

Academic Program Reviews 2004-2008

Final Program Review Summary Sheets –Faculty of Engineering

Architecture programs

B.Sc. Architecture

M.Arch (Professional) Non-Thesis

M.Arch (Post-Professional) Non-Thesis

Ph.D. (Architecture)

Graduate Diploma in Housing

Program Study Group Members:

Annmarie Adams (Professor, School of Architecture; PSG Chair)

Vikram Bhatt (Professor, School of Architecture)

David Covo (Professor, School of Architecture)

Adrian Sheppard (Professor, School of Architecture)

Raphael Fischler (Associate Professor, School of Urban Planning)

Strengths:

- The school has a strong sense of community, and is highly cohesive and productive.
- McGill's Ph.D. in Architecture, is the most substantial, rigorous, and high profile Ph.D. program in Canada. The program has potential to develop even higher levels of scholarship and innovation in history and theory, and in housing, along with other areas such as sustainability, urban design, health care, new materials, and extreme environments.
- The B.Sc. program is able to attract well-qualified, high-performing students. Considerable emphasis on design and in fulfilling professional CACB requirements in the curriculum makes this undergraduate, pre-professional program in architecture unique and formidable among the ten schools of architecture in Canada.
- The M.Arch. (professional) program is a thriving trans-cultural lab, has enormous post-professional presence and capacity, and has intrinsic connections to the global condition.
- For its relatively small size, the School has a large, attractive range of opportunities for post-professional, graduate studies in architecture. The range includes minimum cost and affordable housing, housing in developing nations, health care, history/theory/criticism, urban design, and other architectural design-related topics. It is a strong pool from which to draw Ph.D. students.
- The Blackader-Lauterman Library is a key symbol and resource for the School and the Faculty, and is particularly important for the Ph.D. program.

Recommendations for Improvement:

- Increase the length of the M.Arch I program to provide for more specialization, additional "critical thinking" courses, and to harmonize with the post-professional M.Arch. II program.
- Continue to develop the Sheff Visiting Professorship that was recently established.
- Enhance student recruitment and, with the Faculty, increase the number of fellowships and scholarships available to Ph.D. bound M.Arch II students.
- Review the role of adjunct instructors in the delivery of the curriculum.
- Make closer ties to the other units in the faculty, especially to enhance the teaching of innovative design. The information technology aspects of the program should be reviewed.
- Seek additional financial and human support, such as for endowed chairs, for leading edge design teaching that will engage the students with key architects and theorists from Quebec, Canada, and the international community.

- Develop a plan for upgrading all computer workstations and assess the state of the infra-structure in Architecture, making closer connections to the Faculty computing facilities.
- Form a school task-force to review the B.Sc. curriculum, with special regard to its relation to the M.Arch 1 professional program.
- Explore expansion of the current pool of visiting critics and external reviewers.
- Review the adequacy of space available to graduate students.

April 2009

Chemical Engineering programs

B.Eng. (Bachelor of Engineering), Chemical Engineering

M.Eng. (Master of Engineering) Thesis, Chemical Engineering

M.Eng. (Master of Engineering) Project, Chemical Engineering

Ph.D. (Doctor of Philosophy), Chemical Engineering

Program Study Group Members:

Richard Munz (Associate Professor, Department of Chemical Engineering; PSG Chair)

Milan Maric (Assistant Professor, Department of Chemical Engineering)

Viviane Yargeau (Assistant Professor, Department of Chemical Engineering)

George Demopoulos (Professor, Department of Mining and Materials Engineering)

Strengths:

- The department is cohesive, productive, and committed to provide excellence in teaching (both undergraduate and graduate) and research. An excellent *esprit de corps* permeates the faculty, staff and student body.
- A strong group of new faculty covering research and teaching in critical new areas of chemical engineering including advanced materials, environmental engineering, and bioengineering as well as the more traditional core areas of chemical engineering.
- Competitive and well-regarded graduate and undergraduate programs that attract excellent students, consistent with long range plans.
- Excellent laboratory and technical support.
- Helpful, committed and effective support staff.
- Appropriate attention to safety issues.
- High priority to innovation and quality of undergraduate teaching.
- Availability of minors is well received, especially for life-science-related themes.
- Time-in-program averages at both the Master's and doctoral levels appear to be lower than for most comparable programs.

Recommendations for Improvement:

- Reduce the incoming class size in keeping with the human and physical resources of the Department, or these resources should be increased.
- Make special efforts to increase the complement of senior adjunct academic staff to maintain and enhance the special connection between our students and industry.
- Broaden the number of technical electives to ensure exposure to related areas, including those outside chemical engineering.
- Improve the common room for undergraduates and meeting rooms for design course student teams.
- Upgrade and expand computer facilities.

April 2009

Civil Engineering and Applied Mechanics programs

B.Eng. (Bachelor of Engineering), Civil Engineering

M.Eng. (Master of Engineering) Thesis, Civil Engineering

M.Eng. (Master of Engineering) Project, Civil Engineering

M.Eng. (Master of Engineering) Project, Environmental Engineering

M.Sc. (Master of Science) Thesis, Civil Engineering

Ph.D. (Doctor of Philosophy), Civil Engineering

Program Study Group Members:

V. Chu (Professor, Department of Civil Engineering and Applied Mechanics; PSG Chair)
L. Chouinard (Associate Professor, Department of Civil Engineering and Applied Mechanics)
G. McClure (Associate Professor, Department of Civil Engineering and Applied Mechanics)
M. S. Mirza (Professor, Department of Civil Engineering and Applied Mechanics)
D. Mitchell (Professor, Department of Civil Engineering and Applied Mechanics)
J. Nicell (Professor, Department of Civil Engineering and Applied Mechanics)
V.T.V. Nguyen (Professor, Department of Civil Engineering and Applied Mechanics)
Y. Shao (Associate Professor, Department of Civil Engineering and Applied Mechanics)
S.C. Shrivastava (Professor, Department of Civil Engineering and Applied Mechanics)
D. Carré (Ph.D. Student, Department of Civil Engineering and Applied Mechanics)
J. Finch (Professor, Department of Mining and Materials Engineering)

Strengths:

- The Department has a dedicated academic, technical and support staff with strong and effective leadership.
- Student morale is also very high. All of the degree programs are of high quality and the Department is clearly able to attract first-rate students.
- Teaching methodologies used in departmental courses are on the leading edge of current instructional techniques in Engineering.
- Excellent research programs are being carried out and the department is attracting top PhD students
- The level of student satisfaction with the programs is very high. Students at all levels are pleased with the level of support from clerical and technical staff, and with the availability of the professors for both advising and course-related matters.
- The student body is the most diverse of any Civil Engineering program in Canada in terms of both gender and geographic origin.

Recommendations for Improvements:

- Increase the space for students in the undergraduate teaching labs.
- Encourage fast-tracking of qualified MEng students into the PhD program and also encourage non-thesis (project) students to transfer into the thesis program.
- Reduce time-to-graduation for PhD students to an average of 4 years.
- Additional office space is required for new hires.

April 2009

Electrical & Computer Engineering programs

B.Eng. (Bachelor of Engineering), Electrical Engineering

B.Eng. (Bachelor of Engineering) Honours, Electrical Engineering

B.Eng. (Bachelor of Engineering), Computer Engineering

B.S.E. (Bachelor of Software Engineering)

M.Eng. (Master of Engineering) Thesis, Electrical Engineering

M.Eng. (Master of Engineering) Thesis, Computational Science and Engineering

M.Eng. (Master of Engineering) Non-Thesis, Electrical Engineering

Ph.D. (Doctor of Philosophy), Electrical Engineering

Program Study Group Members:

Jon Webb (Professor, Department of Electrical and Computer Engineering; PSG Chair)

Benoit Champagne (Associate Professor, Department of Electrical and Computer Engineering)

Ioannis Psaromiligkos (Associate Professor, Department of Electrical and Computer Engineering)

Zeljko Zilic (Associate Professor, Department of Electrical and Computer Engineering)

Stuart Price (Professor, Department of Mechanical Engineering)

Strengths:

- In spring 2008 software engineering was accredited for the first time for 3 years.
- Overall, the undergraduate program offerings represent excellent quality, diversity, value and flexibility. The Electrical Engineering (Honours) program is unique in North America, placing McGill in an enviable position and resulting in a positive image of both the department and of the Faculty of Engineering.
- The teaching staff is highly dedicated, with the vast majority of courses (around 90%) taught by tenured or tenure-track faculty.
- The Department faculty has often received the highest McGill teaching awards, such as three McGill Principal's Teaching Awards (out of a total of 15 given) as well as national and international awards, such as IEEE teaching activities awards and an IEEE LEOS Distinguished Lecturer. It is the only ECE Department in Canada that has received two Wighton Fellowships awarded by the National Council of the Deans of Engineering and Applied Science (NCDEAS) for laboratory course teaching.
- Classroom and laboratory facilities found at the new Trottier Building are outstanding, as viewed both nationally and internationally.
- The graduate program in the Department of Electrical and Computer Engineering is outstanding. The mix of complementary and interdisciplinary research areas is quite healthy and is generally aligned with directions with significant opportunity for growth. In particular there is a solid base to grow in the strategic areas of nanotechnology, biological systems, and renewable energy.
- The professors, staff and students enjoy a productive, collegial working environment and there is excellent multi- and inter-disciplinary interaction with other departments, most especially with the school of Computer Science.

Recommendations for Improvement:

- Extend the mandate of the departmental college liaison committee to more generally develop and implement plans to increase enrolment of high quality students.
- Review evaluation procedures in the curriculum to increase emphasis on oral and written presentations, teamwork and other professional skills. This can include having industrial experts give lectures on presentation design, teamwork, and project management in core courses.
- Develop a plan for maintaining teaching lab facilities.
- Increase funding for M.Eng. students who are likely to continue on to Ph.D studies.
- Review the syllabi for graduate level courses to ensure that the workload is commensurate with the allotted credits.
- Better document and publicize the fast-track procedure to the PhD program.
- Consider ways of achieving two years for completion of the M.Eng. thesis program.

Mechanical Engineering programs

B.Eng. (Bachelor of Engineering), Mechanical Engineering

B.Eng. (Bachelor of Engineering) Honours, Mechanical Engineering

M.Eng. (Master of Engineering) Thesis, Mechanical Engineering

M.Eng. (Master of Engineering) Thesis, Computational Science and Engineering

M.Eng. (Master of Engineering) Non-Thesis, Mechanical Engineering

M.Eng. (Master of Engineering) Non-Thesis, Aerospace Engineering

M.Sc. (Master of Science) Thesis, Mechanical Engineering

Ph.D. (Doctor of Philosophy), Mechanical Engineering

MMM (Master in Manufacturing Management)

Program Study Group Members:

Jorge Angeles (Professor, Department of Mechanical Engineering; PSG Chair)

Larry Lessard (Associate Professor, Department of Mechanical Engineering)

Meyer Nahon (Associate Professor, Department of Mechanical Engineering)

Arun Misra (Professor, Department of Mechanical Engineering)

Jon Webb (Professor, Department of Electrical and Computer Engineering)

Strengths:

- The current demand for Mechanical Engineering is good, so that the cutoff grade for entrance into the B.Eng. program is quite high. Very few people drop out of the program; those who drop are quickly replaced by transfer students.
- The B.Eng. program has, by national standards, a very high percentage (~20%) of women in the program. These students are amongst the best in the program.
- The percentage of foreign students in the B.Eng. program is amongst the highest in Canada, at 15%.
- The M.Eng. program is very successful, attracting some of our best undergraduate students. Graduates of the program are highly employable in a variety of settings.
- There has been a significant increase in the number of graduate courses being offered, as new professors are hired.

Recommendations for Improvement:

- Develop a plan for maintaining and updating teaching laboratories and for improving the quality of design studio and project space.
- Review the Teaching Assistant allocation policy and teaching assistant duties and develop a plan to improve the teaching skills of Teaching Assistants.
- Reassess general advising of students, focusing on training of academic staff for advising and other improvements as appropriate.
- Incorporate alternate methods of instruction and evaluation in courses, and facilitate academic staff attendance at teaching and learning workshops.
- Increase the number of students in the Honours program.
- Review the program curriculum with the goal of improving connections between the lab and lecture courses, and consider reduction of the number or frequency of courses offered by adjunct staff.
- Provide space for grad student activities and encourage regular social events bringing together graduate students and staff members.
- Promote the M.Eng. program to the B.Eng. Honours students, with various events and outreach activities, with the goal of recruiting more of these students into the program.
- Be more aggressive in fast-tracking of qualified M.Eng. students into the Ph.D. program, and promote the process more widely to students and professors.
- Review procedures and requirements for the PhD program, and consider guidelines for the preliminary exam. Consider institution of a common committee for the preliminary exam and final defense, which will follow the progress of the student throughout the course of the degree.

April 2009

Mining and Materials Engineering programs

B.Eng. (Bachelor of Engineering), Materials Engineering Co-op Program

B.Eng. (Bachelor of Engineering), Mining Engineering Co-op Program

M.Eng. (Master of Engineering) Thesis, Mining and Materials Engineering

M.Eng. (Master of Engineering) Non-Thesis, Mining and Materials Engineering

M.Sc. (Master of Science) Thesis, Mining and Materials Engineering

Ph.D. (Doctor of Philosophy), Mining and Materials Engineering

Program Study Group Members:

Raynald Gauvin (Professor, Department of Mining and Materials Engineering; PSG Chair)

Mainul Hasan (Associate Professor, Department of Mining and Materials Engineering)

Hani Mitri (Professor, Department of Mining and Materials Engineering)

Jean-Luc Meunier (Associate Professor, Department of Chemical Engineering)

Strengths:

- The Materials Engineering program has enjoyed an outstanding international reputation over the years and the Mining Engineering program is one of the strongest mining programs in the country. The Materials Engineering undergraduate program at McGill is very strong and unique in the Canadian University context, owing at least partially to the strengths of the metals group.
- The ratio of graduate students per professor is quite high in the Materials Engineering area. The *per capita* level of research funding in the department is extremely high.
- The mandatory co-op programs are unique in the Faculty and popular with students.
- The co-op B.Eng. programs provide early integration into the work force upon graduation due to increased marketability from job experiences, professionalism acquired throughout the program, and the development of a substantial network of contacts prior to graduation.
- The quality of the graduate programs can be seen in three factors: the interactional style of many of the professors; the high level of research funding; and, the outstanding quality of graduate students, many of whom receive their own external scholarships from a variety of sources.
- The undergraduate and graduate programs are complementary in that a student graduating from both programs possesses both highly relevant practical knowledge and strong specialization in the sector of their choice.
- The Materials Engineering program is going through a renewal and rejuvenation, with hiring of professors in three new and evolving areas: biomaterials; aerospace materials, thin films and coatings; and computational materials science.

Recommendations for Improvement:

- Consider implementing a core course requirement for Ph.D. students.
- Increase the number of graduate courses offered.
- Increase financial support for Ph.D. students.
- Attract high quality M.Eng. students who are likely to continue on to do PhD study.
- Revisit the idea of making the coop aspect of the programs optional, and weigh fully all of the advantages and disadvantages of a fully mandatory coop program.
- Make efforts to recruit more undergraduate students. This will include increased outreach to CEGEPs. Departmental recruiting activities will pro-actively target CEGEP students from small Quebec towns where the mining and metallurgy industry is located.
- Increase the number of technical complementary credits in the Mining program.

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Urban Planning programs

M.U.P. (Master of Urban Planning)

Ph.D. (Doctor of Philosophy) Urban Planning

Ph.D. (Doctor of Philosophy) Policy and Design

Program Study Group Members:

Raphael Fischler (Associate Professor, School of Urban Planning; PSG Chair)

Lisa Bornstein (Associate Professor, School of Urban Planning)

Jeanne Wolfe (Professor Emerita, School of Urban Planning)

Strengths:

- Urban planning at McGill is a North American leader in university-community partnerships, in classroom- and research-based community engagement, in studio-based planning education, and in international development.
- The school enjoys a strong reputation in the international community of planning researchers.
- The school is characterized by intimacy and an *esprit de corps* among students and faculty that emerges from a keen sense of shared missions in research, teaching, and service.
- Graduates of the Master of Urban Planning have made significant contributions to the field, and the quality of the program is well recognized and respected.
- The M.U.P. program is studio-based, community-connected and collaborative. The studio approach allows planning to be seen as a whole and enables students to “learn by doing”. These three features in combination with McGill’s prestige as an institution put the school in a unique position to advance and become a leader in North America for the studio-based model of planning education.
- Internships are an important component of the program. They are aligned with the philosophy of engagement with the community and students consider it an important aspect of their education.

Recommendations for Improvement:

- Redesign the Supervised Research Seminar and Supervised Research Project to make them more useful to students and professors alike (at the same time making for more timely completion and giving more opportunities for joint publications). The thesis nature of the work should be reduced, the sequencing reconsidered, and the completion times tightened.
- Provide courses in urban studies to other McGill units and fill gaps in its own course offerings by putting new courses on the books, for instance in urban policy, urban economics, and real-estate development.
- Emphasize more general principles of planning law, given the composition of the student population.
- Fine tune current offerings, emphasizing the studio-based context. It is suggested that the “intention, content, lessons, processes and products explored” in each of the three studios be more clearly articulated to prevent the temptation to add more elements which would be course-based.
- Improve placements for paid internships. Additional internship placements outside Quebec would assist in the language barrier, given that many students are not francophone.
- Establish a mentorship program
- Provide assistance with career planning
- Establish an alumni network.

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