, control engineering, information technology, operations research, engineering mathematics, and biomedical technology among others.
- **MathSciNet**: database of reviews, abstracts and bibliographic information for much of the mathematical sciences literature
- **MEDLINE**: Comprehensive coverage of medicine, life science and health administration.
- **Science Citation Index**: indexes thousands of technical and scientific journals. It now includes conference proceedings
- **Scifinder**: provides access to more than 100 years of chemistry and related science information through the combined coverage of Chemical Abstracts and MEDLINE.

A complete list of databases and other online reference works, many more of which are relevant to this program, is available at [http://library.queensu.ca/research/databases/](http://library.queensu.ca/research/databases/). To expedite access to published journal articles, the ability to link from database citations to subscribed full-text or to the Queen’s University Library Catalogue (QCAT) has been enabled.

Data Services, on the Lower Level of Stauffer Library, provides access to statistics and a vast array of data resources. Queen’s University Library provides Research Data Management Services in order to support researchers meet their grant requirements and/or produce a more competitive grant application, increase the impact and visibility of their research, encourage the discovery and use of existing data to explore new research questions, better guarantee the data are accurate, complete, authentic, and reliable, ensure long-term preservation of data for future researchers, and ensure compliance with ethics and privacy policies.
Indicate what new library resources will be needed (e.g. journals, print monographs, audio-visual material, historical documents, electronic databases, statistical/geospatial data)

In consultation with Martha Whitehead, Vice Provost and University Librarian, the proposed program will require no additional library resources. This consultation took place on September 15, 2015.

Indicate the likelihood of the Program having an impact on the Library staffing. Provide date that consultation with the Library staff took place.

In consultation with Martha Whitehead, Vice Provost and University Librarian, the proposed program will have no additional demands on the library staffing. This consultation took place on September 15, 2015.

8.6 Research Funding - Provide evidence of adequate research funding to sustain the research activities of faculty and graduate students AND complete Table 6 (below).

Faculty participating in the proposed graduate program (as listed in Table 6), receive funding from a variety of sources including (but not limited to): Canadian Institutes for Health Research (CIHR), Canada Foundation for Innovation (CFI), Heart and Stroke Foundation, Ontario Research Fund (ORF), Natural Sciences and Engineering Research Council of Canada (NSERC), National Institutes of Health (NIH). We are confident that we can sustain the research activities of faculty and graduate studies with the proposed programs.

Table 6. Research funding (operating) by source (do not include conference grants, SSHRC minor grants or equipment grants). Include last 3 years only. [add additional rows as needed]

<table>
<thead>
<tr>
<th>Year</th>
<th>Field</th>
<th>Federal Granting Council</th>
<th>Other Peer Adjudicated</th>
<th>Contracts</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td></td>
<td>1,182,084</td>
<td>433,350</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td></td>
<td>1,443,992</td>
<td>577,700</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014</td>
<td></td>
<td>1,086,035</td>
<td>292,683</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8.7 Student Funding - Indicate if graduate students in the new Program will receive funding packages. If yes, state the minimum annual funding support (by degree level) and describe how the funding commitments will be met.

The students in the diploma and professional MSc programs will not be offered minimum annual funding support, however some funds may be set aside to provide full or partial tuition bursaries for one or more students in need.

8.8 Describe any additional resources required that are not currently available. Provide evidence of institutional commitment to supplement existing resources as needed (See Budget module).

N/A
9. **Other Matters**

9.1 *Provide evidence of student demand for the Program and describe how this information was obtained.*

The proposed Biomedical Informatics programs will focus on training future professionals to translate data into knowledge that will transform how health care is approached and delivered. The programs will be of interest to students with training in biology, life sciences, biochemistry, medical sciences and related disciplines, who are interested in designing and implementing quantitative and computational methods that solve challenging problems across the entire spectrum of biomedical sciences that wish to develop the skills required for a range of exciting careers in research institutes or industry.

To ensure the programs meet the needs of students, the School of Computing in partnership with the Department of Biomedical and Molecular Sciences conducted a survey to assess student interest in the proposed programs. The survey was administered during the weeks of March 1st and March 29th, 2015.

In total, 211 students viewed the survey and 177 completed it. The largest group of respondents was from the Life Sciences undergraduate program. In total, we sent the survey to 841 Life Sciences students and 122 responded. A 15% response rate is encouraging as the students are ideal candidates for the programs.

Key findings indicate that when combined, 44% of students surveyed placed extremely high priority (12%) or relatively high priority (32%) on enrolling in such programs. An additional 37% were interested but non-committal while 19% of students were not interested in the programs.

When asked why they were potentially interested in applying to such programs, 40% of students said the programs offer an opportunity to acquire applied skills in data analysis, 18% said the programs will allow them to start their career with additional credentials and 26% said the programs will allow them the opportunity to develop the skills required to enter the profession. Finally, 14% said the programs would provide a nice alternative to medical school.

42% of students identified that they preferred to pursue a graduate diploma and then have the option to continue their studies in the Master’s program, while 35% said they would prefer to enroll in the Master’s directly.

In addition, when asked how valuable they felt such programs would be for achieving their career objectives upon graduation, 15% said extremely valuable while 31% said very valuable and an additional 64% said valuable to somewhat valuable.

Finally, 74 of the respondents or 46% of all respondents have asked (and shared their contact information) that we keep them posted on the programs’ development – a positive sign that there is interest in the proposed programs.

For the full student demand survey results, please see **Appendix 4: Student Demand Survey**.

9.2 *Explain how the Program will fulfill societal need. Comment on similar programs offered elsewhere and why the proposed program will be attractive to applicants (include any unique or innovative elements/features).*

The 2009 *Health Informatics and Health Information Management Human Resources Report* has provided estimated hiring requirements for Health Informatics (HI) and Health Information Management (HIM) professionals from 2014 to 2019. The report also identifies HI and HIM professional roles for which there is a risk of skills shortages.

The report’s findings are based on surveys that were administered to the public and private sectors, additional statistical research, and a review of relevant literature on human resources requirements in the e-health field. Based on this research, estimates were developed of the hiring requirements that will result from replacement demand, new investment in e-health technologies, and growth in the installed
base of e-health systems and applications.

**Key Findings**

1) Current employment of health informatics (HI) and health information management (HIM) professionals in the public and private sector is estimated at approximately 39,900 persons. Over the next five years the combination of growth demand and replacement demand will generate hiring requirements ranging from approximately 6,200 to 12,200 persons. More than 70% of these hiring requirements will be in information technology and health information management.

2) Approximately 82% of private sector staff is engaged in roles that directly pertain to implementing and supporting e-health technologies. More than half of survey respondents identified ‘data analytics’ and ‘clinical practice and procedures’ as skill areas in which they are having difficulty meeting their current human resources requirements. Forty percent also identified ‘IT system architecture / data integration’ as being an area of hiring difficulty. A similar proportion (38%) reported difficulty in finding ‘business process / systems needs analysts’.

3) The nature of the e-health market may unintentionally exacerbate skills shortages by encouraging companies in the private sector to under-recruit at the career entry level. Requests for proposals almost always specify required levels of prior experience. The weight given to experience in competitive tenders is then mirrored by companies’ hiring strategies.

4) Certifications are playing an increasingly important role. A majority of companies require or prefer these certifications when hiring new employees.

5) The needs of the health care system will change as it progresses through the various maturity stages in the adoption and utilization of e-health technologies. The progressive implementation of Canada Health Infoway’s blueprint for e-health also changes the health sector’s requirements. These changes in the healthcare system’s needs create both new business opportunities for the private sector and also alter the profile of its human resources needs.

In addition to these finding, the School of Computing and DBMS conducted a small round table discussion with several employers that are currently hiring / managing talent in the biomedical informatics sector. During this discussion, employers were asked to identify skill or knowledge set shortfalls that they observe among new hires. Their feedback was consistent. Employees must have strong analytic and quantitative skills and must be ambitious, have a thirst for knowledge, be a fearless learner and have a curious mind. They must have a desire to seek answers to complicated questions. Employers were also looking for candidates with strong technical skills on experience using MATLAB or R Scripting that has developed their data management and data handling skills. When asked what truly separates candidates during their hiring process, the overwhelming response was “numerical literacy” – a candidate’s ability to look at data sets and come up with a number. The second criteria was a candidate’s ability to speak both languages (i.e. to support / understand a Principal Investigator (PI) when he/she says “this is what I want or what I’m looking for” and can understand that request/question and respond by saying, “This is what I recommend we do and this is how we will do it.” This ability to understand the needs of the PI and to make a recommendation on how to move forward is the key to success.

To conclude, throughout the development of this program, we have kept in mind the needs of industry and have weaved their feedback into the curriculum’s learning objectives and course design to ensure that students when exiting the program have developed the skill-sets required to enter the labour market. It also evident that the labour market for graduates of the proposed program is strong and, according to the *Health Informatics and Health Information Management Human Resources Report,*
Related Programs in Canada

In recent years Canadian universities have recognized the market need for students trained in bioinformatics. These include the University of Toronto (Bioinformatics; Genome Biology and Bioinformatics), University of Alberta (Bioinformatics), University of Calgary (Genome Proteomics), Simon Fraser University (Bioinformatics), University of British Columbia (Computer Science, Micro-Biology and Immunology), Dalhousie (Computational Biology and Bioinformatics), and University of Waterloo (Bioinformatics).

Our proposed graduate programs are unique in that they comprise both bioinformatics and medical informatics and involve collaborations with both biology and health sciences. The value added features of our programs will provide distinctive skills to graduates making them highly attractive to prospective employers.

9.3 For new Professional Programs, provide evidence that the Program is congruent with the regulatory requirements of the profession.

There are no regulatory requirements for this field.

9.4 For research-focused graduate programs, provide a clear indication of the nature and appropriateness of the major research requirements for program completion.

N/A

10. Equity, Diversity and Accessibility

10.1 Describe how the proposed new Program will address equity considerations, including (but not limited to) issues of particular concern for the groups identified in the University’s various Equity programs

The Strategic Plan for Queen’s University names diversity and equity among key values and principles that define the Queen’s Community. Diversity includes but is not limited to a diverse range of experiences, nationalities and ethnicities, sexual orientation and gender identity, income levels, ages and cultures.

The individuals and the groups developing this academic program are, to borrow from the Senate Educational Equity Committee’s phrasing ‘committed to counteracting discrimination in this institution and developing climate of educational equity that recognizes and respects the equal dignity and worth of all who seek to participate in the life, work and mission of the University.

The initiation of an undergraduate program in Biomedical Computing increased the percentage of women in computing. It is anticipated that a graduate program in this area will attract women with undergraduate degrees in health/medical sciences who wish to combine their interests with computational skills.
10.2 Provide information about the representation rates of members of designated groups within the faculty and identify gaps in representation as compared to the appropriate Canadian workforce population.

N/A

11. Quality and Other Indicators

11.1 Provide evidence of the quality of the faculty and their collective breadth and scope to deliver the program (e.g. qualifications, teaching effectiveness, supervisory/mentorship ability, research impact, innovation and scholarly record; appropriateness of collective faculty expertise to contribute substantively to the proposed program).

Faculty in the School of Computing and DBMS are internationally recognized experts in computer science and in biomedical and molecular sciences. Our faculty members are actively engaged in research, and have been successful in obtaining extensive research funds. The capabilities and contributions of the faculty members are also recognized nationally and internationally as demonstrated by publications in international peer-reviewed journals and books, invited presentations and involvement in scientific societies and expert panels and workshops. Research activities involve numerous collaborations among disciplines, within the university, nationally and internationally. The combined expertise in biomedical and computing applications is essential to the process of giving meaning to data and the collaborative nature of the proposed biomedical informatics programs.

11.2 Comment on the Program structure and faculty attributes (including research activity) that will ensure the intellectual quality of the student experience.

As indicated above we are confident that the structures of the new programs will provide students with numerous educational, professional and personal benefits including:

Educational Benefits

- Working collaboratively with a faculty mentor
- Learning about issues, methods, and leaders in a chosen field
- Applying concepts from courses to “real life” situations
- Sharpening problem-solving skills

Professional Benefits

- Exploring potential career paths
- Enhancing professional communication skills
- Learning new techniques and skills for one’s career
- Networking with others who share similar interests

Personal Benefits

- Growing as a critical, independent thinker
- Building confidence and the ability to work independently
- Enhancing ones awareness of ethical issues
In addition, the program’s faculty are international recognized expertise in computer sciences and biomedical and molecular sciences and have sufficient research funds that will significantly contribute to student experiences. The excellence of our Faculty will benefit students through their expertise, mentorship in courses and research projects. Master’s students will also be affiliated with a research laboratory where they will interact with other graduate students and faculty, work on related projects and network with others who share similar interests.

**Supporting documentation**

*Embed relevant documents supporting the proposal (e.g. letters of support from Deans, Department Heads, collaborators, external agencies, etc.) by inserting the letters as Word Documents. If the letters are .pdf documents, it is essential that they are first converted to Word documents using Adobe Acrobat Software to avoid loss of resolution and formatting. If you do not have Adobe Acrobat, please consult your faculty office.*

<table>
<thead>
<tr>
<th>Appendix 1: Course Descriptions</th>
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</thead>
<tbody>
<tr>
<td>Appendix 2: Faculty CVs</td>
</tr>
<tr>
<td>Appendix 3: Proposed Budget</td>
</tr>
<tr>
<td>Appendix 4: Student Demand Survey</td>
</tr>
</tbody>
</table>
### Part C – Administration & Government Reporting Information

Part C is to be completed by the Department/Faculty in consultation with the Office of the University Registrar and the School of Graduate Studies.

#### 12. Information for and/or from the Office of the University Registrar and/or the School of Graduate Studies Registrar

<table>
<thead>
<tr>
<th>12.1. Academic Administration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Academic Career</strong></td>
</tr>
<tr>
<td><strong>Department(s)</strong></td>
</tr>
<tr>
<td>School of Computing</td>
</tr>
<tr>
<td>Department of Biomedical and Molecular Sciences</td>
</tr>
<tr>
<td><strong>Proposed Start Date</strong></td>
</tr>
<tr>
<td><strong>Program duration</strong></td>
</tr>
<tr>
<td>Diploma 4 months</td>
</tr>
<tr>
<td>MBI – 12 months</td>
</tr>
<tr>
<td><strong>Expected enrolment</strong></td>
</tr>
<tr>
<td><strong>Initial Year</strong> 10 GDiP 5 MBI</td>
</tr>
<tr>
<td><strong>Program Name:</strong> Degree (max 50 characters) (e.g. Master of Applied Science)</td>
</tr>
<tr>
<td>Graduate Diploma in Biomedical Informatics</td>
</tr>
<tr>
<td>Master of Biomedical Informatics</td>
</tr>
<tr>
<td><strong>Academic Plan</strong> (e.g. Chemical Engineering)</td>
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<tr>
<td>Biomedical Informatics</td>
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<tr>
<td><strong>Collaborative Program Sub-Plan</strong></td>
</tr>
<tr>
<td>List all departments/plans that may admit students into the Collaborative Sub-Plan. Indicated department with <em>primary responsibility for Sub-Plan</em> (underline)</td>
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<tr>
<td>N/A</td>
</tr>
<tr>
<td><strong>Pattern of Study</strong> (Master’s programs only; choices: Pattern I, II, III)</td>
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<tr>
<td><strong>12.2. Complete the following:</strong></td>
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<tr>
<td>Will students be admitted part-time?</td>
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<tr>
<td>Will all or part of the program be offered at the BISC campus?</td>
</tr>
<tr>
<td>Will all or part of this program be offered via distance learning (e.g. online or blended learning?)</td>
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## 13. Course Information

New Courses with new subject code required? [ ] Yes [ ] No

If yes, suggested Subject Code

<table>
<thead>
<tr>
<th>14. Tuition and Student Activity Fees</th>
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</thead>
<tbody>
<tr>
<td><strong>Tuition Fee</strong></td>
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<tr>
<td><strong>Fee Assessment Protocol</strong></td>
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<tr>
<td><em>(Annual? Per term Or per course?)</em></td>
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<tr>
<td><strong>Student Activity Fees</strong></td>
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<tr>
<td><em>GRAD - SGPS</em></td>
</tr>
<tr>
<td><strong>Non-Tuition Fees</strong></td>
</tr>
</tbody>
</table>

## 15. Government Reporting

| Proposed FORPOS                      |
| Program Weight (BIUs)                |
| Proposed CIP Code                    |
Part D – Authorizations

Part D a-d is to be completed prior to GSEC approval.

<p>| | | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>a. Department Head(s)</td>
<td>____________________________</td>
<td>________________</td>
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<tr>
<td></td>
<td>Signature</td>
<td>Date</td>
</tr>
<tr>
<td>b. Faculty Dean(s) or delegate(s)</td>
<td>____________________________</td>
<td>________________</td>
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<tr>
<td></td>
<td>Signature</td>
<td>Date</td>
</tr>
<tr>
<td>c. Date approved by Faculty Graduate Council/Committee</td>
<td>____________________________</td>
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<tr>
<td>d. Date approved by Faculty Board(s) if required as per Faculty Graduate Council/Committee regulations</td>
<td>____________________________</td>
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<tr>
<td>e. Date Approved by GSEC</td>
<td>____________________________</td>
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<tr>
<td>f. University Librarian</td>
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<tr>
<td></td>
<td>Signature</td>
<td>Date</td>
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<tr>
<td>g. University Registrar</td>
<td>____________________________</td>
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<tr>
<td></td>
<td>Signature</td>
<td>Date</td>
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<tr>
<td>h. Executive Director (Budgeting &amp; Planning)</td>
<td>____________________________</td>
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<tr>
<td></td>
<td>Signature</td>
<td>Date</td>
</tr>
<tr>
<td>i. Vice-Provost and Dean, School of Graduate Studies</td>
<td>____________________________</td>
<td>________________</td>
</tr>
<tr>
<td>j. Provost and Vice-Principal (Academic)</td>
<td>____________________________</td>
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</tbody>
</table>
Appendix 1: Graduate Courses
This section provides detailed descriptions of the graduate programs and courses:

1. CISC 897 Research Methods in Computer Science
2. BMIF 801 Programming Skills and Tools (NEWLY DEVELOPED)
3. BMIF 802 Biomedical Data Analysis (NEWLY DEVELOPED)
4. BMIF 803 Data Mining and Applications (NEWLY DEVELOPED)
5. CISC 832 Data Base Management Systems
6. CISC 859 Pattern Recognition
7. CISC 873 Data Mining
8. CISC 881 Topics in Biomedical Computing I
9. CISC 886 Cloud Computing
10. BMIF 898 Masters Project
11. BMED 809 Principles of Drug Discovery and Development
12. BMED 810 Protein Structure and Function
13. BMED 811 Advanced Molecular Biology
14. BMED 813 Advances in Neuropharmacology
15. BMED 815 Mechanistic Toxicology
16. BMED 854 Cardiovascular Sciences
1. CISC 897 Research Methods in Computer Science

The overall objectives of the course are to provide the research tools for writing and understanding research methods.

Course Learning Outcomes

• Read and critique research papers
• Using the scientific method, express an hypothesis, methodology and results of research
• Prepare and present research posters and oral presentations.
• Understand issues in research ethics.

Assessment

• written assignments
• presentations
• participation

Relation to Degree Level Expectations

• student understands limitations of current research methods
• student is aware of open problems and research opportunities
• student can critically evaluate current research
• student can make a seminar presentation on own or other’s research
• student can write a research paper on own work
• student can present own research at a conference
• student understands and uses professional ethics
• student understands impact of computing on individuals and society
CISC897 Research Methods for Computer Science
Course Outline

Aim
Providing incoming M.Sc. with basic research and working skills, facilitating a smooth transition to graduate studies and research. The course spans multiple elements including time management, writing and presentation skills, and general considerations for experiment design and planning.

General Information

Instructor
Abd-Elhamid M. Taha
Goodwin Hall, Room 754
taha@cs.queensu.ca
http://www.cs.queensu.ca/~taha

Classes
Wednesdays; 13:30-14:30
Miller Hall, Room 210

Website
http://www.cs.queensu.ca/~cisc897

Textbook

Other references
- David Allen, Getting Things Done, Penguin, 2001
- 43 Folders (www.43folders.com)
- How to do research (www.ifs.tuwien.ac.at/~silvia/research-tips)
- You and Your Research, Interview with Dr. Richard W. Hamming (www.chriss-lott.org/misc/kaiser.html)

Timeline

<table>
<thead>
<tr>
<th>Module</th>
<th>Date</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>January 13</td>
<td>Getting started</td>
</tr>
<tr>
<td>2</td>
<td>January 20</td>
<td>Time management</td>
</tr>
<tr>
<td>3</td>
<td>January 27</td>
<td>Research methods</td>
</tr>
<tr>
<td>4</td>
<td>February 3</td>
<td>Compose yourself – I</td>
</tr>
<tr>
<td>5</td>
<td>February 10</td>
<td>Compose yourself – II</td>
</tr>
<tr>
<td>6</td>
<td>February 17</td>
<td>Elevator pitch</td>
</tr>
<tr>
<td>7</td>
<td>February 24</td>
<td>Reading week</td>
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<tr>
<td>8</td>
<td>March 3</td>
<td>Ethics in research</td>
</tr>
<tr>
<td>9</td>
<td>March 10</td>
<td>Writing Centre</td>
</tr>
<tr>
<td>10</td>
<td>March 17</td>
<td>Career Services</td>
</tr>
<tr>
<td>11</td>
<td>March 24</td>
<td>Long Presentations</td>
</tr>
<tr>
<td>12</td>
<td>March 31</td>
<td>Long Presentations</td>
</tr>
<tr>
<td></td>
<td>April 7</td>
<td>Long Presentations</td>
</tr>
</tbody>
</table>
Main Deliverables

- Writing assignments
- Reading assignments
- Short presentation (Module 6)
- Long presentation (Modules 11 and 12)
- Critique of (others’) long presentations
- Survey paper (tentative deadline: April 12th)

Elaborations on the details of the different deliverables will be discussed at suitable times.

Marking Scheme

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reviews</td>
<td>20</td>
</tr>
<tr>
<td>Weekly assignments, class discussion</td>
<td>15</td>
</tr>
<tr>
<td>Short presentation</td>
<td>10</td>
</tr>
<tr>
<td>Long presentation</td>
<td>15</td>
</tr>
<tr>
<td>Critique of (other) long presentations</td>
<td>5</td>
</tr>
<tr>
<td>Survey paper (8 pages)</td>
<td>35</td>
</tr>
</tbody>
</table>

Notes on correspondence and submitting deliverables

- Reasonable submission forms should be used. PDFs are more preferred over compatibility-dependent files.
- Some level of seriousness should be exercised in submissions. This covers both form and content. Having a submission in the email body, or not using intelligible file names, email subjects, etc. will be dismissed without indication.
- When submitting more than one file, you might want to consider an archival format (.zip or .rar) with a readme.txt file, for example, describing the contents.
- To facilitate filtering at my side, use CISC897 at the beginning of each email’s subject, e.g. “CISC897: assignment 2 task 3”.
- Use proper citation or referencing whenever you indicate a reference within your submission. This includes, but is definitely not limited to, relevant dates, publishing locations, URL (and date noted) and names.
- In short, do exercise your better judgment in all the correspondence and submission.
BMIF 801: Programming Skills and Tools for Processing of Biomedical Data

AIM
To provide incoming Graduate Diploma in Biomedical Informatics (GDip [BI])) students with hands-on training in computer programming languages, software tools and algorithms used in biomedical research. Topics will include an introduction to programming in R and MATLAB, pre-processing and management of biomedical datasets, identification of outliers, workflow for quality control assessments, and basics of cloud computing. Examples of real biomedical datasets will be provided to illustrate the application of programming tools.

GENERAL INFORMATION

INSTRUCTOR: Qingling Duan
Botterell Hall, room 513
Kingston, ON, K7L 2V5
T. 613-533-6356
E. qd3@queensu.ca

This is the second of four required courses (each worth 3.0 units) for completion of a GDip [BI] and required for admission into the MBI. Prerequisites for this course include admission in the Graduate Diploma (GDip [BI]) or permission of the Program Coordinator (qingling.duan@queensu.ca).

COURSE COMPONENTS: This course will span over three weeks during the summer session and include lectures, seminars, laboratories and tutorials.

MODULES AND TIMELINE
1. Week 1: Programming for Biomedical Research: Introduction to UNIX, R, and MATLAB
   - Basic command line coding
   - Bioconductor suite of softwares for biomedical research
2. Week 2: Workflow for managing and pre-processing biomedical datasets
   - Working with various file formats
   - Tools for visualizing biomedical datasets
   - Quality assessment such as identification of outliers, technical artifacts, experimental errors
3. Week 3: Cloud Computing: Best practices for configuring one’s own virtual machines and accessing cloud-based datasets

INTENDED STUDENT LEARNING OUTCOMES
- Demonstrate basic programming skills in UNIX, R, and MATLAB
- Gain experience with cloud computing and data visualization tools
- Apply workflow for pre-processing and management of biomedical datasets such as identification of outliers and evaluation of data quality using real examples such as imaging, genomics and other biomedical areas such as flow cytometry and gene expression profile

**RELATION TO DEGREE LEVEL EXPECTATIONS**

- *Depth and breadth of knowledge in anatomical sciences:* Graduating diploma students will demonstrate a sound command of knowledge in the area of biomedical informatics.
- *Research and scholarship:* Graduating diploma students will have a good understanding of current methods in biomedical informatics.
- *Application of knowledge:* Graduating diploma students will have the ability to make informed judgments on complex issues in the area of biomedical informatics.
- *Communication skills:* Graduating diploma students will have the ability to clearly articulate their ideas and their opinions both orally and in written format to colleagues and instructors.

**ASSESSMENT**

Module assignments: 50%
Presentation: 20%
Final assignment: 30%
BMIF 802: Biomedical Data Analysis

AIM
To provide incoming Graduate Diploma in Biomedical Informatics (GDip [BI])) students with hands-on training in analysis of biomedical datasets. Topics will include feature extraction and classification, pattern recognition, supervised and unsupervised learning, and basic concepts of biostatistics as applied to the analysis of biomedical data. Examples of real biomedical datasets will be provided to demonstrate various methodologies for data analysis.

GENERAL INFORMATION

INSTRUCTOR: Qingling Duan
Botterell Hall, room 513
Kingston, ON, K7L 2V5
T. 613-533-6356
E. qd3@queensu.ca

This is the third of four required courses (each worth 3.0 units) for completion of a GDip [BI] and required for admission into the MBI. Prerequisites for this course include BMIF 801 as well as admission in the Graduate Diploma (GDip [BI]) or permission of the Program Coordinator (qingling.duan@queensu.ca).

COURSE COMPONENTS: This course will span over three weeks during the summer session and include lectures, seminars, laboratories and tutorials.

MODULES AND TIMELINE:
1. Week 1: Data visualization and transformations
2. Week 1: Dimension reduction of biomedical Data: principle component analysis
3. Week 2: Data Correlations: regression analysis
4. Week 2: Data Clustering
5. Week 3: Statistical models: parametric and non-parametric tests

INTENDED STUDENT LEARNING OUTCOMES
- Load, transform and visualize biomedical data
- Gain an understanding of Principal Component Analysis (PCA) as a method for dimension reduction and perform PCA on biomedical data as well as interpret the results
- Gain an understanding of linear and non-linear regression and compute linear regressions on data as well as evaluate them
- Gain an understanding of clustering principles and apply basic hierarchical and partitioning methods to biomedical data
- Gain an understanding of the principals behind a statistical test and perform various tests as well as interpret the results
BMIF 803: Biomedical Data Mining and Applications

AIM
To provide incoming Graduate Diploma in Biomedical Informatics (GDip [BI])) students with hands-on training in data mining and its applications in various areas of biomedical research. Topics will include the uses of data mining and the application of various tools using real biomedical data. Examples of real biomedical datasets will be provided to demonstrate various methodologies for data mining and relevance to biomedical research.

GENERAL INFORMATION

INSTRUCTOR: Qingling Duan
Botterell Hall, room 513
Kingston, ON, K7L 2V5
T. 613-533-6356
E. qd3@queensu.ca

This is the final of four required courses (each worth 3.0 units) for completion of a GDip [BI] and required for admission into the MBI. Prerequisites for this course include BMIF 801 and BMIF 802, as well as admission in the Graduate Diploma (GDip [BI]), or permission of the Program Coordinator (qingling.duan@queensu.ca).

COURSE COMPONENTS: This course will span over three weeks during the summer session and include lectures, seminars, laboratories and tutorials.

MODULES AND TIMELINE
1. Week 1: Public databases and web interfaces for biomedical research
2. Weeks 1&2: Types of biomedical datasets: storing and management of data
3. Weeks 2&3: Generating workflow for data management, pre-processing, analysis and interpretation of results

INTENDED STUDENT LEARNING OUTCOMES
- Gain working knowledge for navigating various public and web-based resources for biomedical research
- Identify and characterize various types of biomedical datasets and the file formats used to store this data
- Identify secure platforms for storing, managing, transforming and analyzing biomedical datasets at Queen’s and within Canada
- Generate a hypothesis for biomedical research and establish a pipeline for data pre-processing, analysis and interpretation of the results

RELATION TO DEGREE LEVEL EXPECTATIONS
- Depth and breadth of knowledge in anatomical sciences: Graduating diploma
students will demonstrate a sound command of knowledge in the area of biomedical informatics.

- **Research and scholarship**: Graduating diploma students will have a good understanding of current methods in biomedical informatics.

- **Application of knowledge**: Graduating diploma students will have the ability to make informed judgments on complex issues in the area of biomedical informatics.

- **Communication skills**: Graduating diploma students will have the ability to clearly articulate their ideas and their opinions both orally and in written format to colleagues and instructors.

- **Awareness of limits of knowledge**: Graduating diploma students will gain an appreciation for the breadth of ever-expanding information found in all science and accept that there are always different ways of interpreting science. Graduating diploma students will also have the ability to accept and act on constructive criticism that will elevate their critical thinking skills, sharpen their problem solving skills and further their creative achievement.

**ASSESSMENT**

Module assignments: 50%
Presentation: 20%
Final assignment: 30%
RELATION TO DEGREE LEVEL EXPECTATIONS

- **Depth and breadth of knowledge in anatomical sciences:** Graduating diploma students will demonstrate a sound command of knowledge in the area of biomedical informatics.
- **Research and scholarship:** Graduating diploma students will have a good understanding of current methods in biomedical informatics.
- **Application of knowledge:** Graduating diploma students will have the ability to make informed judgments on complex issues in the area of biomedical informatics.
- **Communication skills:** Graduating diploma students will have the ability to clearly articulate their ideas and their opinions both orally and in written format to colleagues and instructors.

ASSESSMENT

Module assignments: 50%
Presentation: 20%
Final assignment: 30%
5. CISC 832 Data Base Management Systems
The overall objectives of the course are to study theory and practice of modern data base systems.

Course Learning Outcomes
• Describe algorithms and concepts used to implement a relational DBMS including concurrency control, recovery, query processing and query optimization
• Analyze factors affecting the performance of relational DBMSs
• Describe topics related to the concept of big data, such as advanced architectures, NoSQL databases, MapReduce programming paradigm
• Develop MapReduce programs in a cloud environment.
• Apply an in-depth knowledge of one of the research topics introduced in the course.

Assessment
• written assignments
• software implementations
• tests
• presentations
• evaluation of teamwork

Relation to Degree Level Expectations
• student can reason abstractly about a technical problem
• student has knowledge of a fundamental area of computing
• student understands limitations of current research methods
• student is aware of open problems and research opportunities
• student can critically evaluate current research
• student understands the state of the art
• student can make a seminar presentation on own or other’s research
• student can write a survey paper
• student understands and uses professional ethics
• student has participated in team work
The course examines advanced topics in database management systems. The course will first examine the implementation of relational DBMSs including query processing, query optimization, concurrency control and recovery. The course will then cover topics related to big data such as data warehouses, parallel and distributed architectures, column-oriented data stores, streaming data and NoSQL systems.

Students should have taken CISC 332 or have equivalent knowledge of relational database management systems and SQL. Course material will be taken from the course text and recent research papers. Course work will involve both written and programming assignments, a final exam and a course project (for graduate students only).

Announcements

- All official course information and material will be available on the CISC 432/CMPE 432 Moodle site. Only students registered in the course can access the site.

General Information

<table>
<thead>
<tr>
<th>Instructor:</th>
<th>Patrick Martin</th>
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<tr>
<td></td>
<td>Goodwin Hall 630</td>
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<td>613 533 6063</td>
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<td><a href="mailto:martin@cs.queensu.ca">martin@cs.queensu.ca</a></td>
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<td>Office Hours: Wednesday 11:00 – 1:00 or by appointment</td>
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<th>Schedule:</th>
<th>Slot 22 (Monday 3:30 – 4:30, Wednesday 2:30 – 3:30 and Thursday 4:30 – 5:30)</th>
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<td>Botterell Hall B129</td>
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| Prerequisites: | CISC 332* or permission of the instructor. |

Intended Student Learning Outcomes

To successfully complete the course students will demonstrate their ability to

1. Apply optimization algorithms to SQL queries to produce efficient query plans.
2. Apply concurrency control and recovery algorithms to sample transaction workloads to ensure ACID properties are maintained.
3. Assess the use of relational DBMSs and NoSQL systems for different types of data and applications.
4. Apply a NoSQL system to the creation of a sample database.
5. Apply the MapReduce framework to a sample big data problem.
6. Evaluate the use of a big data approach to a sample application area or problem.

Course Outline

Course material is available on the course Moodle site.

Course syllabus

Lecture Sept 14
Lecture Sept 16
Lecture Sept 17

Query evaluation survey

Assignment 1

Notes – week 3

Query optimization survey

Textbook/Readings


Readings: TBD

Grading Scheme

Undergraduate Students

- 4 assignments (60%).
- Term tests (30%).
- Class participation (10%).

Graduate Students

- 4 assignments (40%).
- Term tests (20%).
- Class participation (10%).
- Term project (30%).

Required Work

Assignments (All students)

- Assignment 2 due Nov 5, 2015.
Term Tests (All students)

- Term test 1 on Oct 26, 2015.
- Term test 2 on Nov 30, 2015.

Graduate Student Project (832 students only)


832 project description
Research/Case study project rubric
Survey paper rubric

Grading Method

In this course, some components will be graded using numerical percentage marks. Other components will receive letter grades, which for purposes of calculating your course average will be translated into numerical equivalents using the Faculty of Arts and Science approved scale (see below). Your course average will then be converted to a final letter grade according to Queen’s Official Grade Conversion Scale (see below).

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Late Policy
Assignments should be handed in by 4:00 pm on the day they are due. Late assignments are subject to a 10% per day late penalty, with weekends counted as one day. Late assignments will not be accepted beyond 5 days past the date due.

**Academic Integrity**

Academic Integrity is constituted by the five core fundamental values of honesty, trust, fairness, respect and responsibility (see [www.academicintegrity.org](http://www.academicintegrity.org)). These values are central to the building, nurturing and sustaining of an academic community in which all members of the community will thrive. Adherence to the values expressed through academic integrity forms a foundation for the "freedom of inquiry and exchange of ideas" essential to the intellectual life of the University (see the Senate Report on Principles and Priorities [http://www.queensu.ca/secretariat/policies/senateandtrustees/principlespriorities.html]).

Students are responsible for familiarizing themselves with the regulations concerning academic integrity and for ensuring that their assignments conform to the principles of academic integrity. Information on academic integrity is available in the Arts and Science Calendar (see Academic Regulation 1 [http://www.queensu.ca/artsci/academic-calendars/regulations/academic-regulations/regulation-1]), on the Arts and Science website (see [http://www.queensu.ca/artsci/academics/undergraduate/academic-integrity](http://www.queensu.ca/artsci/academics/undergraduate/academic-integrity)), and from the instructor of this course.

Departures from academic integrity include plagiarism, use of unauthorized materials, facilitation, forgery and falsification, and are antithetical to the development of an academic community at Queen's. Given the seriousness of these matters, actions which contravene the regulation on academic integrity carry sanctions that can range from a warning or the loss of grades on an assignment to the failure of a course to a requirement to withdraw from the university.

**Copyright of Course Materials**

This material is designed for use as part of CISC 432/CMPE 432/CISC 832 at Queen's University and is the property of the instructor unless otherwise stated. Third party copyrighted materials (such as book chapters and articles) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law.

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**Disability Accommodation Statement**

Queen's University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a disability and think you may need accommodations, you are strongly encouraged to contact the Disability Services Office (DSO) and register as early as possible. For more information, including important deadlines, please visit the DSO website at: [http://www.queensu.ca/heds/ds](http://www.queensu.ca/heds/ds)/
6. CISC 859 Pattern Recognition

The overall objectives of the course are to familiarize students with statistical and structural pattern recognition techniques.

Course Learning Outcomes

• describe and apply the following pattern recognition concepts: feature space, training and test data, prior probabilities, class-conditional probability densities, posterior probabilities, Bayesian classifier, minimum risk classifier, curse of dimensionality. Assessment is via short answer questions on exams.

• understand various approaches used statistical and structural pattern recognition, including nearest neighbor classifier, parameter estimation followed by Bayesian classifier, decision tree classifier, clustering, classifier combination, grammars used in syntactic pattern recognition. Students gain practice via a course project; assessment is via the course project, a paper summary (oral and written), and the final exam.

Assessment

• written assignments
• software implementations
• written exams
• presentations
• course project

Relation to Degree Level Expectations

• student can reason abstractly about a technical problem
• student has knowledge of a fundamental area of computing
• student understands limitations of current research methods
• student is aware of open problems and research opportunities
• student can critically evaluate current research
• student understands the state of the art
• student can make a seminar presentation on own or other’s research
• student can write a research paper on own work
• student can present own research at a conference
• student can write a survey paper
• student understands limitations of applications of computing
CISC 859 Pattern Recognition, Fall 2014

[NOTE: I will not be offering CISC859 in Fall 2015 or Fall 2016, due to sabbatical spread over those two terms. This web page contains information for CISC859 as it was taught in Fall 2014.]

Instructor: Dorothea Blostein, 720 Goodwin Hall, 533-6537, blostein@cs.queensu.ca

Lectures: Mondays 1:00-2:15 in Goodwin 521; Fridays 11:30-12:45 in BIO 2109.

Textbook

We use the following textbook and course reader.


Course reader: The CISC859 course reader, available from Queen’s bookstore, contains my extensive notes about the course material. The bookstore does not automatically print more copies when their stock runs out: you must ask them to print another copy for you.

Prerequisites

CISC859 is an introductory course in pattern recognition, geared toward students who have some background in computer science. The course material is relevant to many areas of research, including data mining, artificial intelligence, computer vision and signal processing. In past years, CISC859 has been taken by graduate students from computing, electrical engineering, mechanical engineering, geology, chemistry, and mathematics. Familiarity with the following subjects is helpful. Students missing this background have successfully taken the course by doing some extra reading. Review is provided in lectures.

- Elementary calculus: Integrals, and how they relate to the area under a curve.
- Elementary probability theory: Probability distribution, probability density, random variables. I provide review.
- Elementary formal languages: Context free grammars, and how they define a language. I provide a review.
- Programming: For the course project, you are expected to implement a classifier. Information about suggested projects is provided below.

Course description

The goal of pattern-recognition research is to develop general, domain-independent techniques for data analysis. Here is a brief course overview, from the course reader. The following topics are covered. All topics are summarized in the course reader. Relevant textbook sections are indicated: DHS is an abbreviation for the textbook by Duda, Hart, and Stork.

- Introduction to pattern recognition. Processing of image data.
- Introduction to statistical pattern recognition. Feature extraction and the feature space. Bayes' decision rule. The Normal density [DHS Chapters 1, 2]. Estimating the performance of a classifier [DHS Section 9.6].
• Overview of topics in statistical pattern recognition. Estimation of probability densities (supervised learning): estimating parameters when the form of the density is known [DHS Ch. 3], and estimating the density in general [DHS Sections 4.1 to 4.4]. Nearest-neighbor classifiers [DHS Sections 4.5 and 4.6]. Estimation of discriminant functions [CHS Chapter 5]. Unsupervised learning and clustering [DHS Chapter 10]. Decision trees for multistage pattern recognition [DHS Section 8.2 and 8.3]. Combining the results of multiple classifiers [DHS Section 9.7].
• Introduction to structural pattern recognition. Document image analysis as an example application.
• Generalizations of string grammars for application to multidimensional patterns: array, tree, and graph grammars.

Marking Scheme

The marking scheme is as follows.

• Assignments 10%
The five assignments may be completed individually, or in groups of two or three students. The assignment mark is mainly based on effort: I quickly assess assignment completion, rather than marking in detail. I encourage students to use the assignments to help each other learn the course material. The assignment problems can be solved in various ways, so it is a great exercise for students to explain their attempted assignment solutions to each other, and discuss the correctness (or incorrectness) of the various attempted solutions.

Assignment 1
Assignment 2
The "Pattern Recognition Resources" (below) include a tool for evaluating the Normal density, if you want to use that for assignment 2.
Assignment 3
Assignment 4
Assignment 5

• Project 40%
Select one of the two classification projects described in the course reader (digit classifier or seismic event classifier), or suggest a project of your own. To propose your own project, you need to have access to labeled data you can use to train a classifier. Past students have worked with classification of electrocardiogram data, fingerprints, face images, iris images, and remotely-sensed images from satellites.

Here are sample programs and images for the digit classifier project. Here is a description of a digit classifier written in 2004 by Henry Xiao; the "Downloads" section allows you to download Henry's interesting set of training and testing data.

Organize your project report so that the reader is instantly impressed by the quality of your work. This is an essential presentation skill, not just for writing course project reports, but also for writing theses, conference papers, journal papers, and grant proposals. Please pay attention to my advice about technical writing and oral presentations.
• Oral and written summary of a technical paper 15%
Choose a technical paper related to pattern recognition. Write a one-page summary of this paper and give a short oral presentation to the class. Student presentations will take place in November, exact time to be decided.

You are free to choose a paper from any journal or conference, provided the paper is related to pattern recognition. If you don't know where to start, I recommend that you look at recent issues of PAMI (that's the IEEE Transactions on Pattern Analysis and Machine Intelligence). Alternatively, you can look at the International Journal of Pattern Recognition and Artificial Intelligence, or the journal Pattern Recognition. Papers in these journals cover a wide variety of topics, so you should be able to find a paper that sparks your enthusiasm. You don't have to shy away from an interesting paper because it contains too much math: all we require is an overview, so it’s ok if you don’t understand all the details of proofs and derivations. It is sufficient if you understand the notation, the statements of theorems, and the conclusions that are drawn.

I give you strict page and time limits for the paper summary, so that you can focus on organizing and polishing your presentation. Your written summary has to fit on one page. Please use a readable layout, with good-sized margins and fairly large font. I am not happy if you hand in a three page summary that you have crammed onto one page by using a 6 point font! **Hand in a copy of the paper, as well as your summary.** I will return both to you. For the oral presentation, you have 15 or 20 minutes, depending on how many students are in the class. This time limit will be strictly enforced. Rehearse your talk, to make sure it fits into the time limit.

Please refer to my advice about [technical writing and oral presentations](#).

• Final Exam 35%
**The final exam is 1-4PM, Monday December 8 in Goodwin 254.** Review session Friday Dec 5, 11:00AM in the Goodwin fifth floor classroom.
The final exam tests your mastery of material covered in the assignments. The exam will include major questions on the following two topics: (1) the Bayes' classifier, similar to problem 8 in assignment 1 and problem 6 in assignment 5, and (2) the Anderson math grammar, similar to problem 1 in assignment 5. The remainder of the exam will be shorter questions on various topics, similar to the following assignment problems.

• Assignment 1: problems 1 2 3 7 *8*
• Assignment 2: problems 1b 1c 2a 2b 3b
• Assignment 3: problems 2 3 4a 4b 5a 5b 6 7 8
• Assignment 4: problems 1 2 3
• Assignment 5: problems *1* 2 4a *6*

The assignment problems that are not listed above include problems from the textbook that ask you to prove theorems. Working on such problems is essential for learning the course material, but these types of problems take too long to be included on an exam. Other assignment problems are omitted from the above list because they are too detailed. For example, problem 3 on assignment 5 is about plex grammars: for the final exam I expect you to have some idea about what a plex grammar (graph grammar) is, but I don't expect you to have memorized details about this particular notation.

**Schedule and due dates**

• Weeks 1 and 2 (Sept 8-19): Get a copy of the textbook and course reader. Choose a project (either digit recognizer, seismic event classification, or your own topic). Work on assignment 1 and the following readings:
  o In the Duda, Hart, Stork textbook, read Chapter 1, section 2.1, and section 2.2
In the course reader, read pages 1-10 about the course project. Pages 15-42 Introduction to pattern recognition (read/skim this quickly). Pages 44-53 Introduction to Bayes classifier. Read this carefully.

- Assignment 1 is due Monday, September 22 (start of week 3)
- Assignment 2 is due Monday, October 6 (start of week 5)
- Classifier Project Part 1 is due Friday, October 17 (end of week 6). Part 1 of the classifier project is marked pass/fail. You should hand in evidence that you have started the project: show that you are able to measure features from training data. For students implementing digit classifier, the requirements for Part 1 are described in section 1.4.1 of the course project instructions.
- Student presentations weeks 7 and 8. See instructions above about "Oral and written summary of a technical paper". Oral presentations should be 12-15 minutes long, leaving 5-8 minutes for questions and for the transition to the next speaker. One page paper summaries are due Monday, November 3 (start of week 9). Refer to my advice about technical writing and oral presentations.
- Assignment 3 is due Monday, October 27 (start of week 8)
- Assignment 4 is due Monday, November 10 (start of week 10)
- Classifier Project Part 2 is due Friday, November 21 (end of week 11). This due date is extended to Monday December 1; you can email me your project, or bring hardcopy to the School of Computing office (fifth floor) or slide hardcopy under my office door (Goodwin 720). This is a hard deadline, please be sure to hand in your project report by then. Don't spend all of your time on implementation: be sure to spend sufficient time on writing a clear and convincing project report. Refer to my advice about technical writing and oral presentations. Don't assume that I remember what you wrote in Classifier Project Part 1: include a description of the features you ended up using, even if you already reported the same thing in Part 1. During class on November 21 we will have an informal discussion about the practical realities of implementing, training, and testing a classifier. Be prepared to talk for 2-3 minutes about some interesting things you learned while developing your classifier.
- Assignment 5 is due Friday, November 28 (end of week 12)
- Friday December 5 at 11:00AM there will be a short review session in the Goodwin fifth floor classroom. At that time I will return marked assignment 5, and also projects if I can get the marking done by then.

Pattern Recognition Resources

The textbook used in this course (Pattern Classification by Duda, Hart, Stork) presents classification algorithms that are implemented using a toolbox written in MATLAB. Here is an introduction to the toolbox, written by graduate student Nawei Chen and myself; it illustrates some of the basic pattern recognition ideas we discuss in class.

Mirage is a publicly available Java-based tool for exploratory data analysis. It is written by Tin Kam Ho at Bell Labs, one of the world's top researchers in statistical pattern recognition. This tool offers excellent support for exploratory analysis and visualization of large data sets.

Here is a website for evaluating the normal density. For example, you can use this in assignment 2, to obtain a numerical value for the probability of error when p(x|w) is normally distributed. Alternatively, you can leave your answer for P(error) in the form of an integral.

The R project for statistical computing is a free software environment for statistical computing and graphics. A past CISC 859 student wrote to me: "R implements a lot of the concepts that you discuss in the course, and provides many built-in datasets (like the IRIS dataset and a car manufacturer dataset), so it's a great way to get some fast and easy experience with classifiers from a practical perspective. Coupled with the more theoretical perspective provided by the lectures, I found it to be great one-two punch." A variety of other computing environments also provide implementations of classification algorithms.
These computing environments include Weka (with graphical user interface added by RapidMiner), matlab, and OpenCV.

Here is an extensive set of links for pattern recognition and statistics.

**IAPR** The International Association for Pattern Recognition. Much useful information can be found at the IAPR website. In particular, I recommend taking a look at the information provided by the various Technical Committees of the IAPR, including the following committees:

- TC1 Statistical Pattern Recognition Techniques.
- TC2 Structural and Syntactical Pattern Recognition.
- TC3 Neural Networks and Computational Intelligence
- TC5 Benchmarking and Software. Provides resources to assist researchers in implementing and benchmarking pattern recognition systems.
- TC 7 Remote Sensing and Mapping.
- TC 10 Graphics Recognition. Treats problems in the analysis of engineering drawings, maps, tables, forms, drawings, math notation, music notation, etc.
- TC 11 Reading Systems. Treats problems in OCR (Optical Character Recognition), document image processing, pen-based computing, signature verification, and so on.
- TC 15 Graph Based Representations in Pattern Recognition and Image Analysis.

**Document Layout Interpretation and its Application** is a site that lists research groups, conferences, data sets, software, and bibliographies.

Here is a tutorial on the **Nearest Neighbor Rule** for pattern classification.

**Computer Vision Resources**

**CVonline**, a compendium of computer vision. Covers many topics, including **Hidden Markov Models (HMMs)**.

Supplemental information with CVonline: [online and hardcopy books](#), [datasets for research and student projects](#), [software packages](#)

**Video lectures** for an introductory course on computer vision. Topics include flat part recognition, deformable part recognition, range data and stereo data 3D part recognition, detecting & tracking objects in video, and behaviour recognition

**CVDICT: Dictionary of Computer Vision and Image Processing.**
7. CISC 873 Data Mining
In this course students learn to build models of complex systems from data collected about them. Different modelling techniques are used by different students to address the same datasets, and results compared in class.

Course Learning Outcomes
• design appropriate computational modelling techniques for a range of data analytic problems and apply them effectively
• compare the performance and effectiveness of computational modelling techniques, with an awareness of potential pitfalls
• analyse models of complex systems and determine the implications for the systems under study

Assessment
• project-based exam
• project work leading to weekly class presentations

Relation to Degree Level Expectations
• student can reason abstractly about a technical problem
• student understands limitations of current research methods
• student is aware of open problems and research opportunities
• student can make a seminar presentation on own or other’s research
• student understands impact of computing on individuals and society
• student understands limitations of applications of computing
CISC873 Data Mining

This course is offered in Fall 2014. The schedule at present is Tues 8:30-10:00 and Friday 10:00-11:30, but this may change. Because of the way the course is offered, at most 13 students can take the course. Preference is given to students from the School of Computing, but RMC students also take the course routinely, as well as students from other disciplines.

Data mining builds inductive models from data. Almost all organisations, and many individuals, accumulate data from their interactions, and can use this data to improve service, and sometimes profit. Some examples:

- placing foods that are often bought at the same time on the same shelf can increase supermarket revenue;
- spotting those customers who are likely not to renew a subscription or contract, and offering them a small incentive can improve retention rates;
- noticing unusual patterns in bank account or credit card use can detect fraud;
- associating medical tests that commonly occur together helps to find doctors who are ordering bogus tests.

The algorithms used for data mining must be efficient, because of the huge volumes of data that have to be examined, and sophisticated, because the benefit of an extracted concept depends heavily on how subtle it is.

This course is a project course. We will examine a number of datasets, with each participant using a particular technique to investigate each dataset and see what structure the technique discovers. You will have a chance to try several different techniques during the course.

Good working knowledge of standard software environments is required, especially the ability to develop scripts and plot data (e.g. Excel, Matlab, Open GL + Perl, Python, Awk). Some elementary knowledge of statistics and probability is required.

The course is an applications token for the Ph.D. programme.

Each participant will use two techniques during the course, the first for datasets 1 and 2; and the second for dataset 3. You will choose your combination in the early weeks of the term. Each combination includes one supervised technique and one unsupervised technique. Here are some possible combinations:

- Independent component analysis -- supervised neural networks
- Random forests -- Bayesian approaches (Bayesian networks)
- Support vector machines -- visualization techniques
- Supervised neural networks -- singular value decomposition/semidiscrete decomposition
- Rule based systems (not association rules) -- non-negative matrix factorization
- Bayesian approaches (Bayesian networks) -- hierarchical clustering
- Singular value decomposition/semidiscrete decomposition -- rule-based systems (not association rules)
- Visualization techniques -- autoclass/k-means/EM
- Non-negative matrix decomposition -- Latent Dirichlet allocation
• Autoclass/k-means/EM -- genetic algorithms
• Hierarchical clustering -- support vector machines
• Latent Dirichlet allocation -- random forests
• Genetic algorithms -- independent component analysis

Assessment will be based partly on performance in class (quality of results, and quality of presentation and discussion). Marks will be generated using input from all class participants. There will be a take-home exam at the end of term in which you will be given a dataset and asked to report on what you can find out about it. The exam will be worth 30% of your mark.


Datasets

I will make the datasets available as we go.

Here is an approximation to the weekly schedule that I expect to follow, at least for the first few weeks:

**Weeks 1 and 2**
I will present introductory material on data mining, particularly about ways in which data needs to be prepared before mining, and how your results should be presented.

**Week 2**
You will choose your first data mining technique. I will explain the protocol for doing this in the first class. As soon as you have been allocated a method, you should look for software that will help you. I will be able to give some advice about this.

**Weeks 2 and 3**
You should spend these weeks finding out about your chosen technique. Be prepared to make a brief explanation of what your technique does and how it works in class during Week 3.

**Weeks 4 to 11**
You should be prepared to make some kind of presentation every week, probably a brief powerpoint presentation. We will spend time on each dataset in turn. It's hard to estimate how long we will spend on each one, because it depends on how successful the modelling is.

**Some questions about your technique**

**Week 12**
What have you learned about each of the techniques that you've seen being used? Which technique would you use for problems of the following kind:

• a supermarket with a customer loyalty card which wanted to improve their profit margins;
• a manufacturing plant that wanted to reduce the amount of waste from improperly built products;
• an airport security company that wanted to screen for potential terrorists;
• a satellite company that wanted to spot unusually warm locations on the earth's surface;

If you wanted to spend the next ten years using data mining as your source of livelihood, would you (a) develop a product and sell it, or (b) provide consulting to organisations wanting to use data mining themselves, or (c) something else? Why?

I will ask each person to evaluate the performance of each other member of the class based on their contribution to the course. This might be based on help with data manipulation and software, as well as the quality of their work and presentations. Note that it isn't fair to base performance on the quality of the results obtained, since some techniques are intrinsically more powerful than others.

I'll introduce the dataset to be used for the exam. Notice that the exam task is different from what you've been doing during the term -- you may choose any technique, but you must justify your choice.
8. CISC 881 Topics in Biomedical Computing I

The overall objectives of the course are to discuss the design and structure of computer-assisted intervention systems; their subsystems and their interdependence. In particular, we discuss surgical navigation systems; medical imaging; coordinate system registration; position tracking; visualization; intervention planning.

Course Learning Outcomes

- analyze the mechanism of computer-integrated surgery systems and produce plausible design of such systems
- analyze systems performance
- create select system components of improved performance

Assessment

- topic presentation
- small research project on a system component
- project proposal
- project implementation (methods and results)
- project presentation
- project report/publication

Relation to Degree Level Expectations

- student can reason abstractly about a technical problem
- student is aware of open problems and research opportunities
- student can critically evaluate current research
- student understands the state of the art
- student can make a seminar presentation on own or other’s research
- student can write a research paper on own work
9. CISC 886 Cloud Computing
The goal of the courses is to introduce students to key concepts and techniques from cloud computing. The course focuses on issues such as system architectures, resource allocation and management, and approaches and systems for the storage, management and processing of data in cloud environments.

Course Learning Outcomes
• Describe the motivation for, and the costs/benefits of, cloud computing.
• Describe key concepts and technologies in cloud computing.
• Evaluate recent systems for the storage, processing and management of big data in the cloud.
• Develop programs using NoSQL storage systems in a cloud environment.
• Apply a depth of understanding of at least one data management research topic within cloud computing.

Assessment
• written assignments
• software implementations
• presentations
• evaluation of teamwork

Relation to Degree Level Expectations
• student can reason abstractly about a technical problem
• student has knowledge of a fundamental area of computing
• student understands limitations of current research methods
• student is aware of open problems and research opportunities
• student can critically evaluate current research
• student understands the state of the art
• student can make a seminar presentation on own or other’s research
• student can write a survey paper
• student understands and uses professional ethics
• student has participated in team work
Cloud computing is a distributed computing paradigm where computing resources are provided in an on-demand manner. The goal of the courses is to introduce students to key concepts and techniques from cloud computing. The course focuses on issues such as system architectures, resource allocation and management, and approaches and systems for the storage, management and processing of data in cloud environments.

The learning objectives of the course are the following:

- Students should understand the motivation for, and the costs/benefits of, cloud computing.
- Students should become familiar with key concepts and technologies in cloud computing.
- Students should become familiar with the issues surrounding big data.
- Students should become familiar with recent systems for the storage, processing and management of big data in the cloud.
- Students should achieve a depth of understanding of at least one data management research topic within cloud computing.

**Announcements**

**General Information**

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<tr>
<th>Instructor:</th>
<th>Patrick Martin</th>
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<tbody>
<tr>
<td></td>
<td>Goodwin Hall 630</td>
</tr>
<tr>
<td></td>
<td>613 533 6063</td>
</tr>
<tr>
<td></td>
<td><a href="mailto:martin@cs.queensu.ca">martin@cs.queensu.ca</a></td>
</tr>
<tr>
<td>Schedule:</td>
<td>Monday 11:30 – 1:00 and Thursday 12:30 – 2:00 in Goodwin 521.</td>
</tr>
<tr>
<td>Prerequisites:</td>
<td>A background in DBMSs and permission</td>
</tr>
</tbody>
</table>
Computing Resources

Course projects will be carried out in a cloud environment such as the Amazon cloud. The use of cloud in the course is generously supported by Amazon through an Amazon Education Grant.

Course Content

The course will tentatively cover the following topics:

- Cloud computing concepts
- Cloud data stores
- Large-scale data processing and analysis
- Relational DBMSs in the cloud
- Resource provisioning and management

A course schedule, lecture slides and course bibliography are available on the CISC 886 wiki. Access to the wiki will be assigned in the first week of classes.

Course Requirements

Students are expected to have a background in database management systems (CISC 432/832 or equivalent). Knowledge of distributed systems or service-oriented computing will be beneficial but is not required.

Students will be evaluated as follows:

Classroom participation (15%):
Students are expected to read all papers covered in a week, come to class prepared to discuss their thoughts and take part of the classroom discussions.

Paper presentation and discussion (20%):
Each paper will be assigned to two students; one will act as a presenter and the other as a discussant. The presentation will last 15 minutes and the discussion will last 15-30 minutes. Each student should upload their slides to the course wiki before the class.

- Role of presenter: As a presenter you should not simply repeat the paper's content (remember you only have 15 minutes), instead you should point out the main important findings of the work. You should highlight any novel contributions, any surprises, and other possible applications of the proposed techniques. You should check the authors' other work related to the presented paper. Finally you should place the work relative other papers covered in the
course (especially the papers covered in that particular week). You should prepare a presentation for the paper and submit the presentation, via email, at least one day prior to the presentation.

- **Role of discussant:** As a discussant, you should take an adversarial position by pointing out weak and controversial positions in the paper. You should present a short rebuttal of the paper and submit, via email, a summary of your rebuttal prior to the start of class. You should come prepared with problems and counterexamples for the presented work. *Make sure you list three things you liked and disliked about the paper.*

**Weekly critiques (20%):**
For weeks 5 – 6 and 8 - 10, each student who is not assigned a role of presenter or discussant should pick one of the papers for that week and submit via email a one page critique of the paper before the start of class. The critique should offer a brief summary of the paper, points in favour, points against, and comments for improvement.

**Project (45%):**
One original project carried out individually or in a group of 2 students. The project will explore one or more of the topic areas covered in the course. Details of the project are available on the CISC 886 wiki.

All components of this course will receive letter grades which, for purposes of calculating your course average, will be translated into numerical equivalents using School of Graduate Studies approved scale.

**Academic Integrity**

Academic integrity is constituted by the five core fundamental values of honesty, trust, fairness, respect and responsibility (see www.academicintegrity.org). These values are central to the building, nurturing and sustaining of an academic community in which all members of the community will thrive. Adherence to the values expressed through academic integrity forms a foundation for the "freedom of inquiry and exchange of ideas" essential to the intellectual life of the University (see the Senate Report on Principles and Priorities http://www.queensu.ca/secretariat/policies/senateandtrustees/principlespriorities.html).

Students are responsible for familiarizing themselves with the regulations concerning academic integrity and for ensuring that their assignments conform to the principles of academic integrity. Information on academic integrity is available in the Arts and Science Calendar (see Academic Regulation 1 http://www.queensu.ca/artsci/academic-calendars/2011-2012-calendar/academic-regulations/regulation-1), on the Arts and Science website (see http://www.queensu.ca/artsci/academics/undergraduate/academic-integrity), and from the instructor of this course. Departures from academic integrity include plagiarism, use of unauthorized materials, facilitation, forgery and falsification, and are antithetical to the development of an academic community at Queen's. Given the seriousness of these matters, actions which contravene the regulation on academic integrity carry sanctions that can range from a warning or the loss of grades on an assignment to the failure of a course to a requirement to withdraw from the university.
Copyright Statement

The material on this website is copyrighted and is for the sole use of students registered in CISC 886. The material on this website may be downloaded for a registered student’s personal use, but shall not be distributed or disseminated to anyone other than students registered in CISC 886.

Failure to abide by these conditions is a breach of copyright, and may also constitute a breach of academic integrity under the University Senate’s Academic Integrity Policy Statement.

[CISC Home Page]

School of Computing, Queen's University

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10. BMIF 898 Master’s Project

A project is chosen after consulting with potential supervisors. The project should normally require between two and four months of full time work, and be comparable in work load to two CISC graduate level half courses. A written report of the project is submitted by the student and is then independently evaluated by each member of a committee of three. The committee consists of the supervisor, a School examiner, and the Director (or delegate). The ultimate authority for appointing members of the committee lies with the Director. The chair of the committee, who is allowed to vote, is the Director (or delegate). All outcomes of the project examination require at least two votes. If the initial decisions are not all in agreement then the project should be discussed before an outcome is decided.

There are three possible outcomes of the project examination, PASSED, REFERRED, and FAILED. These are patterned on the decisions of an MSc thesis exam, and are detailed in the Calendar of the School of Graduate Studies and Research section 8.6 paragraph b. A project is PASSED if it is acceptable in its present form or requires minor revisions. In the case of minor revisions, the supervisor is responsible for informing the student of the required changes and for verifying that the changes have been made. A project is REFERRED if it is not acceptable in its present form, but could be acceptable pending major revisions. The chair, in consultation with the committee, communicates a list of revisions to the student in writing. A copy of this letter will be sent the Graduate Coordinator. The revised project is then re-examined by the entire committee and can either be PASSED or FAILED. The third outcome of a project examination is FAILED. In the case that a project is failed, the student must withdraw from the program. In all cases the outcome of the project should be decided and communicated to the student, as well as the graduate coordinator, at most two weeks (ten working days) after every member of the committee has received it.
BMED 809 (formerly PHAR 811)  
PRINCIPLES OF DRUG DISCOVERY AND DEVELOPMENT  
WINTER TERM – 2014/2015

BMED 809 is a problem-based course focusing on and consisting of discussions of receptor theory, mechanisms of drug action, drug metabolism, pharmacokinetics, pharmacogenetics and pharmacogenomics, and drug transport. The course comprises lectures, problem-solving discussions and seminars, based on recent literature.

**TIME:**  
Mon.  9:30-10:30  
Thurs. 9:30-11:30

**PLACE:**  
Pharmacology & Toxicology Seminar Room (Room 569)

**EVALUATION:**  
Presentation of Introduction / Review  
One page summary of assessment for each problem  
Research article presentation  
Participation in group discussions


**FORMAT:** Each topic will be discussed over the course of two weeks, as follows:

**Monday of Week 1:** Introductory / Review Lecture by a student based on assigned reading (assigned reading provided one week in advance by supervising professor), followed by assignment of research article(s).  
**Thursday of Week 1:** Presentation of research articles (students), followed by assignment of a research problem.  
**Monday of Week 2:** Identification of issues to be addressed in order to solve research problem (whole group).  
**Thursday of Week 2:** Discuss resolution of research problem (whole group).

<table>
<thead>
<tr>
<th>DATE</th>
<th>TOPIC</th>
<th>PROFESSOR(S)</th>
</tr>
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<tbody>
<tr>
<td>Jan 5,8,12,15</td>
<td>Receptor Theory / Pharmacokinetics</td>
<td>K. Nakatsu/J.F. Brien</td>
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<tr>
<td>Jan 19,22,26,29</td>
<td>Signal Transduction &amp; Drug Actions</td>
<td>D.H. Maurice</td>
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<tr>
<td>Feb 2,5,9,12</td>
<td>Drug Transport</td>
<td>C.J. Nicol</td>
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<td>Feb 16-20</td>
<td>Reading Week</td>
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<tr>
<td>Feb 23,26, Mar 2,5</td>
<td>Pharmacogenetics / Pharmacogenomics</td>
<td>C.J. Nicol</td>
</tr>
<tr>
<td>Mar 9,12,16,19</td>
<td>Phase I Biotransformation</td>
<td>T.E. Massey</td>
</tr>
<tr>
<td>Mar 23, 26, 30, Apr 2</td>
<td>Phase II Biotransformation</td>
<td>L.M. Winn</td>
</tr>
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Protein Structure and Function
(BCHM410/BMED810)

2015/2016 Fall

Helix Central Administrator <medtech@queensu.ca>
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Course Description

This course presents an integrated approach to the study of protein functions *in vivo* and *in vitro*. Topics include global (proteomics) as well as small-scale analyses of protein interactions. Theories and applications of a selection of techniques will be taught, such as mass spectrometry, 2-dimensional gel electrophoresis, fluorescence microscopic imaging, surface plasmon resonance, calorimetry, bioinformatics and protein evolution, protein modifications and processing, interpretation and applications of 3-D structure, and structure-function relationships.

Hands-on trainings on selected techniques will be provided to students, who will give short presentations of what they have learned to the class during the last two weeks of the term.

Course Objectives

Required Textbooks

There is no required textbook for this course. Most of the lecture materials are generated from published research papers and review articles available in PubMed. Appropriate references will be given in lecture notes in Power Point format before each class.

Evaluation

Students will be evaluated by their performance in:

1) One mid-term examination (25%) on Dr. Mak's materials;

2) Two take-home assignments (10% each) by Dr. Jia and Dr. Allingham;

3) Oral presentations (15%);

4) Final examination (40%) (Drs. Mak, Jia and Allingham).

Total 100%.

Grading Method

Queen’s Official Grade Conversion Scale

<table>
<thead>
<tr>
<th>Grade</th>
<th>Numerical Course Average (Range)</th>
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<tbody>
<tr>
<td>A+</td>
<td>90-100</td>
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<tr>
<td>A</td>
<td>85-89</td>
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<tr>
<td>A-</td>
<td>80-84</td>
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</tbody>
</table>
B+  77-79
B   73-76
B-  70-72
C+  67-69
C   63-66
C-  60-62
D+  57-59
D   53-56
D-  50-52
F   49 and below

**Expectations**

Students are expected to attend all the lectures, participate in hands-on training of selected techniques, collaborate with group members in the preparation and presentation of talks. Since there is no textbook required, self-learning via PubMed in addition to lecture notes is highly encouraged.

**Academic Integrity**

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to withdraw from the university.

Course Calendar

Lecture 1. Introduction: Global (Proteomics & Genomics) vs Reductionist approaches.
Tuesday, September 15th, 2015, 9:30 AM to 10:30 AM
An introduction to BCHM410/810 will be given in our first lecture. The objectives and lecture schedules will be presented.

Lecture 2. Differential display strategy to identify proteins of interest: 2-D gel electrophoresis
Thursday, September 17th, 2015, 8:30 AM to 9:30 AM

Lecture 3. Protein Identification by Mass Spectrometry 1
Friday, September 18th, 2015, 10:30 AM to 11:30 AM

Lecture 4. Protein Sequencing by Mass Spectrometry
Tuesday, September 22nd, 2015, 9:30 AM to 10:30 AM

Thursday, September 24th, 2015, 8:30 AM to 9:30 AM

Lecture 6. Functional Proteomics 1 - Pull-Down assays
Friday, September 25th, 2015, 10:30 AM to 11:30 AM

Tuesday, September 29th, 2015, 9:30 AM to 10:30 AM

Lecture 8. Beyond Interactomes: How Proteins work in the cell
Thursday, October 1st, 2015, 8:30 AM to 9:30 AM

Lecture 9 - Regulation of protein interactions in the cell
Friday, October 2nd, 2015, 10:30 AM to 11:30 AM

Lecture 10. Quantitative analyses of protein interactions (cont.) Introduction to fluorescence microscopy.
Tuesday, October 6th, 2015, 9:30 AM to 10:30 AM

Lecture 11. Fluorescence Microscopy - Improving resolution, FRET
Thursday, October 8th, 2015, 8:30 AM to 9:30 AM
Lecture 12. In vitro protein interaction studies 1 - Surface Plasmon Resonance

Friday, October 9th, 2015, 10:30 AM to 11:30 AM

Lecture 13. In vitro protein interaction studies 2 - Isothermal Calorimetry

Tuesday, October 13th, 2015, 9:30 AM to 10:30 AM

Lecture 14. Recap and Perspectives in Protein Structure and Functions

Thursday, October 15th, 2015, 8:30 AM to 9:30 AM

Lecture - Mid-term Exam

Friday, October 16th, 2015, 10:30 AM to 11:30 AM

Lecture 1 - Protein Complexes

Tuesday, October 20th, 2015, 9:30 AM to 10:30 AM

We will review the general characteristics of protein complexes and some of their functions in cells.

Lecture 2 - Cytoskeletal Proteins

Thursday, October 22nd, 2015, 8:30 AM to 9:30 AM

In order to better understand the properties, mechanisms and dynamics of protein complexes, we will examine classes of proteins that form an enormous diversity of macromolecular assemblies. The proteins comprise the eukaryotic cytoskeleton.

Lecture 3 - Electron Microscopy

Friday, October 23rd, 2015, 10:30 AM to 11:30 AM

We will discuss:

1. Basic operation and physics of image formation.
2. Types of data that can be obtained
3. Resolution
4. Types of EM techniques.

Lecture 4 - Electron Microscopy - Helical Reconstruction

Tuesday, October 27th, 2015, 9:30 AM to 10:30 AM

Helical symmetry is commonly used for building macromolecular assemblies. Helices offer several advantages for structure determination. They allow us to improve resolution of the determined 3D structure by averaging across the constituent subunits, and each helical assembly provides multiple views of these subunits and thus provides a complete 3D data set. This review focuses on two methods of helical reconstruction from EM images.

Lecture 5 - Motor Proteins
Now that we have learned some basic properties of cytoskeletal filaments and a common method to visualize them, we will discuss one of the major groups of proteins that interact with these filaments - Motor Proteins. Kinesin, myosin and dynein use actin and microtubule polymers as molecular highways for conducting intracellular trafficking, and that also have the ability to influence the structure and distribution of these filaments in cells.

**Lecture 6 - Atomic Force Microscopy**

Friday, October 30th, 2015, 10:30 AM to 11:30 AM

AFM is one of the foremost tools for imaging static and dynamics biomolecules. It can also useful for measuring forces within and between them, and for manipulating matter at nanometer scale.

**Lecture 7 - TIRF Microscopy**

Tuesday, November 3rd, 2015, 9:30 AM to 10:30 AM

**Lecture 8 - Optical Tweezers**

Thursday, November 5th, 2015, 8:30 AM to 9:30 AM

**Lecture - Protein databases and 2nd structure predictions**

Friday, November 6th, 2015, 10:30 AM to 11:30 AM

**Lecture - Protein folding**

Tuesday, November 10th, 2015, 9:30 AM to 10:30 AM

**Lecture - Structural folds and classification**

Thursday, November 12th, 2015, 8:30 AM to 9:30 AM

**Lecture - Structural genomics**

Friday, November 13th, 2015, 10:30 AM to 11:30 AM

**Lecture - Function annotation and case studies**

Tuesday, November 17th, 2015, 8:30 AM to 9:30 AM

**Lecture - Structure-based drug designs**

Thursday, November 19th, 2015, 8:30 AM to 9:30 AM

**Student Presentations**

Friday, November 20th, 2015, 10:30 AM to 11:30 AM

**Student Presentations**

Tuesday, November 24th, 2015, 9:30 AM to 10:30 AM
Student Presentations
Thursday, November 26th, 2015, 8:30 AM to 9:30 AM

Student Presentations
Friday, November 27th, 2015, 10:30 AM to 11:30 AM

Student Presentations
Tuesday, December 1st, 2015, 9:30 AM to 10:30 AM

Student Presentations
Thursday, December 3rd, 2015, 8:30 AM to 9:30 AM

Student Presentations
Friday, December 4th, 2015, 10:30 AM to 11:30 AM
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<td>Expectations</td>
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<td>Academic Integrity</td>
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<td>Course Calendar</td>
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Course Description

This course focuses on advanced molecular biology as it applies to the human genome and human diseases. Topics that will be covered include: Genomics and genetic variation, SNPs, pharmacogenomics, forensics, recombination, GWAS, Next Generation Sequencing, microbiome, regulation of gene expression, X-inactivation, stem cells regenerative medicine. Bioinformatics including the use of UCSC genome browser, HapMap browser and Ingenuity pathway analysis. The course will build from concepts learned in BCHM 218, and will extend to current literature and review articles.

Course Objectives

Required Textbooks

Although we will not ask students to purchase a textbook for this course, some introductory materials will be found in "Molecular Biology of the Gene" 7th Edition by Watson, Baker, Bell, Gann, Levine and Losick and "Molecular Biology" by Michael Cox. Also, review articles on each topic will posted in the course learning events sections where appropriate.

Evaluation

Midterm (Feb 25th ) 20% CRM and MK 15%/5%
Assignments X3 30% 10% each from various sections
Term SNP Project 10%
Final Exam 40% CRM

Grading Method

Queen’s Official Grade Conversion Scale

Grade Numerical Course Average (Range)
A+ 90-100
A 85-89
A- 80-84
B+ 77-79
B 73-76
Expectations

Although the lectures will provide the bulk of the course content, we want students to take an active role in their learning. Your approach to this course should be more than just memorizing molecular biological elements and concepts, but should strive to understand how experiments designed to comprehend them are done and why they are done that way. Students are expected to read the assigned readings and are encouraged to ask any questions on any aspect about the lectures. Research into other papers/books or websites will help with your studying, and more importantly help strengthen your independent learning skills. We also encourage interaction and discussion of the material with classmates and, where possible, an additional tutorial prior to the final exam.

Academic Integrity

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from a warning or the loss of grades on an assignment to the failure of a course to a requirement to withdraw from the university.

Course Calendar

Course Overview and Review
Monday, January 5th, 2015, 10:30 AM to 11:30 AM

Human Evolution
Wednesday, January 7th, 2015, 9:30 AM to 10:30 AM

Introduction to Web Based Genomics Data
Friday, January 9th, 2015, 8:30 AM to 9:30 AM

Pharmacogenomics
Monday, January 12th, 2015, 10:30 AM to 11:30 AM

Forensics Recombination
Wednesday, January 14th, 2015, 9:30 AM to 10:30 AM

NCBI Resources
Friday, January 16th, 2015, 8:30 AM to 11:30 AM

BRCA1 and Tumour Suppressors
Monday, January 19th, 2015, 10:30 AM to 1:30 PM

Haplotypes and HapMap
Wednesday, January 21st, 2015, 9:30 AM to 11:30 AM

UCSC Genome Browser
Friday, January 23rd, 2015, 8:30 AM to 9:30 AM

Next Generation Sequencing
Monday, January 26th, 2015, 10:30 AM to 11:30 AM

NGS and Tumour Biology
Wednesday, January 28th, 2015, 9:30 AM to 10:30 AM

Microbiome
Friday, January 30th, 2015, 8:30 AM to 9:30 AM

Microbiome Paper
Monday, February 2nd, 2015, 10:30 AM to 11:30 AM

**Copy Number Variations**

Wednesday, February 4th, 2015, 9:30 AM to 10:30 AM

**GWAS**

Friday, February 6th, 2015, 8:30 AM to 9:30 AM

**GWAS**

Monday, February 9th, 2015, 10:30 AM to 11:30 AM

**Ingenuity**

Wednesday, February 11th, 2015, 9:30 AM to 10:30 AM

**Ingenuity**

Friday, February 13th, 2015, 8:30 AM to 9:30 AM

**Introduction to Chromatin and Transcription**

Monday, February 23rd, 2015, 10:30 AM to 11:30 AM

**Midterm**

Wednesday, February 25th, 2015, 9:30 AM to 10:30 AM

**Embryonic development**

Friday, February 27th, 2015, 8:30 AM to 9:30 AM

**X Chromosome Inactivation**

Monday, March 2nd, 2015, 10:30 AM to 11:30 AM

**Stem Cells**

Wednesday, March 4th, 2015, 9:30 AM to 10:30 AM

**iPS cells**

Friday, March 6th, 2015, 8:30 AM to 9:30 AM

**Stemness and transcriptional regulation**

Monday, March 9th, 2015, 10:30 AM to 11:30 AM

**Differentiation and Stemness**

Wednesday, March 11th, 2015, 9:30 AM to 10:30 AM

**Regenerative medicine**
Myc and stem cell function

Telomerase, Stem cell function and DNA repair

Cancer Stem cell model

Transdifferentiation

Guided Differentiation

Stem Cell Trials

Understanding Papers

Understanding Papers
PHAR 810  Advanced Topics in Neuropharmacology (NOW BMED-813)  
January-April 2013  
Time: Tuesday, 1 p.m. – 4 p.m.  
Place: Bracken Library Room 126

<table>
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<tr>
<th>Session</th>
<th>Topic</th>
<th>Faculty</th>
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<tr>
<td>January 15</td>
<td>Introduction</td>
<td>J. Reynolds</td>
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<tr>
<td>January 22</td>
<td>Glutamate Receptor Trafficking</td>
<td>J. Reynolds</td>
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<tr>
<td>January 29</td>
<td>Heteromeric GPCR Signaling</td>
<td>J. Reynolds</td>
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<tr>
<td>February 5</td>
<td>Gasotransmitters</td>
<td>J. Brien</td>
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<td>February 12</td>
<td>Pharmacology of Synaptic Plasticity</td>
<td>J. Reynolds</td>
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<tr>
<td>February 19</td>
<td>READING WEEK</td>
<td>J. Reynolds</td>
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<tr>
<td>February 26</td>
<td>No Class</td>
<td>J. Reynolds</td>
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<td>March 5</td>
<td>Schizophrenia</td>
<td>J. Reynolds</td>
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<tr>
<td>March 12</td>
<td>Alzheimer’s Disease</td>
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<td>March 19</td>
<td>Fetal Alcohol Spectrum Disorder</td>
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<td>March 26</td>
<td>Parkinson’s Disease</td>
<td>J. Reynolds</td>
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<tr>
<td>April 2</td>
<td>Neurodegeneration</td>
<td>J. Reynolds</td>
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**Evaluation:**  
Oral Presentations 2 x 20% each = 40%  
Written Reports 3 x 10% each = 30%  
Term Essay 30%
PHAR 810: Winter Term, 2013

Course Outline

Oral Presentations: Each student will be responsible for two oral presentations and for leading the discussion on an assigned original research paper. The presentation should cover the relevant background information that establishes the rationale for the study, the research question or hypothesis posed, the methodology employed to conduct the study, the major experimental results, how the study contributes to our knowledge in the field, and provide a critical appraisal of the strengths and weaknesses of the study. These presentations will be approximately 30 minutes in length.

Research Reports: Each student will be responsible for submitting three 2-page, single-spaced, written reports on the research papers discussed in class. These reports will be in one of three formats: (1) Compare and contrast the two original research papers. What are the strengths and weaknesses of each? Do they agree/disagree in their major findings and/or interpretation? Do they agree/disagree with the results of other investigators?; (2) Outline the future directions that you believe the research should take. What are the most relevant/important experiments that are a logical extension of the research reported in one, or both, original papers?; (3) Discuss the implications of the research for the discovery/development of novel therapeutic approaches. Are new targets for drug discovery identified/suggested by the experimental findings reported? What advantages/improvements over existing therapies are suggested?

Review Paper: Each student will be responsible for submitting a review paper on an assigned topic (maximum length, 20 double-spaced, typed pages, excluding references and figures). Topics will be assigned by early to mid February, and the review is due by April 4, 2013. Each review paper will consist of: (1) an overview of the current state of knowledge in the selected topic, including an appraisal of current therapeutic approaches; (2) an examination of the relevant experimental models; and (3) a discussion of emerging concepts for drug discovery and development in the topic area.

Grading:
Oral Presentation: 2 x 20% = 40%
Research Reports: 3 x 10% = 30%
Review Paper: 30%
PHARMACOLOGY 815*
MECHANISTIC TOXICOLOGY
WINTER TERM – 2013 / 2014

PHAR-815* is a problem-based course consisting of discussions of major mechanisms of toxicity supplemented with student presentations of research articles.

Time: Mondays 9:30-10:30
Thursdays 9:30-11:30

Place: Room 660, Botterell Hall

Evaluation:
Presentation of Introduction / Review ................................................................. 25%
One-page summary of assessment for each problem ........................................... 25%
Research article presentation ............................................................................. 25%
Participation in group discussion ...................................................................... 25%

Course Dr. Thomas E. Massey, Botterell Hall, Room 556
Coordinator: Tel: 533-6115; Email: masseyt@queensu.ca


Recommended Casarett and Doull’s Toxicology, 7th edition; C.D. Klassen, ed.,

Format: Each topic will be discussed over the course of two weeks, as follows:
Monday of Week 1: Introductory lecture by a student, followed by assignment of research article(s).
Thursday of Week 1: Presentation of research articles (students), followed by assignment of a research problem.
Monday of Week 2: Identification of issues to be addressed in order to solve research problem (whole group).
Thursday of Week 2: Discuss resolution of research problem (whole group).
## PHAR- 815*
### MECHANISTIC TOXICOLOGY
#### WINTER TERM – 2013/2014

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Topic</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday, January 6</td>
<td>9:30-10:30</td>
<td>Xenobiotic-induced cell death.</td>
<td>L.M. Winn</td>
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<td>Thursday, January 9</td>
<td>9:30-11:30</td>
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<tr>
<td>Monday, January 13</td>
<td>9:30-10:30</td>
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<td>Thursday, January 16</td>
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<tr>
<td>Monday, January 20</td>
<td>9:30-10:30</td>
<td>Carcinogenesis – I (mutagenesis, DNA repair).</td>
<td>T.E. Massey</td>
</tr>
<tr>
<td>Thursday, January 23</td>
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<td>Monday, January 27</td>
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<tr>
<td>Monday, February 3</td>
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<td>Carcinogenesis – II (epigenetic mechanisms).</td>
<td>C.J. Nicol</td>
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<tr>
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<td>READING WEEK</td>
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<td>February 10-14</td>
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<td>Monday, February 17</td>
<td>9:30-10:30</td>
<td>Carcinogenesis – II (epigenetic mechanisms).</td>
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<td>Thursday, February 20</td>
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<td>Monday, February 24</td>
<td>9:30-10:30</td>
<td>Neurotoxicology</td>
<td>C. Green</td>
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<tr>
<td>Thursday, February 27</td>
<td>9:30-11:30</td>
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<td></td>
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<tr>
<td>Monday, March 3</td>
<td>9:30-10:30</td>
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<tr>
<td>Thursday, March 6</td>
<td>9:30-11:30</td>
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<td></td>
</tr>
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<td>Monday, March 10</td>
<td>9:30-10:30</td>
<td>Current issues in toxicology</td>
<td>W.J. Racz</td>
</tr>
<tr>
<td>Thursday, March 13</td>
<td>9:30-11:30</td>
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<td>Monday, March 17</td>
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<td>Thursday, March 20</td>
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<td></td>
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<tr>
<td>Monday, March 24</td>
<td>9:30-10:30</td>
<td>Developmental toxicology</td>
<td>T.R.S. Ozolins</td>
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<tr>
<td>Thursday, March 27</td>
<td>9:30-11:30</td>
<td></td>
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<tr>
<td>Monday, March 31</td>
<td>9:30-10:30</td>
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</tr>
<tr>
<td>Thursday, April 3</td>
<td>9:30-11:30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Table of Content

Table of Content ........................................ 2  
Course Description .................................. 3  
Course Objectives .................................. 3  
Required Textbooks .................................. 3  
Evaluation ........................................... 3  
Grading Method ....................................... 5  
Expectations .......................................... 5  
Academic Integrity .................................... 6  
Course Calendar ....................................... 6
Course Description

A study of the physiology, pharmacology and anatomy of the cardiovascular system. Topics include integrative mechanisms and pharmacotherapy involved in short-term and long-term control of the circulation in health and disease.

NOTE This course involves a group research project.

PREREQUISITE Level 4 and (registration in the LISC Major or Specialization Plan) and (a GPA of 2.5) or permission of the course coordinator

Course Objectives

Required Textbooks

No textbook required

Evaluation

Independent Group Research (20%):

Focusing on the specific circulatory parameter that will be provided, your group (6-7 students) will need to develop a question and a corresponding experimental approach to answer “your” question. To accomplish this, groups will assess changes in various arterial pressure and heart rate parameters with an automated blood pressure cuff to account for the role these controllers play in circulatory changes. Peer assessment (2%) will be as described below.

Peer Assessment (5%)

Your project group members give a mark out of 2 for your involvement, contributions and effort in the project: 0.5 (far below expectations), 1.0 (below expectations), 1.5 (satisfactory/good performance), or 2 (strong performance).

Both your classmates and the course coordinator give a mark out of 3 (to be averaged) for your overall involvement, attendance and participation in the course: 0.5-1.5 (far below expectations), 2 (below expectations), 2.5 (satisfactory/good performance) or 3.0 (strong performance).

Seminar Presentation and Discussion (SPAD 20%)

Working in small groups (2-3), students are expected to read an original paper and present its findings to
the rest of the group, emphasizing how the data collected in each study fits into the conceptual framework being developed in the course. As part of this assessment another group (2-3) will be assigned to be the “Discussants”, responsible for managing the discussion following a presentation, including managing the flow and consolidation of questions. Maximum of 30 min presentation followed by 20 min discussion (led by 2-3 discussants). Timing is important, as there must be time for active discussion!

Presentations are evaluated with respect to critical assessment of the paper AND on the clarity of teaching the concepts relevant to understanding/integrating the material.

- Clarity of background presented (and overall knowledge)
- Critical assessment of overall research area and the experimental findings
- Ability to integrate material into overall understanding of CV regulation
- Overall clarity of presentation
- Ability to answer questions

Each of presenting students is responsible for ALL aspects of the paper (i.e. not just parts you assigned each other). The paper will be handed out one week prior to the presentation.

ALSO each student MUST is responsible for submitting a mark for each presenter (out of 100%) after the seminars are completed. As this grading is part of your course participation, please take this peer assessment seriously. The average of these marks will be used to adjust the marks given by faculty.

Responsibility of Non-Presenting Students: The other non-presenting students (but not the Discussants) need to upload/submit questions about the paper (e.g. Helix, OneDrive, Dropbox) before noon on the day of the presentation to allow the discussants sufficient time to consolidate/organize the submitted questions. Be prepared as you may still be asked to present your question. The questions need to be about issues such as gaps in knowledge, discrepancies in interpretation or methodological flaws; not just a simplistic “what is a particular method?”

Midterm Exam - Group Presentation (15%)

Students will work in small groups to critically assess the results of a hypothetical short term experiment. Using knowledge gained in the course up to the time of the exam, students will need to discuss and present figures regarding the time course of changes of various control systems and tissue responses that occur between the onset of a perturbation and the “steady-state” in response to a described scenario. Students will present their answers in groups as a recorded presentation (e.g. voice over PowerPoint or video) to the rest of the class and to the instructor.

Final Exam – Written (40%)

Building on the mid-term exam, students will use information learned in lectures, during independent study, in papers and in the project as well the conceptual framework developed throughout the course to answer the question. In the essay a student will need to discuss the time course of changes of various control systems and tissue responses that occur between the onset of a perturbation and the “steady-state” in response to a detailed experimental scenario lasting weeks. Students will be expected to compose an organized but comprehensive response in 1500 words or less.
Grading Method

Independent Group Research Project 20%

Peer assessment - Group project, Seminars, Class discussion 5%

Seminar presentation 20%

Mid Term Exam (recorded ePresentation to answer question + group discussion) 15%

Final Exam (3-5 hr written, maximum of 1500 words + figures) 40%

Expectations

As part of the group work, students will:

(i) apply the course concepts to various experimental scenarios

(ii) communicate via oral presentation and discussion the concepts being developed

(iii) facilitate learning by other students before a test, exam or presentation.

Previous evidence has recommended that groups of two to six people is ideal. Groups of 2-3 students are good for simple tasks to enable a consensus to be reached quickly. Groups of 4-6 are superior for multifaceted projects in which an increased number of concepts/opinions may improve the end results.

Groups will be assigned randomly for the duration of the course because when students choose their own teams, they are likely to team up with friends or form cliques that can get off topic.

Designating Roles in Groups

(https://citl.indiana.edu/resources/teaching-resources1/teaching-handbook-items/group-work.php)

Groups that are created for discussion or studying can be easily organized around a multi-person model based on roles. Each member of the group plays a specific role that supports the team’s collaborative effort. These roles include:

Leader: Responsible for keeping the group on task, maintaining the schedule (meetings, deadlines), and maintaining contact information (phone numbers, emails).

Encourager: Encourages conversation and inclusion of all opinions, and guides the discussion towards consensus.

Prober: Ensures that the assumptions are correct and that there is sufficient evidence for the solution.

Recorder: Writes down the group’s solution that will be submitted/presented on behalf of the group.
While some people will tend to lead and some will tend to follow, everyone should be willing to compromise and modify their ideas in the interest of group unity. If the groups are going to be working together on a long-term project or multiple tasks, you may wish to modify these roles to emulate roles that one might encounter. Ensure that the students rotate through these positions. Try to break a long project into at least as many tasks as there are people in each group and have the students rotate through the roles each time they start a new task.

**Academic Integrity**

*Academic integrity* is constituted by the five core fundamental values of honesty, trust, fairness, respect and responsibility (see www.academicintegrity.org). These values are central to the building, nurturing and sustaining of an academic community in which all members of the community will thrive. Adherence to the values expressed through academic integrity forms a foundation for the "freedom of inquiry and exchange of ideas" essential to the intellectual life of the University (see the Senate Report on Principles and Priorities: http://www.queensu.ca/secretariat/policies/senateandtrustees/principlespriorities.html). Students are responsible for familiarizing themselves with the regulations concerning academic integrity and for ensuring that their assignments conform to the principles of academic integrity. Information on academic integrity is available in the Arts and Science Calendar (see Academic Regulation 1 http://www.queensu.ca/artsci/academic-calendars/2011-2012-calendar/academic-regulations/regulation-1), on the Arts and Science website (see http://www.queensu.ca/artsci/academics/undergraduate/academic-integrity), and from the instructor of this course. Departures from academic integrity include plagiarism, use of unauthorized materials, facilitation, forgery and falsification, and are antithetical to the development of an academic community at Queen's. Given the seriousness of these matters, actions which contravene the regulation on academic integrity carry sanctions that can range from a warning or the loss of grades on an assignment to the failure of a course to a requirement to withdraw from the university.

**Course Calendar**

**Course Introduction and Assignments**

Tuesday, September 15th, 2015, 4:30 PM to 6:00 PM

**Short Term Cardiac & Circulatory Control I**

Thursday, September 17th, 2015, 3:30 PM to 6:00 PM

**Short Term Cardiac & Circulatory Control II**

Tuesday, September 22nd, 2015, 4:30 PM to 6:00 PM

**Short Term Cardiac & Circulatory Control III**

Thursday, September 24th, 2015, 3:30 PM to 6:00 PM
SPAD-I
Tuesday, September 29th, 2015, 4:30 PM to 6:00 PM

SPAD-II and SPAD-III
Thursday, October 1st, 2015, 3:30 PM to 6:00 PM

Facilitated Group Project Session
Tuesday, October 6th, 2015, 4:30 PM to 6:00 PM

SPAD-IV and SPAD V
Thursday, October 8th, 2015, 3:30 PM to 6:00 PM

Short Term Cardiac & Circulatory Control IV + Review
Tuesday, October 13th, 2015, 4:30 PM to 6:00 PM

Long Term Circulatory Control I - Mechanisms/Treatments
Thursday, October 15th, 2015, 3:30 PM to 6:00 PM

In-Class Mid-Term Presentations
Tuesday, October 20th, 2015, 4:30 PM to 8:00 PM

Opportunity to Work on Group Project
Thursday, October 22nd, 2015, 3:30 PM to 6:00 PM

SPAD-VI
Tuesday, October 27th, 2015, 4:30 PM to 6:00 PM

Long Term Circulatory Control II - Mechanisms/Treatments
Thursday, October 29th, 2015, 3:30 PM to 4:30 PM

SPAD-VII
Thursday, October 29th, 2015, 4:30 PM to 6:00 PM

Long Term Circulatory Control III - Mechanisms/Treatments
Tuesday, November 3rd, 2015, 4:30 PM to 6:00 PM

Opportunity to Work on Group Project
Thursday, November 5th, 2015, 3:30 PM to 6:00 PM

SPAD-VIII
Tuesday, November 10th, 2015, 4:30 PM to 6:00 PM
Kidney Physiology, Pathophysiology, Pharmacotherapy I
Thursday, November 12th, 2015, 3:30 PM to 4:30 PM

SPAD-IX
Thursday, November 12th, 2015, 4:30 PM to 6:00 PM

Kidney Physiology, Pathophysiology, Pharmacotherapy II
Tuesday, November 17th, 2015, 4:30 PM to 6:00 PM

Facilitated Group Project Session
Thursday, November 19th, 2015, 3:30 PM to 6:00 PM

Kidney Physiology, Pathophysiology, Pharmacotherapy III
Tuesday, November 24th, 2015, 4:30 PM to 6:00 PM

Presentations of Research Projects
Thursday, November 26th, 2015, 3:30 PM to 6:00 PM

SPAD-X
Tuesday, December 1st, 2015, 4:30 PM to 6:00 PM

SPAD-XI and XII
Thursday, December 3rd, 2015, 3:30 PM to 6:00 PM
APPENDIX 2

Faculty Curriculum Vitae (separate document)
<table>
<thead>
<tr>
<th>Program Name : Biomedical Computing</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
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<td>2017</td>
<td>2018</td>
<td>2019</td>
<td>2020</td>
<td>2021</td>
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<td>Program Intake (M.Sc)</td>
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<td>Enrollment</td>
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<tr>
<td>Returning Students Year 2</td>
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<td>Returning Students Year 3</td>
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<td>Returning Students Year 4</td>
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<td>Total New Students</td>
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<td>183,202</td>
<td>150,662</td>
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<td>Enrollment Domestic vs. International</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Domestic (G.D)</td>
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<td>Non-tuition</td>
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<tr>
<td>Program fee</td>
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</table>

Assumptions:

| Grant Revenue Assumption            | 4,119 |       |       |       |       |
| Recovery to the University Fund     | 4,119 |       |       |       |       |
| Shared Services Attribution Cost per FTE | 4,119 |       |       |       |       |

Revenue

| Tuition revenue (G.D.)               | 120,000 | 180,000 | 240,000 | 240,000 | 240,000 |
| Tuition revenue (M.Sc) New           | 65,000  | 90,000  | 135,000 | 135,000 | 135,000 |
| Tuition revenue (M.Sc) From Diploma  | 111,000 | 161,713 | 232,023 | 232,023 | 232,023 |
| Government grant revenue             | 200,000 | 207,153 | 280,023 | 280,023 | 280,023 |
| Combined both programs               | 294,090 | 287,202 | 352,229 | 352,229 | 352,229 |
| Gifts and grants                    | (7,510) | (11,096) | (15,341) | (15,341) | (15,341) |
| Total net new revenue from proposed programs | 286,579 | 276,007 | 336,888 | 336,888 | 336,888 |

Expenditures

| Direct cost program                | 60,000 | 60,000 | 60,000 | 60,000 | 60,000 |
| Academic salaries and professional fees | 60,000 | 60,000 | 60,000 | 60,000 | 60,000 |
| Faculty - Salaries                 | 20,000 | 20,000 | 20,000 | 20,000 | 20,000 |
| Program delivery                   | 30,000 | 30,000 | 30,000 | 30,000 | 30,000 |
| Books and materials                |        |        |        |        |        |
| Scholarships and bursaries         |        |        |        |        |        |
| Other Salaries                     | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |
| Benefits                           | 20,000 | 15,000 | 15,000 | 15,000 | 15,000 |
| Office                             | 150,000 | 125,000 | 100,000 | 100,000 | 100,000 |
| Inflationary growth                |        |        |        |        |        |
| Start up and lab                    |        |        |        |        |        |
| 22% of Salaries                   |        |        |        |        |        |
| Marketing                          |        |        |        |        |        |
| Total expenses                     | 395,838 | 350,844 | 298,475 | 298,475 | 298,475 |
| Net Revenue                         | 286,579 | 276,007 | 336,888 | 336,888 | 336,888 |

Insert Notes if required.
University Fund Recovery Rate

<table>
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<th>Grant per Student</th>
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<td>2015-16</td>
<td>2016-17</td>
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<td>1.0 BIU</td>
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<tr>
<td>1.5 BIU</td>
<td>5,607</td>
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<tr>
<td>2.0 BIU</td>
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<td>2.0 BIU Engineering</td>
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<tr>
<td>Ph.D</td>
<td>26,214</td>
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<table>
<thead>
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<th>Grant Rates</th>
<th>Grant per Student</th>
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</thead>
<tbody>
<tr>
<td>Undergraduate Students</td>
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<tr>
<td>Undergraduate On-Campus 1.0 FFTE Student</td>
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<tr>
<td>Undergraduate On-Campus 0.4 FFTE Student</td>
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<tr>
<td>Undergraduate Off-Campus/Distance 0.3 FFTE Student (ATEP, Trent, Dist Career)</td>
<td>$512</td>
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<td>Post-Graduate Medical Resident (1.00 FFTE)</td>
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<td>Graduate Students</td>
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<tr>
<td>Research Masters On-Campus 1.0 FFTE Student Eligible for all Financial Support</td>
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<td>Doctoral On-Campus 1.0 FFTE Student Eligible for all Financial Support</td>
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<td>Profi Graduate On-Campus 1.0 FFTE Student Eligible for Partial Financial Support</td>
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<td>Graduate On-Campus 0.3 FFTE Student with Minimal/No Financial Support</td>
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<tr>
<td>Graduate Off-Campus 1.0 FFTE Student with No Financial Support</td>
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<tr>
<td>Faculty</td>
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<tr>
<td>Regular On-Campus 1.0 EFT Faculty Member</td>
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<td>Term Adjunct On-Campus 0.25 EFT Faculty Member</td>
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<tr>
<td>Staff</td>
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<tr>
<td>On-Campus Full- or Part-Time Staff Member</td>
<td>$1,414</td>
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Notes
1. Research Masters and Doctoral "all" financial support averaged at $5,500 (operating fund only) excluding TA income. Cell equation can be changed to adjust.
2. Professional graduate "partial" financial support set at $1,000 (operating fund only) excluding TA income. Cell equation can be changed to adjust.
3. The $4,167 value for undergraduate on-campus full-time in FHS: Meds refers to a student in the MD program only
4. Arts and Science Professional Graduate On-Campus Full-Time student based on SURP.
5. Salary for all regular faculty set at $150,000.
6. Stipends for term adjuncts set at $25,000 except for Law and Business ($35,000)
7. Staff salary set at $60,000 per EFT. Actual shared service expense for a part-time staff member will be slightly lower than shown.
8. Shared service expense for the research bins based on average per faculty member research revenue in that Faculty/ School, and the proportion of faculty members with funded research (in that Faculty/ School)
9. All graduate student use of teaching space is estimated. The potential error in the estimate is substantial, but the teaching space bin in quite small.
10. Undergraduate and graduate student contribution to some advancement expense is driven by degrees awarded. Degree completion rates and time-to-complete degree vary by student/program category.
11. Professional graduate on-campus and off-campus student costs use an average of within-Faculty tuition + grant revenue for all professional graduate programs.
**APPENDIX 3B:**

**BUDGET MODULE**

This module is to be completed by the Academic Units in consultation with the Faculty Office (s) and/or School of Graduate Studies as appropriate as well as the Office of the Vice-Provost (Planning and Budgeting).

<table>
<thead>
<tr>
<th>Summarize the additional resources needed to implement the Program under the following headings (where applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Faculty</strong> <em>(e.g. number of 0.5-credit courses)</em></td>
</tr>
<tr>
<td><strong>Staff</strong> <em>(include number or fraction of FTEs)</em></td>
</tr>
<tr>
<td><strong>Teaching Assistants</strong> <em>(include number of TA hours)</em></td>
</tr>
</tbody>
</table>

**Other Non-Academic University Services**

*Indicate which of the following Services will be needed. Provide details as needed.*

| **Financial Services** | Students will add to the number of financial transactions since we will require more adjunct and TA contracts, however we don’t expect this to be a large burden. There will also be a one-time cost associated with the addition of the program into the application and tracking systems and creation of a hood for convocation. |
| **Human Resources** | As stated above additional contracts will be required, however we expect this impact to be minimal. |
| **Advancement** | None. |
| **Student Services** | These students will increase participation in Expanding Horizons, Career Services and Counseling, however we expect this to be a minimal impact. |
| **Residences** | Residence space will not be required. |
| **Administrative services** | The School of Computing will handle administrative issues such as admission, registration, degree completion, etc. in conjunction with and as governed by the policies and procedures of the School of Graduate Studies for the new programs. |
| **Other** | Specialized computer laboratory ($30,000 the first year and ongoing support at $10,000 per year for steady state) that would accommodate up to 20 students. There would also be start-up costs for program evaluation ($5,000) and marketing ($20,000) plus ongoing costs of $10,000 a year for marketing. |
**Budget Module and Narrative**

Complete the Budget template in consultation with the Faculty Financial Officer and the Registrar detailing one-time expenses (monies that will only be required once for start-up), base funds (year after year expenses), all other expenses and revenues from all sources for each year until steady state is reached. Consultations with the Office of the Vice-Provost (Planning and Budgeting) are also recommended. 

Include a narrative to accompany the budget template [maximum 2 pages; use of subheadings suggested].

**Additional Resources:**

The courses for both of the proposed programs will be taught by existing faculty and adjuncts requiring $60,000 for salary per year. It is anticipated that three new courses equivalent to 3 credit units each will be needed. Since the courses will be dependent on labs, there will also be a TA requirement ($20,000), administrative/recruitment support ($10,000) and a specialized computer laboratory ($30,000 the first year and ongoing support at $10,000 per year for steady state) that would accommodate up to 20 students. There would also be start-up costs for program evaluation ($5,000) and marketing ($20,000) plus ongoing costs of $10,000 a year for marketing.

**Net Impact:**

It is anticipated that combined the Graduate Diploma and Master’s program will steadily grow over the next five years reaching a steady state of 35 students (20 for the Graduate Diploma and 15 for the Masters though the distribution of enrolments is difficult to predict; direct entry into the Masters may be higher than diploma enrolments). As a result, this growth will allow all initial start-up and administration costs to be recovered in Year 1 and a net positive revenue to the University of approximately $98,000 in 2017 and $377,000 in 2021 after adjusting for the timing difference of shared services costs attribution.

It should also be emphasized that, according to Queen’s University Senate Policy, these new programs will be jointly assessed within five years of commencement to monitor financial sustainability and academic quality.

If other sources are needed, list the sources and indicate if the funds have been applied for and if they have been secured.

N/A

**Net Impact of the Proposed Program**

Summarize any other resource or funding implications of the proposed Program.

N/A
Biomedical Informatics Student Demand #2

If such a program was offered, what priority would you place on enrolling in a graduate level Biomedical Informatics program?

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely High - I would almost certainly make this a priority</td>
<td>21</td>
<td>11.9%</td>
</tr>
<tr>
<td>Relatively High - I would give serious consideration to making this a priority</td>
<td>56</td>
<td>31.8%</td>
</tr>
<tr>
<td>Neither High nor Low - It sounds intriguing, but I'm uncertain about making it a priority</td>
<td>65</td>
<td>36.9%</td>
</tr>
<tr>
<td>Relatively Low - I don't think I would be willing to make it a priority</td>
<td>19</td>
<td>10.8%</td>
</tr>
<tr>
<td>Extremely Low - This is not something that fits my plans</td>
<td>15</td>
<td>8.5%</td>
</tr>
</tbody>
</table>

Total: 176

What is the main reason for your decision to place low priority on potentially enrolling in a biomedical informatics program?
<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>I do not believe a program such as this will help me acquire a job upon graduation</td>
<td>2</td>
<td>6.1%</td>
</tr>
<tr>
<td>I have other plans to pursue additional education upon graduation (i.e. plan to attend medical school etc.)</td>
<td>11</td>
<td>33.3%</td>
</tr>
<tr>
<td>I have no knowledge of computing and thus, a program with elements of computing is intimidating to me</td>
<td>8</td>
<td>24.2%</td>
</tr>
<tr>
<td>I have no interest in biomedical informatics</td>
<td>10</td>
<td>30.3%</td>
</tr>
<tr>
<td>Other, please specify</td>
<td>2</td>
<td>6.1%</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>33</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Why are you potentially interested in enrolling in a Biomedical Informatics program?**
<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>I believe a program like this offers an opportunity to acquire applied skills in data analysis</td>
<td>55</td>
<td>40.7%</td>
</tr>
<tr>
<td>This type of program will allow me to start my career with additional credentials</td>
<td>25</td>
<td>18.5%</td>
</tr>
<tr>
<td>This type of program will allow me to increase my work competencies and makes me more marketable to employers</td>
<td>35</td>
<td>25.9%</td>
</tr>
<tr>
<td>This program provides a nice alternative to medical school</td>
<td>19</td>
<td>14.1%</td>
</tr>
<tr>
<td>Other, please specify...</td>
<td>1</td>
<td>0.7%</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>135</strong></td>
<td></td>
</tr>
</tbody>
</table>

If you were to pursue a graduate level program in Biomedical Informatics, which educational format would appeal to you the most?
<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Graduate Diploma:</strong> a 4-month program that runs from May to August and includes 3 courses and a research paper</td>
<td>17   13.0%</td>
</tr>
<tr>
<td><strong>Master of Science (MSc):</strong> 12-month program that runs May to April and includes 6 courses and a major research project</td>
<td>46   35.1%</td>
</tr>
<tr>
<td><strong>Both programs - start with the Graduate Diploma and then have the option to continue my studies in the MSc program and transfer all 3 courses to the MSc</strong></td>
<td>65   49.6%</td>
</tr>
<tr>
<td><strong>None of the Above</strong></td>
<td>2    1.5%</td>
</tr>
<tr>
<td><strong>Other, please specify...</strong></td>
<td>1    0.8%</td>
</tr>
</tbody>
</table>

**Total:** 131

In choosing a program, how important is it that each of the following courses be included in the program?
<table>
<thead>
<tr>
<th>Variable</th>
<th>Important</th>
<th>Not Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biomedical Data Management</td>
<td>124</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>97.6%</td>
<td>2.4%</td>
</tr>
<tr>
<td>Biostatistics</td>
<td>108</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>85.0%</td>
<td>15.0%</td>
</tr>
<tr>
<td>Data Mining</td>
<td>82</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>65.6%</td>
<td>34.4%</td>
</tr>
<tr>
<td>Medical Informatics</td>
<td>115</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>91.3%</td>
<td>8.7%</td>
</tr>
<tr>
<td>Medical Imaging</td>
<td>95</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>75.4%</td>
<td>24.6%</td>
</tr>
<tr>
<td>Bioinformatics</td>
<td>115</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>91.3%</td>
<td>8.7%</td>
</tr>
<tr>
<td>Research Opportunities</td>
<td>106</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>84.1%</td>
<td>15.9%</td>
</tr>
<tr>
<td>Career Development Programming &amp; Support</td>
<td>104</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>81.9%</td>
<td>18.1%</td>
</tr>
</tbody>
</table>

How valuable do you think a program such as this would be for achieving your career objectives upon graduation?

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Count %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely valuable</td>
<td>19</td>
<td>15.1%</td>
</tr>
<tr>
<td>Very valuable</td>
<td>40</td>
<td>31.7%</td>
</tr>
<tr>
<td>Valuable</td>
<td>44</td>
<td>34.9%</td>
</tr>
<tr>
<td>Somewhat valuable</td>
<td>23</td>
<td>18.3%</td>
</tr>
</tbody>
</table>

Total: 126

What year of study are you currently enrolled?
### 2nd Year
- Count: 49
- Percentage: 31.2%

### 3rd Year
- Count: 57
- Percentage: 36.3%

### 4th Year
- Count: 44
- Percentage: 28.0%

### Other
- Count: 7
- Percentage: 4.5%

**Total:** 157

### Upon graduation, what field are you looking to work in?

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicine</td>
<td>29</td>
<td>18.8%</td>
</tr>
<tr>
<td>Private Industry (i.e. Pharmaceuticals, Bioinformatics etc)</td>
<td>25</td>
<td>16.2%</td>
</tr>
<tr>
<td>Research</td>
<td>23</td>
<td>14.9%</td>
</tr>
<tr>
<td>Healthcare Sector</td>
<td>36</td>
<td>23.4%</td>
</tr>
<tr>
<td>Apply / Attend Medical School</td>
<td>24</td>
<td>15.6%</td>
</tr>
<tr>
<td><strong>Other, please specify...</strong></td>
<td>17</td>
<td>11.0%</td>
</tr>
</tbody>
</table>

**Total:** 154

### In what academic discipline are you currently enrolled?
<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Life &amp; Physical Sciences:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biochemistry, Biology, Chemistry, Computing,</td>
<td>122</td>
<td>79.2%</td>
</tr>
<tr>
<td>Environmental Studies, Geography &amp; Urban</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planning, Geology, Life Sciences, Math and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Statistics, Physics and Astronomy, Psychology</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Social Sciences:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economics, Environmental Studies, Gender</td>
<td>24</td>
<td>15.6%</td>
</tr>
<tr>
<td>Studies, Geography &amp; Urban Planning, Global</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development Studies, Industrial Relations,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kinesiology and Health Studies, Political</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Studies, Psychology, Sociology</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Humanities:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Art History &amp; Conservation, Classics, English</td>
<td>1</td>
<td>0.6%</td>
</tr>
<tr>
<td>Language &amp; Literature, History, Jewish</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Studies Program, Philosophy, Religious</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Studies</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other, please specify...</strong></td>
<td>7</td>
<td>4.5%</td>
</tr>
</tbody>
</table>

**Total:** 154

As we develop this program, would you be interested in receiving more information about the program and how to apply?
<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>74</td>
<td>48.7%</td>
</tr>
<tr>
<td>No</td>
<td>78</td>
<td>51.3%</td>
</tr>
</tbody>
</table>

Total: 152

If yes, please provide an email address or phone number where you can be reached.

71 responses

- my academic background is neither computational or biological
- Up and coming field, a lot of jobs available requiring this training
- 1 year program with practicum component
Appendix C

Faculty of Arts and Science
Report of the Nominating Committee
January, 2016

Terms are generally from September 1\textsuperscript{st} to August 31\textsuperscript{st} annually for a term of three years, unless otherwise indicated.

Secretary, Faculty Board
Patrick Costigan, School of Kinesiology and Health Studies 2018

Senate
Ariel Salzmann, Department of History (winter term)
NEW UNDERGRADUATE FOR-CREDIT CERTIFICATE PROPOSAL

Expedited Approval Submission Form

Once the Pre-Approval process for a new Undergraduate Program is completed, and permission obtained from the Provost Office to submit a full proposal for an Expedited Approval, this template is to be used for a new for-credit Senate-approved Undergraduate Certificate (normally defined as a coherent subset of an existing degree program). New Undergraduate Certificate submissions must receive the approval of the appropriate Faculty Board(s) (or equivalent) and the Provost prior to submission to the Senate Office for referral to the Senate Committee on Academic Development (SCAD) which will then make its recommendations to Senate. Academic Units are strongly advised to contact the appropriate Faculty Associate Dean(s) with any questions that arise during this proposal development. Refer also to the Guide to QUQAPs.

NOTE: the textboxes in this template will expand as needed

Part A – General Summary

<table>
<thead>
<tr>
<th>Name of Proposed Certificate:</th>
<th>Certificate in Media Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Unit(s):</td>
<td>Department of Film and Media</td>
</tr>
<tr>
<td>Proposed Start Date:</td>
<td>September 2016</td>
</tr>
<tr>
<td>Type of Study:</td>
<td>Part-time</td>
</tr>
</tbody>
</table>

Contact Information (1)          Contact Information (2)

<table>
<thead>
<tr>
<th>Name:</th>
<th>Sidneyeve Matrix</th>
<th>Name:</th>
<th>Susan Lord</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title:</td>
<td>Associate Professor</td>
<td>Title:</td>
<td>Department Head</td>
</tr>
<tr>
<td>Unit:</td>
<td>Film and Media</td>
<td>Unit:</td>
<td>Film and Media</td>
</tr>
<tr>
<td>E-mail:</td>
<td><a href="mailto:Sidney.Eve@queensu.ca">Sidney.Eve@queensu.ca</a></td>
<td>E-mail:</td>
<td><a href="mailto:Susan.Lord@queensu.ca">Susan.Lord@queensu.ca</a></td>
</tr>
</tbody>
</table>

Executive Summary (1 page maximum suggested – minimum font size 11)

Briefly summarize the rationale for introducing this new Undergraduate Certificate and how it fits with the academic goals of the Faculty/School and University. Briefly describe: the educational goals and learning outcomes; internal or external collaboration required to deliver this program; how the program relates to the existing undergraduate program(s); what is the target market; how the relevant stakeholders (e.g. faculty, staff, students) were consulted in preparing the proposal; and additional resources required.

In the 2014 - 2015 academic year over 1,100 students from Commerce, Arts and Science, Health Sciences, Engineering, and Education took online courses in media studies, mostly via the Department of Film and Media (FILM240, FILM260, and FILM340). An additional 1,570 students enrolled in these courses on-campus.

Inspired by these numbers, and from student feedback gathered from online Film and Media courses regarding the importance of adding digital media literacy to their degrees, Queen’s Arts and Science Online and the Department of Film and Media are co-designing an online Certificate in Media Studies to launch in Fall 2016. In doing so, it will raise students’ awareness of, and provide access to, a range of innovative media courses.
offered via Queen’s Arts and Science while providing students with the opportunity to attain an additional academic credential that demonstrates their sustained interest and competencies in media theory and creative practice to post-graduate programs and future employers upon graduation.

Certificate Structure

This Certificate will be open to all registered full- and part-time undergraduate students in 2nd, 3rd and 4th year, exchange students studying at Queen’s as well as distance learners. Although it is designed to be completed 100% online, the Certificate in Media Studies can also be achieved by completing 4 traditional (on-campus) courses or via a combination of online and on-campus courses. The Certificate requires students to complete 12.0 units total: 2 core courses and 2 option courses. For students enrolled in a degree program as well as the certificate program, two of these courses (6.0 units) may also be counted toward the requirements of a student’s degree plan.

Core Courses
Students will take the following two core courses:

- FILM 240/3.0 Media and Popular Culture
- FILM 236/3.0 Media and Cultural Studies

Option Courses
Students will choose two option courses from:

- FILM 260/3.0 Digital Media Theory and Practice
- FILM 300/3.0 Hollywood
- FILM 303/3.0 Contemporary World Cinema
- FILM 308/3.0 Popular Cultures
- FILM 320/3.0 Media and the Arts
- FILM 335/3.0 Culture & Technology
- FILM 338/3.0 Contemporary Cultural Studies
- GNDS 125/3.0 Gender, Race, and Pop Culture
- MUSC 171/3.0 The Social History of Popular Music
- DRAM 205/3.0 Theatre in the Age of Film and TV
- POLS 313/3.0 Mass Media and Politics in Canada
- STSC 339/3.0 Media & Performance

Undergraduate students will request to register in the Certificate Program through Arts and Science Program Plan Selection in May. Distance students may apply for the Certificate Program through the Distance application process, or request to register through Continuing and Distance Studies. All students will apply to graduate in the Certificate Program on SOLUS in the same way students apply now to graduate in a degree program.

Educational Goals and Learning Outcomes:

1. **Apply online communication skills** to articulate ideas clearly and concisely and demonstrate critical thinking using both visual and narrative methods across disciplinary boundaries;
2. **Develop fluency** in the foundations of media and cultural studies in order to identify the circuits of production, distribution and consumption of media forms from advertising to film, television to popular music, news media to mobile apps;
3. **Expand skills in online collaboration** in order to engage in online discussions, articulate peer feedback in a considerate manner and demonstrate responsibilities and contributions to team-based assignments;
4. **Investigate key trends** in current creative economies, industries, and cultures to articulate how they function to shape identities, knowledges, and relations of power;
5. Demonstrate applied digital media literacy skills useful for research, design, and communication across a range of disciplines and professional fields from public health to public relations, marketing and education to public policy and entrepreneurial endeavors;
6. Articulate the role of the creative and culture industries in influencing and shaping how we understand ourselves, each other, and how we participate in Canadian culture.

**Target Markets:**

The Certificate in Media Studies program is designed for current undergraduate degree students in all Faculties and Schools at Queen’s, as well as for current and new distance students.

**Stakeholder Support:**

This certificate proposal was inspired by student feedback gathered from online Film and Media courses regarding the importance of acquiring creative communication skills and digital media literacy for their degrees in the Faculties of Engineering, Commerce, Education, Health Science and Arts and Science.

This proposal received unanimous support from faculty in Film and Media and representatives of the Student Film Association. It also has the support of Queen’s Arts and Science Online.

**Additional Resources Required:**

No additional resources will be required in the initial offering of the program. If the demand for the Certificate increases, surplus from tuition will be used to hire additional faculty and staff to stabilize the program. In the meantime, staff and faculty from Film and Media will administer and manage the Certificate, in consultation with Queen’s Arts and Science Online.
## Part B – Evaluation Criteria

Part B is to be completed by the Unit/Faculty.

In accordance with Queen’s University Quality Assurance Processes (QUQAPs), the criteria should be regarded as the minimum criteria upon which the new program submission will be assessed. Further information can be found in [Guide to QUQAPs](#).

### 1. Introduction

1.1 **Describe how the Certificate is consistent with the University’s mission and values as well as the academic goals of the Faculty(ies) and Unit(s).**

The Academic Plan identifies the centrality of fundamental academic skills and the University’s Strategic Mandate Agreement with the MTCU, commits to developing new opportunities for expanded credentials and increased opportunities for experiential learning.

The proposed Certificate in Media Studies is designed to meet both of these objectives by allowing students the opportunity to develop the general and specific skills that meet their needs (acquiring creative communication skills and digital media literacy), and also to pursue additional academic credentials that will demonstrate they have competencies in media theory and creative practice, skills and credentials that will help address society’s needs by preparing students appropriately for careers after leaving Queen’s.

In addition, because this Certificate may be completed entirely online, it is composed of those courses that reflect and advance Queen’s mission to provide innovative, inclusive, and accessible teaching and learning experiences. These courses enable students to develop their media literacies and technical competencies using digital information and communication tools.

Since the courses selected for inclusion have few (if any) pre-requisites, are offered in Fall, Winter, and Summer terms, and include both 12 and 6 week durations, together they align with Queen’s commitment to diverse, accessible learning opportunities for students located in Kingston or anywhere in the world with web access.

In both of the core courses and many of the options listed in this proposal, students from every imaginable discipline and field collaborate on group projects, engage in online peer review, and work in virtual teams to coproduce creative works, case studies, and research projects.

1.2 **List the Objectives of the Certificate and specify the anticipated learning outcomes and career paths** [Refer to UDLEs, p.31 of QUQAPs].

By completing the Certificate in Media Studies students will:

1. **Apply online communication skills** to articulate ideas clearly and concisely and demonstrate critical thinking using both visual and narrative methods across disciplinary boundaries;
2. **Develop fluency** in the foundations of media and cultural studies in order to identify the circuits of production, distribution and consumption of media forms from advertising to film, television to popular music, news media to mobile apps;
3. **Expand skills in online collaboration** in order to engage in online discussions, articulate peer feedback in a considerate manner and demonstrate responsibilities and contributions to team-based assignments;
4. **Investigate key trends** in current creative economies, industries, and cultures to articulate how they function to shape identities, knowledges, and relations of power;
5. **Demonstrate applied digital media literacy skills** useful for research, design, and communication
across a range of disciplines and professional fields from public health to public relations, marketing and education to public policy and entrepreneurial endeavors;
6. **Articulate the role of the creative and culture industries** in influencing and shaping how we understand ourselves, each other, and how we participate in Canadian culture.

### 1.3 Explain how the objectives will be achieved (e.g. course work, teaching and research seminars, independent research, laboratory and technical training, internships, practica, major research papers, and thesis).

#### Course Activities:

In the two core courses alone, beyond reading scholarly articles and writing short essays, students will also be supported to design, develop, and deliver the following learning assignments and activities:

- **An ePortfolio:** online resume website to showcase creative and academic work completed while at Queen’s. Useful as a supplement for undergrad and postgrad awards and admissions committees, and employers.
- **Visual communication designs:** these include creating and critiquing web videos, infographics, presentation slides, and digital photography using graphic design software and cloud-based apps
- **Collaborative group work:** problem-based learning activities and case studies completed within online teams, and peer review activities to support students’ communication and critical thinking skills
- **Independent research:** honing intelligent online research skills via library indexes; discerning credible information on the web; searching for images and multimedia assets online; understanding digital copyright; discovering and assessing popular news coverage and reviews of media productions

#### 2. Program Regulations

**2.1 Admission Standards** - Describe the admission standards for the proposed Certificate Program, including degree, diploma and/or course requirements, and any other specific standards with reference to the learning outcomes and expectations of the Program. Provide the rationale for standards that differ from those set by the Faculty for degree programs and departmental requirements for entry to undergraduate degree programs. If applicable, indicate policies/procedures to encourage applications from qualified under-represented groups (e.g. Aboriginal people, visible minorities or persons with disabilities).

### Admission Standards:

The Certificate in Media Studies program is open to current undergraduate degree students at Queen’s, as well as to current and new distance students. The program can be taken in conjunction with a degree program from any Faculty, in which case the Arts and Science regulations about limited double-counting of courses apply, or as a stand-alone credential. New distance applicants for the Certificate in Media Studies program need to meet existing admission criteria for distance degrees. Admission standards for this Certificate program are the same as for the BAH degree at Queens, as specified in the Faculty of Arts and Science Admission Regulations 2 to 5. For graduates with an Ontario Secondary School Diploma: minimum overall 75% average on six 4U and 4M courses, including ENG4U and no more than three 4M courses. These standards are the same as for admission to the BA General programs offered online in the Faculty (BAs in English, History, Psychology and Global Development Studies).

Distance applicants can also enter the Faculty of Arts and Science as non-degree students and, if they meet Arts and Science eligibility criteria for progression to a degree program, can enroll in the certificate program at a later point.
All students enrolled in the Certificate program need to meet the Faculty of Arts and Science progression criteria.

Online courses are particularly accessible to students who are located remotely, who may be managing a disability that makes on-campus classes a challenge, and for non-traditional, returning, continuing, and life-long learners in the Kingston area and far beyond.

### 3. Certificate Structure and Requirements

Describe the Certificate under the following headings (as applicable)

<table>
<thead>
<tr>
<th>3.1 General Certificate Requirements – Describe the program duration and rationale, total number of courses, examinations, progress reports, advisory committees, etc.</th>
</tr>
</thead>
</table>

**General Requirements**

Students do not register in the Certificate in Media Studies, instead they apply for it, via SOLUS. The total number of online course credits required to earn the Certificate is 12.0. Students who complete the course requirements in good standing (GPA of 1.60) will receive the Certificate. There is no deadline for completion. No advisory committees or progress reports of any kind are required. However faculty (Sidneyeve Matrix) and staff (Linda Graham) in Film and Media will be available to advise students who wish to pursue the Certificate, as need be.

As well, students who intend to or are actively pursuing the Certificate will be invited to self-identify by participating in the events organized around it (e.g. speakers, screenings, streamings, and shows). They can opt into a mailing list, and elect to participate on the related branded social platforms. Therefore, we definitely do expect to have a “community of creatives” from across campus and beyond, who are pursuing a common goal and who will have much in common otherwise.

Comprising 12.0 units of degree-credit courses, the program provides a strong foundation in media research methods and theories, through 6.0 units of required courses – FILM 240/3.0 Media and Popular Culture and FILM 236/3.0 Media and Cultural Studies – while enabling students from a variety of disciplines and fields to collaborate on group projects, engage in online peer review, and work in virtual teams to coproduce creative works, case studies, and research projects, through an additional 6.0 units of carefully selected option courses.

More specifically, FILM 240/3.0 Media and Popular Culture, will introduce students to media research techniques used to support the media and entertainment sectors of the creative industries. Essentially half media studies and half information design, in FILM 240/3.0 students will learn a range of approaches to media production, distribution, and consumption, from publishing to films, from marketing to software design. They will then apply these insights about research, design, dissemination, and audience engagement, while creating their own digital deliverables, such as multimedia infographics and posters. The subsequent required course, FILM 236/3.0 Media and Cultural Studies, extends the focus on culture and media forms to encourage students to develop a critical vocabulary to analyze the roles, functions, and impact of mass media technologies, institutions, and practices in both scholarly and practical forms. Working independently and in groups, in FILM 236 students explore the social, political, and cultural contexts of contemporary media, and reflect on the tensions between citizenship and consumerism inherent in popular culture products, processes, and practices.

Students then have the option to focus their studies through choosing from a range of option courses, to reinforce and deepen their understanding of contemporary media artefacts and activities. Option courses, such
Core Courses
Students will take the following two core courses:
- FILM 240/3.0 Media and Popular Culture
- FILM 236/3.0 Media and Cultural Studies

Option Courses
Students will choose two option courses from:
- FILM 260/3.0 Digital Media Theory and Practice
- FILM 300/3.0 Hollywood
- FILM 303/3.0 Contemporary World Media
- FILM 335/3.0 Culture and Technology
- GNDS 125/3.0 Gender, Race and Pop Culture
- MUSC 171/3.0 The Social History of Popular Music
- DRAM 205/3.0 Theatre in the Age of Film and TV

On-campus students may substitute the following courses currently offered only on campus for an online option course:
- FILM 320/3.0 Media and the Arts
- FILM 338/3.0 Contemporary Cultural Studies
- POLS 313/3.0 Mass Media and Politics in Canada
- STSC 339/3.0 Media and Performance
- FILM 308/3.0 Popular Cultures

Students who intend to or are actively pursuing the Certificate in Media Studies will be invited to self-identify by participating in the events organized around it (e.g. speakers, screenings, streamings, shows). They can opt into a mailing list, and elect to participate on the related branded social platforms. Therefore we definitely do expect to have a “community of creatives” from across campus and beyond, who are pursuing a common goal and who will have much in common otherwise.

Courses in the program are either currently offered by CDS or are in development, and will be offered in rotation, allowing students to be able to complete the program within 4 academic terms. Students will be able to register in the certificate as a stand-alone program or concurrently with a degree program. In the latter situation, there will be limited double-counting of credits towards both programs, consistent with the Faculty’s policy on certificate and diploma programs. Students will be able to complete all the courses for the program entirely through online study. Additional online course options will be developed as demand and funding warrant, to augment and diversify the program.
3.2 **Course Requirements** – In Table 1 below, list core (required) courses, optional courses (e.g. select X from the following list) and elective courses (indicate level and disciplines).

<table>
<thead>
<tr>
<th>Course/Credit (number and name)</th>
<th>(C)ore, (O)ptional or (E)lective</th>
<th>Proposed Instructor(s) and Home Academic Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two of:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>+FILM 240/3.0 Media and Popular Culture</td>
<td>C</td>
<td>Sidneyeve Matrix, Film &amp; Media</td>
</tr>
<tr>
<td>+FILM 236/3.0 Media and Cultural Studies</td>
<td>C</td>
<td>Susan Lord, Film &amp; Media</td>
</tr>
<tr>
<td>Two of:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>+FILM 240/3.0 Media and Popular Culture</td>
<td>O</td>
<td>Sidneyeve Matrix, Film &amp; Media</td>
</tr>
<tr>
<td>*FILM 260/3.0 Digital Media Theory and Practice</td>
<td>O</td>
<td>Sidneyeve Matrix, Film &amp; Media</td>
</tr>
<tr>
<td>+FILM 300/3.0 Hollywood</td>
<td>O</td>
<td>Scott MacKenzie, Film &amp; Media</td>
</tr>
<tr>
<td>+FILM 303/3.0 Contemporary World Media</td>
<td>O</td>
<td>Karine Bertrand, Film &amp; Media</td>
</tr>
<tr>
<td>+FILM 335/3.0 Culture and Technology</td>
<td>O</td>
<td>Scott MacKenzie, Film &amp; Media</td>
</tr>
<tr>
<td>+DRAM 205/3.0 Theatre in the Age of Film and TV</td>
<td>O</td>
<td>Grahame Renyk, Drama</td>
</tr>
<tr>
<td>+GNDS 125/3.0 Gender, Race and Pop Culture</td>
<td>O</td>
<td>Melissa Houghtaling, Drama</td>
</tr>
<tr>
<td>+MUSC 171/3.0 Social History and Popular Music</td>
<td>O</td>
<td>Kip Pegley, Robbie McKay, School of Drama and Music</td>
</tr>
<tr>
<td>FILM 308/3.0 Popular Cultures</td>
<td>May be substituted for 3.0 units of option courses</td>
<td>Sidneyeve Matrix, Film &amp; Media</td>
</tr>
<tr>
<td>FILM 320/3.0 Media and the Arts</td>
<td>May be substituted for 3.0 units of option courses</td>
<td>Gary Kibbins, Film &amp; Media</td>
</tr>
<tr>
<td>FILM 338/3.0 Contemporary Cultural Studies</td>
<td>May be substituted for 3.0 units of option courses</td>
<td>Keren Zaiontz, Film &amp; Media</td>
</tr>
<tr>
<td>POLS 313/3.0 Mass Media and Politics in Canada</td>
<td>May be substituted for 3.0 units of option courses</td>
<td>Jonathan Rose, Politics</td>
</tr>
<tr>
<td>STSC 339/3.0 Media and Performance</td>
<td>May be substituted for 3.0 units of option courses</td>
<td>Keren Zaiontz, Film &amp; Media</td>
</tr>
</tbody>
</table>

Courses offered with an * are (or will be) offered only online
Courses marked with a + are (or will be) offered on-line and on-campus
Use space below to comment on Table 1

3.3 **Course Descriptions** - For each EXISTING and NEW undergraduate course that is part of the proposed Certificate, provide a calendar description below and append/embed the course outline in Section 12.

**FILM 236/3.0 Media and Cultural Studies** (online and on-campus sections available by Fall 2016)
Introduction to cultural and social theory of film and other media as it relates to the tension between citizenship and consumerism. Examines roles, functions, and impact of mass media technologies, institutions, and practices in both scholarly and practical forms.
FILM 240/3.0 Media and Popular Culture (online and on-campus sections available)
Course surveys a variety of popular media forms and genres (film, TV, radio, music, novels, magazines, advertising, news, Internet). Introduces contemporary cultural studies analysis concerning the impact of everyday media use on the formation of identities, perceptions, lifestyles and communities.

FILM 260/3.0 Digital Media Theory and Practice (available online)
Survey of digital media theories and online mass communication practices, with emphasis on social and mobile technologies. Course considers the impact of digitalization on the creative and culture industries.

FILM 300/3.0 Hollywood: The Dream Factory (online and on-campus sections available)
This course examines Classical Hollywood Cinema from the early 1940s until its demise at the end of the 1950s.

FILM 303/3.0 Contemporary World Media (online and on-campus sections available by 2016)
This course examines the cinema from a particular national perspective. Previous years have focused on Arctic cinema, Japanese cinema or the cinema of Hong Kong, Taiwan and China. Special emphasis on how social, cultural or political context informs and shapes the film production of a nation, is given.

FILM 308/3.0 Popular Cultures (available on campus)
This course examines recent popular culture trends, practices, styles, theories, texts, artifacts, and discourses.

FILM 320/3.0 Media and the Arts (available on campus)
This course will explore contemporary digital and media culture, focusing on the various ways it has transformed the manner in which art and other cultural forms of expression are made, distributed and received. We will address the history of "new media," and some of its key concepts, like interactivity, authorship and copyright, digital aesthetics, its impact on politics, and other associated topics.

FILM 335/3.0 Culture and Technology (online and on-campus sections available)
Research and studies in relations of media, technology, and culture. Critical examination of cultural and communication technologies and the employment of technology within selected examples from film, television, and other media.

FILM 338/3.0 Contemporary Cultural Studies (available on campus)
An intermediate study of key concepts in cultural studies investigated through cultural practices and/or national contexts from the 1960s to the present.

GNDS 125/3.0 Gender, Race, and Pop Culture (online and on-campus sections available)
Explores popular culture from feminist and anti-racist perspectives, with attention to sexuality, gender, race and nation in a variety of media.

DRAM 205/3.0 Theatre in the Age of Film and TV (online and on-campus sections available)
An exploration of theatricality and theatrical communication via an examination of how some major trends in theatre since the 19th century have been represented by film and electronic media. The course will study examples of theatrical works on film and other theatrical responses to social, cultural, and political issues presented in mass media.

MUSC 171/3.0 The Social History of Popular Music (online and on-campus sections available)
A survey of important trends in 20th century Western popular music. Topics include genres,
individual artists and groups, record labels and stylistic trends, and sociological issues.

**POLS 313/3.0 Mass Media and Politics in Canada** (on campus only)
A critical examination of the relationship between the mass media and politics, focusing on the functions of the media in modern liberal democracies and the ways in which news stories are created and packaged.

**STSC 339/3.0 Media and Performance** (on campus only)
An intermediate study that examines how performance shapes our social experiences and lived identities. From the daily acts of self-performance on social media to the ‘once in a life time’ performances in the Olympic Games, performance binds contemporary cultural practices, small and large.

### 3.4 Certificate Timelines

In a table or figure, summarize the expected progress through the Certificate by term to completion. If both full-time and part-time studies are proposed, specify timelines for each.

**Table 2. Expected program progression through to completion** (format is optional; modify as needed)

Since students can take these courses in any order (minding prerequisites, where they exist), the table below indicates when these courses are generally offered.

<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>W</td>
<td>SS</td>
</tr>
<tr>
<td>MUSC 171</td>
<td>GNDS 125</td>
<td>MUSC 171</td>
</tr>
<tr>
<td>FILM 236</td>
<td>FILM 236</td>
<td>FILM 300</td>
</tr>
<tr>
<td>STSC 339</td>
<td>STSC 339</td>
<td>FILM 300</td>
</tr>
</tbody>
</table>

### 3.5 Other matters

Comment on any special matters and innovative features.

Optional Workshops in DIY Media Production:

To add some practical skills training, Film and Media will partner with CDS to hire adjunct instructors from the creative industries to design and deliver short online media production weekend workshops (approximately 3 hours each). To add to their hard skills in media production, students can sign up to take these optional workshops for a small additional registration fee. Sample workshop topics may include:

- InDesign/Photoshop/Illustrator for Media Communications
- ePortfolio Website Design
- Design Thinking Bootcamp for Entrepreneurs
- Blogs and Writing for the Web
- Video for Social Platforms with Final Cut Pro
- Digital Presentation Design
- Digital Photography
- Podcasting
### 4. Program Content

#### 4.1 Explain how the curriculum of the proposed Certificate addresses the current state of the discipline and/or profession.

To respond to this question, we must look to the bigger picture. The timeliness of this proposed Certificate in Media Studies is a reflection of the evolution of the Film and Media Department into a unit centrally concerned with digital media, as we work to better prepare students to participate in the creative industries. The widespread cross-disciplinary demand at Queen’s for such alternative credentials in media arts is a demonstration of the relevance of this Certificate.

A case in point: when we asked hundreds of Queen’s students from over 40 different degree programs whether they felt that media literacy and digital creativity are a key part of their educational experience at Queen’s, three quarters of them said they do not get sufficient opportunities to be creative in their core courses. We asked them whether such digital media competencies matter to their future professional endeavours, and over 80 percent answered with a resounding YES!

When hundreds of students from various disciplines from Engineering to Health Science and Commerce to Education, visit us in Film and Media to take our courses as electives in their programs, they often tell us that they will apply the practical skills they gained in these courses to their volunteer activities, part-time jobs, and job interviews.

They also tell us that they now “think differently” about television, cinema, and advertising, having gained a critical, analytical perspective on culture and communication. Having the Certificate in Media Studies will only make it more clear to future employers that these students have practical creativity, communication, and critical thinking skills that can be applied on the job, in the lab or office, or in their terminal degree program.

#### 4.2 Identify any unique curriculum, innovations or creative components.

Some courses included in this proposal will require students to attend film screenings or attend other cultural events. Other courses involve hands-on film and media production. Still other courses involve students in online webinars and require them to design digital media artworks for display on social learning platforms. Several courses require virtual group work, online peer review or creative critiques, and make heavy use of asynchronous forum discussions. The option courses in the Certificate in Media Studies program were selected for their combined multimodality and the creative, hands-on opportunities they offer students. As learners progress through the Certificate, they will be exposed to and involved in the creative synergies that are emerging as a result of digitalization, from the vantage points of music and film, drama and politics, gender studies and digital culture and composition.

#### 4.3 Academic Integrity - Explain how the Certificate educates students on the importance and role of academic integrity.

All courses that comprise the Certificate include in their syllabi Faculty of Arts and Science regulations related to Academic Integrity. Courses that involve online learning components actively instruct students about the responsibilities required for professional online communication and the ethical dimensions of using digital media for educational ends. Whether students are engaged in online testing, digital collaboration via group work, media production and distribution, or peer review, conversations about copyright plagiarism, unauthorized crowdsourcing, identity theft, digital rights management, authorial intent, sampling and remixing media, or cyberbullying, academic integrity and digital citizenship are key aspects of the teaching and learning experience. In this sense, online courses are perhaps better suited than traditional on-campus ones (especially those that do not employ social and digital media for educational purposes) to assist students in developing a deep understanding of, and personal commitment to, defining what academic integrity means at Queen’s and beyond, in the context of the rights and responsibilities of participatory digital citizenship. Put differently, online courses such as the ones included in this proposal do not just “educate” students about academic integrity, they make the issues real, relevant, and get students actively involved in shaping such expectations for participating in a digital class, community, and culture.
## 5. Assessment of Teaching and Learning

### 5.1 Degree Level Expectations (DLE) – In Table 3 below, summarize how the Certificate’s structure and requirements address each DLE listed as well as any additional program-specific UDLEs [Refer to p.31 QUQAPs]

**Table 3. Mapping curriculum and degree level expectations (DLEs) (add rows as needed)**

<table>
<thead>
<tr>
<th>DLE</th>
<th>Learning Outcomes</th>
<th>Relevant Courses, Academic Requirement</th>
<th>Indicators of Achievement</th>
</tr>
</thead>
</table>
| Depth and breadth of knowledge   | Learning Outcome 2. Develop fluency in the foundations of media and cultural studies in order to identify the circuits of production, distribution and consumption of media forms from advertising to film, television to popular music, news media to mobile apps. | FILM 236/3.0 Media and Cultural Studies  
FILM 240/3.0 Media and Popular Culture  
FILM 260/3.0 Digital Media Theory and Practice  
FILM 303/3.0 Contemporary World Media  
FILM 320/3.0 Media and the Arts  
FILM 338/3.0 Contemporary Cultural Studies  
FILM 300/3.0 Hollywood  
FILM 335/3.0 Culture and Technology  
MUSC 171/3.0 Social History of Popular Music  
GNDS 125/3.0 Gender, Race, and Pop Culture  
DRAM 205/3.0 Theatre in Age of Film and TV  
POLS 313/3.0 Mass Media and Politics in Canada  
STSC 339/3.0 Media and Performance | Samples:  
Weekly tests, weekly homework, essay, review assignments.  
Media ownership mapping exercise  
Group research dossier  
Group or individual expression of research in form of media/cultural project  
Critical theory summation report  
Review of key text in its historical period  
Self-designed research project  
Exams                                                                 |
| Knowledge of methodologies       | Learning Outcome 2. Develop fluency in the foundations of media and cultural studies in order to identify the circuits of production, distribution and consumption of media forms from advertising to film, television to popular music, news media to mobile apps.  
Learning Outcome 4. Investigate key trends in current creative economies, industries, and cultures to articulate how they function to shape identities, knowledges, and relations of power.  
Learning Outcome 6. Articulate the role of the creative and culture industries in influencing and shaping how we understand ourselves, each other, and how we participate in Canadian culture. | FILM 236/3.0 Media and Cultural Studies  
FILM 240/3.0 Media and Popular Culture  
FILM 260/3.0 Digital Media Theory and Practice  
FILM 303/3.0 Contemporary World Media  
FILM 308/3.0 Popular Cultures  
FILM 320/3.0 Media and the Arts  
FILM 338/3.0 Contemporary Cultural Studies  
FILM 300/3.0 Hollywood  
FILM 335/3.0 Culture and Technology  
MUSC 171/3.0 Social History of Popular Music  
GNDS 125/3.0 Gender, Race, and Pop Culture  
DRAM 205/3.0 Theatre in Age of Film and TV  
POLS 313/3.0 Mass Media and Politics in Canada  
STSC 339/3.0 Media and Performance | Samples:  
Weekly weblogs, research dossier and project require reference to and interpretation of information source.  
Media ownership map requires specific references to historical and industrial/institutional context.  
Exams and quality of Moodle discussion board participation  
Comparative theory analysis. Self-designed research paper Critical theory summation report |
| Application of knowledge | Learning Outcome 4. Investigate key trends in current creative economies, industries, and cultures to articulate how they function to shape identities, knowledges, and relations of power. | FILM 240/3.0 Media and Popular Culture  
FILM 260/3.0 Digital Media Theory and Practice  
FILM 303/3.0 Contemporary World Media  
FILM 308/3.0 Popular Cultures  
FILM 320/3.0 Media and the Arts  
FILM 338/3.0 Contemporary Cultural Studies  
FILM 335/3.0 Culture and Technology | Samples:  
Final project requires thesis + research + argument regarding cultural phenomena chosen by student.  
Infographic assignment  
Design a visual brief  
Essay requires thesis + research + argument  
Class presentations on research and critical methods  
Create a short film or screencast  
Design your ePortfolio  
Complete a media content analysis |
| Communication skills | Learning Outcome 1. Apply online communication skills in order to articulate ideas clearly and concisely and demonstrate critical thinking using both visual and narrative methods across disciplinary boundaries.  
Learning Outcome 3. Expand skills in online collaboration in order to engage in online discussions, articulate peer feedback in a considerate manner and demonstrate responsibilities and contributions to team-based assignments.  
Learning Outcome 5. Demonstrate applied digital media literacy skills using social media sites and digital creative tools to create a variety of scholarly analysis and creative works. | FILM 236/3.0 Media and Cultural Studies  
FILM 240/3.0 Media and Popular Culture  
FILM 338/3.0 Contemporary Cultural Studies  
FILM 300/3.0 Hollywood  
FILM 308/3.0 Popular Cultures  
FILM 335/3.0 Culture and Technology  
GNDS 125/3.0 Gender, Race, and Pop Culture  
DRAM 205/3.0 Theatre in Age of Film and TV  
POLS 313/3.0 Mass Media and Politics in Canada  
STSC 339/3.0 Media and Performance | Samples:  
Class presentation, weekly tutorials, essay, review assignment  
Weekly weblogs and written keywords assignment.  
Written, annotated and clearly organized research dossier.  
Classroom/LMS dialogue: presentation of research/commentary; response and development.  
Classroom/LMS discussion of final projects. Each research group functions as a formal discussant in rotation.  
Bi-weekly writing assignments, including re-drafting of reviews and critical writing. |
| Awareness of limits of knowledge | Investigate key trends in current creative economies, industries, and cultures to articulate how they function to shape identities, knowledges, | FILM 240/3.0 Media and Popular Culture  
FILM 260/3.0 Digital Media Theory and Practice  
FILM 303/3.0 Contemporary World Media | Samples:  
Exams and feedback received via Moodle |
Autonomy and professional capacity

- Apply online communication skills in order to articulate ideas clearly and concisely and demonstrate critical thinking using both visual and narrative methods across disciplinary boundaries.
- Expand skills in online collaboration in order to engage in online discussions, articulate peer feedback in a considerate manner and demonstrate responsibilities and contributions to team-based assignments.
- Demonstrate applied digital media literacy skills using social media sites and digital creative tools to create a variety of scholarly analysis and creative works.

Use space below for comments on Table 3. Include discussion of how indicators of achievement associated with the Certificate Program differ from or overlap with those of the Degree Program(s) from which the courses are drawn. (as applicable)
5.2 Describe how the proposed methods of assessing student achievement relate to the Certificate’s learning outcomes and degree level expectations.

The Certificate in Media Studies includes courses that have much in common, most critically, a focus on media and the creative industries. However within this bundle of classes, there is much diversity for students to pick from in terms of course design and delivery. These courses represent seven different disciplines within Arts and Science. Three courses are offered online-only, three are offered on-campus only, and the rest are somewhere in-between, using either a blended format, or giving students a choice as to how they prefer to study (virtually or face-to-face).

With this amazing diversity comes an array of methods for assignments and assessments that will vary from course to course and across disciplines and subject matter. Students may be reading theoretical and historical texts, writing research essays, or doing presentations. They might be asked to create a poster, a video, or a podcast. Students might be required to work independently, then collaborate in a group. Some learning activities happen in real time, others are on-demand and asynchronous. From multiple-choice tests to designing infographics, from media content analyses to film screenings, students who pursue the Certificate in Media Studies will be exposed to a variety of new and classic creative and research-based assignments and learning activities across an array of modalities. In the process they will develop technical and communication competencies that will serve them well in other courses and post-graduation.

5.3 Outline the plans for documenting and demonstrating the level of performance of students [Refer to UDLEs p.31, QUQAPs]

Without exception, the courses affiliated with the Certificate in Media Studies include a considerable focus on “studies” and theory. As such, students are engaged in research and critical assessment of scholarship, to acquire a depth and breadth of knowledge about their creative industries in contemporary and historical context. As well, they will be tasked with generating new knowledge as they master disciplinary methods and apply them to topics in which they have a personal interest. However the majority of the courses listed in this proposal also include creative, hands-on production assignments, activities that require students to apply their newfound knowledge to original research problems and cultural scenarios, to arrive at an original composition using a variety of media.

Professional capacity is a key objective of this Certificate in Media Studies. Students who complete the requisite number of courses in media, culture, and communication, will have been exposed to a variety of professional challenges, activities, and events. From developing digital media literacy, to creating information objects and navigating the library databases, to acquiring a professional vocabulary associated with the creative industries, to collaborating with others, students will graduate with the practical creative capacities they’ll need to succeed post-graduation in the world of work.

The students completing courses associated with the Certificate in Media Studies will be expected to demonstrate their communication skills via standard research essays, presentations, online discussion forums, in-class discussions, where appropriate.

In terms of developing an awareness of the limits of knowledge and an appreciation for other perspectives, interpretations, and methods, students will be expected to participate in comparative analyses of creative and theoretical texts, and to engage with each other in a course community.
6. Mode of Delivery

6.1 Explain how the proposed mode(s) of delivery meets the Certificate’s learning outcomes and the DLEs. Comment on the relationship between mode of delivery and accessibility requirements.

Considering the Accessibility of Online Media Courses

By exposing students to a diverse range of online delivery methods, from synchronous webinars and online office hours, to video lecture modules and on-demand quizzes, discussion boards, and peer reviews, students completing the Certificate in Media Studies will be challenged and supported to master new knowledge, and apply it in very practical ways. There is no getting around the fact that an online class is always also about information technology, digital literacies, virtual relationships and online impression management, no matter what the subject matter. In Film and Media, we see online teaching as a productive opportunity for students to confront, negotiate, and appreciate the nuances of digital communication, diverse media publics, information flows, the power of rhetorics and images online, and the challenges of distributed professional collaborations and digital workstyles.

We address issues of course design, inclusion and accessibility at length in section 10 of this proposal.

6.2 Distance Delivery - Where students may take the same Certificate or elements of it in two different modes of delivery, indicate how consistency in the Certificate requirements and standards will be assured. Describe how a learning community will be fostered, how regular interactions with faculty, students, etc., will be assured, and comment on access to materials, resources, and technology.

Maintaining Consistency Across Modalities

Students may complete the Certificate in Media Studies by taking courses online, on-campus, or as a combination of both. Since Queen’s has a mandate to avoid replacing traditional tertiary course offerings with online ones, this means that many courses included in this proposal are already blended or hybrid offerings. For example, MUSC 171 “Popular Music” is offered as a completely online course in the summer, and as an on-campus course each fall. The same is true for FILM 240 “Media and Culture,” FILM 303 "Contemporary World Media" and several other courses on the list, which also have online and on-campus sections offered annually. There is an exception to this rule, since FILM 260 “Digital Media Theory and Practice” was purpose-built for exclusively online delivery to fill a need for summer elective courses, and as such has never been offered as on-campus courses. However, as a result of launching this Certificate in Media Studies, if demand warrants it, we will launch on-campus section of this “Digital Media Theory and Practice” courses too.

Consistency in the Quality of Instruction

How will we guarantee the quality of instruction in these courses? First, in most cases we have the same faculty teaching the online and on-campus versions of the course, to maintain consistency in delivery and assessment. Second, online instructors complete training via CDS when they are developing their courses, and they work with Instructional Designers and Educational Media Technologists to ensure that the course experience online is just as good (oftentimes, and in many ways, even better) than the on-campus offering. Third, all curriculum revisions to develop online sections of courses are passed by departmental committees before being reviewed by the Arts and Science Curriculum Committee, to ensure that learning objectives and the like are consistent and well thought-out.

A Community of Learners

How can a learning community be fostered among participants in the Certificate in Media Studies Program? At present, Queen’s students from all across campus may drop into Drama and Music or Film for an elective course, and perhaps they will complete more than one of those creative courses. However there is no sense of belonging for these “visitors.” This is something we intend to change, to a degree, with the introduction of the Certificate in Media Studies. Through our regular communications with those students currently pursuing the certification, and those who have graduated to Queen’s alums, we aim to connect Queen’s creatives online. By developing a special Certificate, we will build an online community platform, showcasing student works, advertising for internship opportunities and upcoming events, profiling graduates, and organizing exhibits, workshops, and contests. If any
department at Queen’s is well-suited to design and support a creative community via online platforms, that would be Film and Media – where courses in social media communication strategy and creative media production have attracted thousands of Queen’s students. However we do not intend to limit the Certificate in Media Studies community to cyberspace. We are also in “possession” of a stunning new facility, namely the Isabel Bader Centre For the Performing Arts, and we intend to take full advantage of this beautiful new space to showcase the creative accomplishments of Queen’s students. We will also invite, film, and live stream guest speakers on the creative industries, bringing together the on and offline worlds.

Digital Resources for Online Study at Queen’s
How will participants in the Certificate in Media Studies have access to technology and other required resources? Beyond the virtual connectivity described above, it is important to note that at Queen’s online courses lean heavily on the enterprise teleconferencing and learning management systems (Moodle, Brightspace AdobeConnect) to ensure that students have safe, reliable access to their peers, library resources, professors, and course materials. We do not need to make any extra technological investments in order to offer the Certificate in Media Studies, since we will continue to make great use of the existing digital teaching and learning platforms. However we do intend to build out a section of the departmental website to keep all Certificate in Media Studies people, news, courses, and resources on the “same page.”

It is worthwhile to note that students taking online courses at Queen’s are already required to have access to a reliable computer and high speed internet connectivity. CDS will administer proctored exams for off-campus students, as required, to ensure academic integrity standards are met at exam time.

7. Anticipated Enrolment

7.1 Indicate how many new students the Certificate program is expected to attract; describe the strategies to recruit students, and indicate how many students must be accommodated by other departments/units (as applicable). Indicate which departments/units will be affected and how.

Impact on other departments:
No other departments must accommodate students completing the Certificate, and we do not anticipate any department being affected by this new proposal.

How will we market this new Certificate in Media Studies?
We have many ideas about promoting this new Certificate. First, Film and Media plans to work closely with the professionals at Queens’ Marketing (Annalisa Boccia), from the Arts & Science Marketing office (Lindsay Fair), and from Queen’s Arts and Science Online (Sara Aly) in our promotional efforts. With their input we plan to launch a social media and Google AdWords campaign (both of which are relatively low budget). Second, we will hold student creative competitions, such as photography, poster, and video contests, to increase awareness about the Certificate in the Queen’s community and beyond. Third, with help from a work-study student who has an interest in media and marketing, we plan to conduct surveys and publish whitepapers about educational innovation, media, and creativity at Queen’s.

How many students will the Certificate attract?
In the first year, we expect 20 current students in Arts and Science, Commerce and Engineering to enrol in the Certificate program concurrently with a degree program. There will be limited double-counting of credits towards both programs, consistent with the Faculty’s policy on certificates and diplomas.

How many new Distance students will the Certificate attract?
Since this initiative is designed to serve current Queen’s students, we do not expect to see significant numbers of new enrolments (e.g. new Queen’s students). However once we have begun advertising and promoting the Certificate, we expect the Certificate program will attract 15 new distance students and
Queen’s alumni. Table 4 shows estimated annual enrolment intake in Table 4 for new Distance student registrations, i.e. 15 students in the first and second years, 20 students in Year 3, etc.

7.2 In Table 4 below, summarize the projected intake and enrolments by year until steady-state is reached (modify table as needed).

Table 4. Anticipated intake and enrolment in Certificate Program

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
<th>Year 6</th>
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<td>23</td>
<td>28</td>
<td>40</td>
<td>45</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Total Enrolment</td>
<td>15</td>
<td>30</td>
<td>43</td>
<td>78</td>
<td>90</td>
<td>95</td>
<td>95</td>
</tr>
</tbody>
</table>

Use space below for comments on Table 4. Include comments on whether enrolments in the existing degree program(s) might be affected in any way.

Figures in Table 4 assume that, of each intake of the Distance cohort, 50% of students will take 2 years to complete the certificate, and 50% will take 3 years. This assumption is based on students completing the program on a part-time basis. It is possible that some students may complete the certificate in 1 year or take as long as 4 years. (For example, the total of 42 in Year 3 is based on intake of 20 students, plus 15 students from Year 2, plus 7 students from Year 1 (50%).

Table 4 also shows 20 on-campus students (20% of 100 students projected to enroll in the program each year). Additional enrolments from these students will appear in Year 4, when they graduate with their Degree plus the Certificate having taken 6.0 units over and above the Degree requirements). After year 4, we should be seeing 20 students per year graduating with their degree and the certificate program (enrolling in 6.0 additional course units to their degree requirements).

8. Resources

Provide evidence that the Academic Unit(s) has the necessary resources to implement and deliver the proposed new Certificate under the following headings (where applicable).

8.1 Faculty – Identify faculty members who will be involved in the delivery of the proposed Certificate and comment on the adequacy of these resources. Complete Table 5 below.

Submit completed CV modules for faculty members not listed as core in the degree program from which the Certificate is derived (core faculty are defined as tenured, tenure-track, and emeritus faculty).

Table 5. Faculty associated with the proposed Certificate Program (add rows as needed)

<table>
<thead>
<tr>
<th>Faculty Member (Home Unit)</th>
<th>Rank/Status (Tenured, tenure track, continuing adjunct, term adjunct, special appt, emeritus, etc.)</th>
<th>Total Undergrad Teaching (incl new Program) (units)</th>
<th>Total Grad Teaching (units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Susan Lord</td>
<td>Assoc. Professor Tenured</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Jonathan Rose</td>
<td>Assoc. Professor Tenured</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Kip Pegley</td>
<td>Assoc. Professor Tenured</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Sidneyeve Matrix</td>
<td>Assoc. Professor Tenured, QNS</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Gary Kibbins</td>
<td>Assoc. Professor Tenured</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Keren Zaiontz</td>
<td>Asst. Professor Tenure-track, QNS</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Karine Bertrand</td>
<td>Asst. Professor Tenure-track</td>
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<tr>
<td>Graham Reyny</td>
<td>Continuing Adjunct</td>
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</tr>
<tr>
<td>Scott MacKenzie</td>
<td>Adjunct (term)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melissa Houghtaling</td>
<td>Adjunct (term)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Robbie MacKay</td>
<td>Adjunct (term)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
8.2 **Staff** - Comment on the adequacy of the staff complement to support the Certificate Program (administrative, technical, IT, laboratory, etc.).

The proposed program clusters together courses that are already being offered, or that will be offered within the next year, into a coherent program with a clear theme. Faculty funding is being used for the development and delivery of new online courses (FILM 303, 236, 300 and 335).

8.3 **Space Requirements** - Describe the space (work space, laboratory space, office, classrooms) and equipment needed to support students’ academic activities.

No physical resources such as classroom space are needed as new Distance students admitted to the Certificate program will be taking courses online.

8.4 **Program Administration** – Describe how the Program will be administered (e.g. admissions, tracking progress, curriculum, etc.)

This program will be administered by the Department of Film and Media. A faculty member (Sidneyeve Matrix) and an office administrator (Linda Graham) will serve as part-time coordinators to advise students, track progress, review curriculum through the normal CPR process.

The Faculty of Arts and Science will manage admissions to the Certificate in Media Studies in collaboration with Undergraduate Admission following established infrastructure and processes used for other online programs. Student performance and academic progress will be monitored by the Student Services division of the Faculty Office in the same way as for students in other Arts and Science programs. Existing infrastructure in the Faculty Office (CDS, Student Services) will be used to support the offering of the program.

8.5 **Information Technology** - Describe the information technology needed to support the delivery of the program and to support the student’s scholarship. Indicate the resource implications for hardware, software/internet, audio-visual, telecommunications, etc. Indicate person contacted and date of ITS consultation.

Since the many of the courses comprising the Certificate in Media Studies are already offered online, no additional information technology will be needed to support the delivery of the program or the student’s scholarship. Given the evolving nature of technology, new software and applications are constantly being explored by CDS in collaboration with Queen’s IT Services; courses in the certificate program will evolve to exploit these new technologies as they are adopted.

In consultation with ITS, it is also recommended that CDS continue to monitor software license agreements to ensure user thresholds are not exceeded by the introduction of this or other new programs. If thresholds are exceeded, costs will increase. This consultation took place on…

*Date:* November 2, 2015
8.6 **Library** - Provide information about library support holdings, availability of and access to library resources relevant to the proposed Program(s).

The library collects information resources in all formats to support teaching, learning and research across the range of programs offered by the Department of Film and Media and consequently has materials to support this certificate. This is a multidisciplinary certificate and the library also collects in the other specific disciplinary areas including Cultural Studies, Politics, Art, Gender Studies and Music. Materials supporting the courses in this certificate program will be both disciplinary and interdisciplinary. The Library subscribes to an electronic package of technical books that would support the technical skills component of the certificate and also the practical skills training to be offered through the optional workshops. Materials not owned can be ordered through our interlibrary loan service.

*Indicate what new library resources will be needed (e.g. journals, print monographs, audio-visual material, historical documents, electronic databases, statistical/geospatial data).*

The library will, within budget constraints, continue to collect in all formats in these areas. We will access new resources for purchase as they become available. The liaison librarian will need to be informed of changes in course content or new directions in existing courses.

*Indicate the likelihood of the Program having an impact on the Library staffing. Provide date that consultation with the Library staff took place.*

Queen's University Library currently has a liaison librarian for Film & Media Studies who provides research, teaching and collection services for media studies. Course guides developed by the liaison librarians already exist for some courses – Film 335, GNDS 125 – and work is currently being developed to support Film 240, 260 and 340. The multidisciplinary nature of the certificate will necessitate cooperation and discussion with liaison librarians for other subject areas including Cultural Studies, Art, Music, Gender Studies and Politics.

**Date:** November 4, 2015

8.7 **Describe any additional resources required that are not currently available. Provide evidence of institutional commitment to supplement existing resources as needed. [See also Budget modules]**

Please see budget appendix.

9. **Other Matters**

9.1 **Provide evidence of student demand for the Certificate Program and describe how this information was obtained.**

The proposed Certificate in Media Studies responds to a growing need for expanded online learning in Canada, particularly in terms of the availability of fully online programs, not just individual courses, that can be completed at a distance (“2011 Outlook for Online learning and Distance Education,” Contact North, Fast Forward: How Emerging Technologies are Transforming Education and Training”, Contact North, January 2011). In addition, the Certificate allows students to demonstrate to employers that they have a sustained interest and demonstrated competencies in media theory and creative practice – skills that are very much in demand within the labour market.

In addition, a study was conducted by Queen’s Institutional Research and Planning Department in August 2011 to assess interest levels in 10 potential online programs to determine whether these programs could attract new distance students to Queen’s. The proposed program offerings were surveyed against a wide demographic representing current Queen’s students, other post-secondary students and Queen’s alumni. Participants were asked about online programs as additional areas of study to their current program and not as substitutes. The research also assessed the interest of
respondents and tested against their past history of learning, distance learning, online learning and use of technology.

The survey found that among alumni and general public groups, 50% plan involvement in the coming two years and that 60% of current students planned to enroll in courses within two years of graduating. Of the 10 proposed programs, Queen’s alumni and students displayed a fairly uniformed distribution of interest in all 10 programs but found a preference for online programs over online courses (where programs are collection of courses on a common theme or subject), which suggests a strong program orientation for future involvement, mirroring the demand found in Contact North’s 2011 report.

While the market research did not eliminate any of the 10 proposed programs for lack of interest, the proposed Certificate in Media Studies ranked 3rd highest among all programs for level of interest among participants surveyed. This ranking clearly demonstrates the Certificate has strong potential to be successful as an initial offering by Queen's Arts and Science Online and the Department of Film and Media.

Furthermore, in order to determine if there was sufficient demand for a Certificate in Media Studies, we created a snapshot of enrolment in three Film and Media course offerings over a 5-year period, which included a total of over 5000 participants. The following three courses were designed as high-enrolment courses, offered with both on-campus and online sections: FILM 240/Media & Culture; FILM 315/Digital Media Trends (rebranded in 2011 as FILM260); and FILM 340/Advertising. During the five year period between 2011 and 2015, together these courses were offered by Sidneyeve Matrix fifteen times, 5 times on-campus and 10 times online. The total enrolment for the period was 5,216.

Removing most (or all) of the pre-requisites to increase accessibility and diversity in these courses successfully attracted students from across campus and beyond. Overall, 91% of the students enrolled in these courses were not Film and Media minors or majors. After filtering out all declared "film" student registrants from the enrolment totals, 4,750 registrations out of 5,216 remained.

In terms of degree programs, these significant registrant groupings were evident:

- Approximately one third were from either Commerce (20%) or Engineering (12%);
- almost half (45%) were from students earning a Bachelor of Arts or Fine Art or Bachelor of Music;
- Approximately one-fifth of registrations came from students registered in a Bachelor of Science or Computing or Nursing or Health Education degree program;
- Approximately 300 enrolments represented Non-Degree or Visiting or Exchange students.

Considering where these elective courses fit into students’ degree progress, the data indicate that enrolment in these five 200/300 level courses is roughly one-third 2nd year, one-third 3rd year, with the final third divided evenly between 1st and 4th year students.

In other words, students from outside Film and Media and from faculties other than Arts and Science have demonstrated a sustained interest in taking media courses. Dozens of those students completed two, three, or four of the courses on the list for this Certificate proposal. This snapshot of patterns in registration data from just three of the many courses that are included in the proposed Certificate program indicates just how popular media studies is among Queen's students.

As a result, the Department of Film and Media anticipates that combined, this suite of courses will continue to attract annual student enrollments in excess of 2,000 students (based on 2014-2015 enrollment data) over the next few years.

With the introduction of the proposed Certificate, it is projected that 5% of these students (100) will actively pursue the Certificate in an effort to obtain the additional academic credential and that 20% of
these students (20 students) will successfully complete Certificate requirements annually.

### 9.2 Explain how the Certificate Program will fulfill societal need. Comment on similar certificates offered elsewhere and why the proposed Certificate Program will be attractive to applicants (include any unique or innovative elements/features).

**Why Offer A Certificate Now?**

We should also note a cultural trend that is gaining widespread support and further justifies the timeliness and need for this proposed Certificate. At a moment when “competency based learning” is considered a key trend for higher education, alternative credentials and certificates are proliferating and gaining legitimacy. Whether these informal and formal credentials are earned online via MIT and Harvard MOOCs, corporate training provided by Udemy, LinkedIn’s Lynda.com, or via powerful creative organizations such as IDEO, and even MoMA – such agile, practical, digital “badges” are quickly becoming a currency in higher education and the creative industries. We would like to participate in this momentum, and we see the Queen’s Online Certificate in Media Studies as comparable to and in sync with the spirit of our new Online Writing Certificate and the Queen’s Certificate in Business for Arts and Science students.

We have also addressed the issue of “need” in section 4.1 above.

### 9.3 For new Professional Certificate programs, provide evidence that the Certificate is congruent with the regulatory requirements of the profession.

N/A

### 10. Equity, Diversity and Accessibility

#### 10.1 Describe how the proposed new Certificate Program will address equity considerations, including (but not limited to) issues of particular concern for the groups identified in the University’s various Equity programs.

**Designing Inclusive Online Learning at Queen’s**

As it turns out, since this Certificate in Media Studies is achievable 100% online, this also makes it one of the most accessible learning opportunities Queen’s has to offer.

Online learning at Queen’s is particularly advanced in terms of offering technology-enhanced flexibility to students, allowing them to meet their personal learning objectives. Many courses use audio-enhanced digital books, online remote testing, lecture slides, outlines, transcripts and closed-captioned videos to help all students (not just those who require AODA accommodations) to succeed and make timely progress. It is a point of pride that CDS courses are developed at the outset according to principles of inclusive instructional design. To this end, online developers and instructors work closely with Queen’s Student Accessibility Services, with Queen’s Health Services, and with Queen’s IT Services to leverage educational technologies and deliver high-quality, personalized learning experiences to all students joining us online in the Queen’s community.

Just as importantly, in terms of educational access and flexibility, many of the courses in this proposed Certificate have no (or very few) pre-requisites. This means the Certificate welcomes part-time, life-long, and continuous learners to join us online at Queen’s to complete this new credential. Open, online learning opportunities such as this Certificate in Media Studies, unbundled from a full degree plan, are a very attractive option for those who may be returning to higher ed after a long absence, for transfer students, and for those who are seeking a bit of upgrading or “upskilling” to get ahead in their workplace or transition into a new career opportunity. We anticipate that part time students who “test the waters” with this Certificate will then continue on at Queen’s, taking advantage of the other flexible, accessible learning activities that Queen’s Arts and Science is working so hard to develop and deliver.
## 11. Quality and Other Indicators

### 11.1 Define indicators that will provide evidence of the quality of the faculty and how they will be used (e.g. qualifications, teaching effectiveness, supervisory/mentorship ability, research impact, innovation and scholarly record; appropriateness of collective faculty expertise to contribute substantively to the proposed Certificate Program).

To Measure Student Satisfaction and Quality of Instruction and Teaching Effectiveness:

The traditional measure of quality teaching and learning at Queen’s is the USAT. As this tool is not set up to be administered online and not suitable for online courses, the Student Evaluation of Teaching Effectiveness at Queen’s, piloted through CDS since Summer 2014, will be available to obtain student feedback to gauge the effectiveness of both course design and the teaching methods.

Also many online faculty take advantage of the functions of their campus learning management system, to deliver questionnaires and informal surveys to students, asking for just-in-time feedback about their experience in the course. This kind of feedback is sometimes anonymized and used as testimonials on the Arts and Science Online website, to encourage students to consider an online course.

To Measure Innovation and Impact:

Since we are eager to understand why students would pursue a Certificate in Media Studies, Sidneyeve Matrix will be designing a (GREB-approved) collaborative faculty research project to survey profs and students about “why media literacy matters” – and the forms of “creativity and innovation at Queens.” We plan to publish these data in scholarly journals, but also use them as the basis for whitepapers that can be distributed via the Department of Film and Media and Queen’s Arts and Science Online.

### 11.2 Comment on the Certificate program structure and faculty attributes (including research activity) that will ensure the intellectual quality of the student experience.

The faculty teaching the courses that comprise this Certificate have lengthy and prestigious research records. Many also have a wealth of experience teaching online.

**Our Associate Professors:**

- Susan Lord is an Associate Professor and has been the Head of the Department of Film and Media for the past five years. She designed and has delivered FILM 236, and will be retrofitting this course for online delivering in 2016. Professor Lord’s research is in the areas of media and cultural studies and she played a leadership role in designing the Cultural Studies graduate program at Queen’s.

- Sidneyeve Matrix is a Queen’s National Scholar and Associate Professor in the Department of Film and Media. She has designed and delivered five online courses at Queen’s, and regularly publishes research about the impact of digital technology on postsecondary teaching and learning.

- Kip Pegley is an award-winning instructor and Associate Professor in the School of Drama and Music. Dr. Pegley teaches what is arguably the best-loved course at Queen’s, namely “Social History of Popular Music” (MUSC 171). Kip has extensive research and publishing expertise in cultural studies and much experience in working with students across the disciplines.
• Gary Kibbins is an Associate Professor in the Department of Film and Media. Prof Kibbins is an award-winning experimental filmmaker and he designed and has delivered the popular “Media and the Arts” course. Gary will be developing an online section of this course in 2016.

• Jonathan Rose is an Associate Professor in the Department of Political Studies. He has won several teaching awards. One of Professor Rose’s areas of research specialization is Canadian politics and media representation.

Our Assistant Professors, Continuing and Term Adjuncts:

• Karine Bertrand is a newly hired tenure-track Assistant Professor in the Department of Film and Media. She came to us in 2015 from Université de Montreal where she taught courses in her research areas: popular culture and international cinema. Dr. Bertrand is also an experienced online instructor.

• Robb MacKay is an experienced online instructor and adjunct lecturer in the School of Drama and Music. Robb is a professional musician and a Special Education teacher in the Limestone District School Board. His research focuses on the effects of gender in music education and on broader social justice issues in education.

• Keren Zaiontz is a new Queen’s National Scholar and Assistant Professor in the Department of Film and Media. She came to us in 2015 from Simon Fraser University. Dr. Zaiontz’s areas of research specialization are theatre and performance studies, media and cultural studies, and the creative industries.

• Scott MacKenzie is an instructor in the Department of Film and Media. Dr. MacKenzie holds a PhD in Communications at McGill University. Scott is currently developing two courses for online delivery in 2016. His research areas include a focus on digital and transnational media.

• Grahame Renyk is a Continuing Faculty Lecturer in the School of Drama and Music. He holds an M.A. from the Graduate Centre for the Study of Drama at the University of Toronto, and is completing his PhD dissertation in Literary/Theatre Studies at the University of Guelph. Grahame is an award-winning instructor who has been extensively involved in designing and teaching online and blended learning courses at Queen’s.

• Melissa Houghtaling is an instructor in the Department of Gender Studies. Melissa holds a PhD in Sociology from Queen’s University, and she is an experienced online instructor at Queen’s. Dr. Houghtaling’s research is in the area of science and technology studies.
12. Supporting Documentation – Unit(s) Input

Append (embed) any additional information that is pertinent to the Program(s) and that supports the narratives in Part B (Sections 1-11). For example, as relevant and available, append/embed the following:

[This is not a complete list, and is only intended to provide guidance; Units are encouraged to provide any additional relevant documents and data summaries as needed]

Appendix 1 MDIA Calendar Copy

Appendix 2 Budget Model

Appendix 3 Budget Module

Appendix 4 Letters of Support Summary
Part C – Administration & QC/Government Reporting Information

Part C is to be completed by the Department(s)/Faculty(s) in consultation with the Office of the University Registrar and the Faculty Office(s).

12. Information for and/or from the Office of the University Registrar and/or the Faculty Office(s)

12.1. Academic Administration

<table>
<thead>
<tr>
<th>Academic Career</th>
<th>UGRD and DIST</th>
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<tbody>
<tr>
<td>Department(s)/Academic Unit(s)</td>
<td>Department of Film and Media; Arts and Science/Continuing and Distance Studies</td>
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<tr>
<td>Proposed Start Date</td>
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<td>Expected enrolment</td>
<td>Program duration</td>
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<td>Initial Year</td>
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<td>Steady State</td>
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<td>Program duration is flexible depending on the rate at which student chooses to complete courses. Minimum one year.</td>
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<td>(max 4 characters) (e.g., BSCH)</td>
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<td>Media Studies, MDIA-C-MDA</td>
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</tr>
</tbody>
</table>

12.2. Complete the following:

| Will students be admitted part-time? | ☒ Yes | ☐ No |
| Will all or part of the program be offered at the BISC campus? | ☐ Yes | ☒ No |
| Will all or part of this program be offered via distance learning (e.g. online or blended learning?) | ☒ Yes | ☐ No |

13. Course Information

| New Courses with new subject code required? | ☐ Yes | ☒ No |

If yes, suggested Subject Code

14. Tuition and Student Activity Fees

<p>| Tuition Fee | Regular domestic and international Arts and Science per unit tuition fee |</p>
<table>
<thead>
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<th>Fee Assessment Protocol (Annual? Per term Or per course?)</th>
<th>Per Course</th>
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<tr>
<td>Student Activity Fees UGRD - AMS</td>
<td>AMS fees if applicable</td>
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<td>Non-Tuition Fees</td>
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**15. Government Reporting**

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<tr>
<td>Proposed CIP Code</td>
<td>50.0102 Digital Arts</td>
</tr>
</tbody>
</table>
Part D - Authorizations

Part D is to be completed by the Faculty Office(s) following Faculty Board approval and then sent to the Provost Office for approval and signature.

<table>
<thead>
<tr>
<th>Date Approved by Faculty Board (or equivalent)</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Department/Unit Head(s)</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>University Librarian</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>University Registrar</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Faculty Dean(s) or delegate(s)</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chief Information Officer and Associate VP (Information Technology Services)</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Executive Director (Planning and Budgeting)</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Provost and Vice-Principal (Academic)</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date Approved by SCAD</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date Approved by Senate</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Media Studies – Certificate**

**MDIA-C-MDA**

Subject: Administered by the Department of Film and Media and the Faculty of Arts and Science.

Plan: Consists of 12.0 units as described below.

Program: The Plan will lead to a Certificate in Media Studies.

<table>
<thead>
<tr>
<th>1. Core</th>
<th>(6.0 units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>6.0 units</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Option</th>
<th>(6.0 units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>6.0 units</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Supporting</th>
<th>(0.0 units)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>4. Additional Requirements</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>5. Substitutions</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>6. Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. No more than 6.0 units of core and option courses may be counted toward the requirements of both the Certificate and another program.</td>
</tr>
<tr>
<td>B. No more than 3.0 units of core and option courses may be transfer credits from outside Queen’s University.</td>
</tr>
</tbody>
</table>

**Media Studies Course List**

The following list contains courses offered through other Departments. In accordance with Academic Regulation 2.5 (Access to Classes), students do not have enrolment priority in all of these courses. Access to these courses may only be made available during the Open Enrolment period, and then only if space permits.

**MDIA_Options**

**Media Studies Options**

DRAM 205/3.0; FILM 240/3.0; FILM 260/3.0; FILM 300/3.0; FILM 303/3.0; FILM 308/3.0; FILM 320/3.0; FILM 335/3.0; FILM 338/3.0; GNDS 125/3.0; MUSC 171/3.0; POLS 313/3.0; STSC 339/3.0
### Program Name: Media Studies Certificate

<table>
<thead>
<tr>
<th></th>
<th>Year 1 Forecast</th>
<th>Year 2 Forecast</th>
<th>Year 3 Forecast</th>
<th>Year 4 Forecast</th>
<th>Year 5 Forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Intake</td>
<td>3.00</td>
<td>3.00</td>
<td>4.00</td>
<td>10.00</td>
<td>10.00</td>
</tr>
<tr>
<td>Enrollment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Returning Students</td>
<td>-</td>
<td>2.20</td>
<td>3.00</td>
<td>4.00</td>
<td>4.50</td>
</tr>
<tr>
<td>Returning Students</td>
<td>-</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Returning Students</td>
<td>-</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Returning Students</td>
<td>-</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total Enrollment</td>
<td>3.00</td>
<td>5.20</td>
<td>7.00</td>
<td>14.00</td>
<td>14.50</td>
</tr>
<tr>
<td>Enrollment Domestic vs International</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic</td>
<td>3.00</td>
<td>5.20</td>
<td>7.00</td>
<td>14.00</td>
<td>14.50</td>
</tr>
<tr>
<td>International</td>
<td>-</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Enrollment Reduction</td>
<td>-</td>
<td></td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Domestic program fees**  
Tuition $6,205  
Non-tuition $6,205  
Total Fees $12,410

**International program fees**  
Tuition $6,205  
Non-tuition $6,205  
Total Fees $12,410

Assume no increase in tuition fees from 2015-16

### Assumptions:

- **Grant Revenue Assumption**  
  - Use grant rate provided for type of student in program on the rates schedule
- **Recovery to the University Fund**  
  - Use Shared Services Allocation cost on Elasticity Summary provided on Rates Schedule Tab
- **New Faculty Positions Required**  
  - Previous CDS provided by Chris Conway

### Revenue

- Tuition revenue  
  - 18,615  
  - 32,266  
  - 43,435  
  - 86,870  
  - 89,973
- Non-tuition revenue  
- Government grant revenue  
  - 8,851  
  - 15,460  
  - 20,839  
  - 41,678  
  - 43,167
- Gifts and grants  
- University Fund Recovery on Revenues  
  - (859)  
  - (1,552)  
  - (2,089)  
  - (4,178)  
  - (4,327)

**Total net new revenue from proposed program**  
26,851  
46,195  
62,185  
124,370  
128,812

### Expenditures

- **Direct program costs**  
  - 54,000  
  - 4,080  
  - 4,162  
  - 4,245  
  - 4,330
- Academic salaries and professional fees  
- Adjunct Salaries  
- T.A. Salaries  
- Program delivery  
- Books and materials  
  - 12,000  
  - 21,216  
  - 29,331  
  - 59,428  
  - 62,781
- Scholarships and bursaries  
- Other salaries and benefits  
- Other  
  - 12,000  
  - 21,216  
  - 29,331  
  - 59,428  
  - 62,781

**Attribution of Central Shared Services**  
-  -  
- 4,743  
- 8,221  
- 11,087  
- 22,134  
- 22,925

**Total expenses**  
12,000  
21,216  
33,874  
67,649  
73,848

**Net Revenue**  
14,851  
24,979  
28,311  
56,721  
54,964

Insert Notes if required:
- Timing Difference of Shared Services  
  - 9,908  
  - 16,757  
  - 21,987  
  - 42,809  
  - 43,106

Last Revised: 12/4/2015  
F:\Student_Services\Shared\CURRICULUM\2015-16\New Plans\Media Studies Certificate\Copy of Media Certificate Budget Model Template - 20150724v2
The following areas are considered shared services:

- Physical Plant Services
- IT Services
- Human Resources
- Library and Archives
- Student Services (Student Affairs, School of Graduate Studies, Student Financial Support)
- Advancement
- Principal’s Office and Secretariat’s Office
- VP Research Portfolio (Research Services, Animal Care, Industry Partnerships, etc.)
- Provost and VP Academic Portfolio (Provost Office, International, Planning & Budget, etc.)
- VP Finance & Administration Portfolio (Financial Services, Procurement, Environmental Health & Safety, etc.)
This module is to be completed by the Academic Units in consultation with the Faculty Office (s) and/or School of Graduate Studies as appropriate as well as the Office of Planning and Budgeting.

### Summarize the additional resources needed to implement the program under the following headings (where applicable)

The *Certificate in Media Studies* is being developed for students to attain an academic credential that demonstrates their sustained interest and competencies in media studies. All courses for the program can be completed entirely through online study, using existing administrative structures and infrastructure in the Faculty Office (CDS, Student Services). Comprising 12.0 units in total, the courses that will contribute to the Certificate in Media Studies are either already offered online through CDS or are in development. By providing a fully online certificate program, we intend to attract new distance students, with only incremental increases in expenses and service provision that will be more than covered by incremental increases in revenue from tuition and grant. Several on-campus option courses are also included in the program in which on-campus students may have access to enroll. Students will be able to register in the certificate concurrently with a degree program or as a stand-alone program. In the former situation, there will be limited double counting of credits towards both programs, consistent with the Faculty’s policy on transfer credit.

<table>
<thead>
<tr>
<th>Faculty (e.g. number of 0.5-credit courses)</th>
<th>No new faculty will be required as this program is being mounted around a set of courses that are currently offered or will be introduced in 2016-17.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff (include number or fraction of FTEs)</td>
<td>No additional staff are required. The Faculty of Arts and Science, Continuing and Distance Studies and the Department of Film and Media Studies will be able to absorb the incremental work that will be generated from the introduction of this Certificate program.</td>
</tr>
<tr>
<td>Teaching Assistants (include number of TA hours)</td>
<td>Only incremental increases in teaching assistant hours will be required, commensurate with any incremental increases in enrolment in the core and option courses.</td>
</tr>
</tbody>
</table>

### Other Non-Academic University Services

*Indicate which of the following Services will be needed. Provide details as needed.*

<table>
<thead>
<tr>
<th>Financial Services</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Human Resources</td>
<td></td>
</tr>
<tr>
<td>Advancement</td>
<td></td>
</tr>
<tr>
<td>Student Services</td>
<td>The student services most accessed by Distance students are the, Library, Accessibility Services and the Writing Centre. Distance students already have access to Accessibility and the Writing Centre, and demand for their services will increase only incrementally with new Distance Students.</td>
</tr>
</tbody>
</table>
Almost all courses that can contribute to this program are currently offered and already support by the Library. Students have access to online resources via the web proxy. The Library supports these existing courses and in the future will monitor for increases in online consultations.

Residences

Administrative services  
Office of the Registrar for Admissions and Records. Impact limited to incremental increases in Distance applications and enrolments. Admissions Services also collects an application fee to process Distance admissions.

Information Technology Services Help Desk and LMS support. Since the courses comprising the Certificate in Academic Writing are already offered online, no additional information technology will be needed to support the delivery of the program or student scholarship. Given the evolving nature of technology, new software and applications are constantly being explored by CDS in collaboration with Queen’s IT Services; courses in the program will evolve to exploit these new technologies as they are adopted.

Other

**Budget Module and Narrative**

*Complete the budget template found on the QUQAP website in consultation with the Faculty Financial Officer and the Registrar detailing one-time expenses (monies that will only be required once for start-up), base funds (year after year expenses), all other expenses and revenues from all sources for each year until steady state is reached. Consultations with the Office of Planning and Budgeting are also recommended. Include a narrative to accompany the budget template [maximum 2 pages; use of subheadings suggested].*

**Pattern of Enrolment**

Distance Studies in the Faculty of Arts and Science does not distinguish formally between part-time and full-time studies, but based on data from other online degree programs offered through Continuing and Distance Studies, we anticipate that all of the distance students will complete the program on a part-time basis following one of two patterns. We expect half of the students will complete the program in 2 years as follows: 6.0 units in year 1 and 6.0 units in year 2. We assume that the other half of the students will complete the program in three years as follows; 6.0 units in year 1; 3.0 units in year 2; 3.0 units in year 3.0. On-campus students will take 6.0 additional courses to their Degree program over the 4 years of the Degree program.

**Course Development and Delivery**

Faculty funding is being used for the development and delivery of online courses. A proposal to fund develop Contemporary World Media has been submitted to the Ministry of Training, Colleges and Universities through the Ontario Online Learning Consortium.

**Teaching and Teaching Support**

The participating academic departments will assign instructors and teaching assistants for their courses; the Faculty of Arts and Science will provide the funding for instructor and teaching support for online courses.
If other sources are needed, list the sources and indicate if the funds have been applied for and if they have been secured.

### Net Impact of the Proposed Program

**Summarize any other resource or funding implications of the proposed program.**

Revenues from tuition and grant will more than cover expenses to the University, Faculty of Arts and Science and CDS to accommodate incremental increases in online course enrollment from new distance students who enrol in this fully online certificate program. Net revenue over five years is estimated at $55,000 (see budget template). This estimate is based on the following assumptions: 1. no increase in tuition and grant from 2015-16, 2. expenses include salaries and benefits of CDS staff, faculty members and teachings assistants, and a 20% reinvestment fund; expenses increase by 2 percent per year. For on-campus students who register in the certificate program concurrently with a degree program, there will be limited double counting of credits towards both programs, consistent with the Faculty’s policy on transfer credit. Revenue calculations on the budget template, include potential additional revenue for on-campus students beginning at year 4.
Letters of Support Summary – Media Studies Certificate

School of Drama and Music
Date: October 8th, 2015
Author: Craig Walker
   This message is to formally confirm our support for the inclusion of DRAM 205, “Theatre in the Age of Film and Television,” in the proposed Certificate in Media Studies.

Department of Gender Studies
Date: November 19th, 2015
Author: Melissa Houghtaling
   We had our Gender Studies department meeting today, and I’m happy to report that the department voted in favour (unanimously) for the inclusion of GNDS 125 in the Media Studies Certificate.

Department of Political Studies
Date: October 9th, 2015
Author: Jonathan Rose
   I am the instructor of POLS 313, Media & Politics in Canada, and as undergrad Chair in Political Studies, happy to support this.
Report of New Offerings of Existing Courses
January 2016

As per the Faculty Board motion of 7 March 2014 regarding the approval and reporting of course variants, the Departments listed below have:

1. provided intended student learning outcomes for courses that will be delivered in a different format and/or location from the original offering of the course as approved by Faculty Board;
2. indicated the delivery format and/or location for the proposed offering of the course;
3. provided learning hours for the existing and proposed offerings of the course; and
4. certified that the Department Curriculum Committee or Undergraduate Studies Committee has determined that the proposed offering of the course will have the same intended student learning outcomes as the original offering of the course.

<table>
<thead>
<tr>
<th>Department</th>
<th>Course</th>
<th>Course Title</th>
<th>Original Course Offering</th>
<th>Proposed Course Offering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computing</td>
<td>CISC 102/3.0</td>
<td>Discrete Mathematics for Computing I</td>
<td>Main campus, face-to-face</td>
<td>Online</td>
</tr>
<tr>
<td>English</td>
<td>ENGL 281/3.0</td>
<td>Legends of King Arthur: Medieval to Modern</td>
<td>Main campus, face-to-face</td>
<td>Online</td>
</tr>
<tr>
<td>Film and Media</td>
<td>FILM 236/3.0</td>
<td>Media and Cultural Studies</td>
<td>Main campus, face-to-face</td>
<td>Online</td>
</tr>
<tr>
<td></td>
<td>FILM 303/3.0</td>
<td>Contemporary World Media</td>
<td>Main campus, face-to-face</td>
<td>Online</td>
</tr>
<tr>
<td>Geography &amp; Planning</td>
<td>GPHY 227/3.0</td>
<td>Cities: Geography, Planning and Urban Life</td>
<td>Main campus, face-to-face</td>
<td>Online</td>
</tr>
<tr>
<td>Kinesiology &amp; Health Studies</td>
<td>HLTH 497/3.0</td>
<td>Special Topics in Health Studies I – Global Sport and Disability</td>
<td>Main campus, face-to-face</td>
<td>BISC</td>
</tr>
<tr>
<td>Languages, Literatures &amp; Cultures</td>
<td>SPAN 111/3.0</td>
<td>Beginning Spanish I</td>
<td>Main campus, face-to-face; BISC</td>
<td>Online</td>
</tr>
<tr>
<td>Psychology</td>
<td>PSYC 205/3.0</td>
<td>Introduction to Comparative Cognition</td>
<td>Main campus, face-to-face</td>
<td>Online</td>
</tr>
<tr>
<td></td>
<td>PSYC 221/3.0</td>
<td>Cognitive Psychology</td>
<td>Main campus, face-to-face</td>
<td>Online; BISC</td>
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<tr>
<td></td>
<td>PSYC 342/3.0</td>
<td>The Psychology of Social Influence</td>
<td>Main campus, face-to-face</td>
<td>BISC</td>
</tr>
<tr>
<td></td>
<td>PSYC 397/3.0</td>
<td>History of Modern Psychology</td>
<td>Main campus, blended; Online</td>
<td>BISC</td>
</tr>
</tbody>
</table>

Respectfully submitted,

Sue Blake
Assistant Dean (Studies)