

**REPORT OF THE ACADEMIC PLANNING COMMITTEE
TO THE REGULAR March 2014 SENATE**

RECOMMENDATIONS AND COMMENDATIONS OF ACAPLAN FOLLOWING THE QUALITY ASSURANCE - CYCLICAL PROGRAM REVIEW OF LAURENTIAN UNIVERSITY'S GRADUATE PROGRAMS IN THE DEPARTMENT OF EARTH SCIENCES

Final Assessment Report & Implementation Plan November 2013

In accordance with the Laurentian University's Institutional Quality Assurance Process (IQAP), the Final Assessment Report has been prepared to provide a synthesis of the external evaluation and Laurentian's response and action plan. This report identifies the significant strengths of the program, opportunities for program improvement and enhancement, and sets out and prioritizes the recommendations that have been selected for implementation.

The report includes an Implementation Plan that identifies who will be responsible for approving the recommendations set out in the Final Assessment Report; who will be responsible for providing any resources made necessary by those recommendations; any changes in organization, policy or governance that will be necessary to meet the recommendations; who will be responsible for acting on those recommendations; and timelines for acting on and monitoring the implementation of those recommendations.

**SUMMARY OF THE CYCLICAL PROGRAM REVIEW OF THE GRADUATE PROGRAMS
DEPARTMENT OF EARTH SCIENCES**

The Laurentian University's Department of Earth Sciences offers a M.Sc. in Geology that can be obtained through a research-based thesis program, or an applied modular coursework option. The Department also offers a directed thesis-based Ph.D. Program in Mineral Deposits and Precambrian Geology.

The M.Sc. Geology - Thesis-based option has been offered since 1970, when it was introduced as the first graduate degree program at Laurentian University. Students take four 3- credit (one term) courses, and undertake a research-based thesis in one of two fields: Mineral Deposits or Precambrian Geology. Graduates of the M.Sc. program can proceed to a professional career in industry or government, or can seek entrance to a Ph.D. program.

The M.Sc. Geology - Mineral Exploration option was initiated in January 2000, and is directed at industry-based geologists. It provides an innovative approach in program delivery by utilizing team-taught, multidisciplinary, modular courses. Participants are recommended to have a minimum of two years' experience beyond a B.Sc. (Hons), and are typically continuously employed in the geosciences, in industry or government during their participation in the program. Candidates participate in six 3-credit Modular Courses (delivered on and off campus) and are required to undertake a minor research project related to their current workplace. The program is designed for them to enhance their professional skills in order to ensure more informed performance in their workplace.

The thesis-based Ph.D. program in Mineral Deposits and Precambrian Geology was approved in the fall of 2003, and was the first doctoral program introduced at the university. To graduate a student must complete, either six one-term (three credit) graduate-level courses beyond the B.Sc. (Hons) level, or four one-term graduate-level courses beyond the M.Sc. level, in addition to a research based thesis.

In June 2012, the Department submitted its Self-Study to the Office of Vice-President Academic and Provost of Laurentian University. Volume One presented an overview of its graduate programs and summarized the Department's perception of the faculty, physical resources, students, program regulations and courses, and overall strengths and challenges. Attached to the self-study were the following appendices: APPENDIX 1 Library Resources; APPENDIX 2.a Analytical equipment in Earth Sciences; APPENDIX 2.b Memorandum of agreement with Ontario Geolabs; APPENDIX 3 Recent and current student research in Earth Sciences; APPENDIX 4 Thesis guidelines and regulations. Volume Two contained the c.v.'s of the faculty.

On 17-18 December 2012, the Review Team conducted a site visit. It was headed by Dr. Jeremy P. Richards, a full professor in the Department of Earth and Atmospheric Sciences, University of Alberta and Dr. Derek Wilton, a full professor in the Department of Earth Sciences, Memorial University. On campus, they were joined by Dr. Alicia Hawkins (Anthropology) and Dr. Ramesh Subramanian (Engineering) as well as two graduate students in Earth Sciences, Katherine Hahn and Robert Lodge.

Over the two days, the team was able to see department offices, classrooms, laboratories, and the Ontario Geological Survey's Geoscience Laboratories (Geolabs). The visit also included interviews with eight students and eleven individual faculty and staff members as well as the Dean of Science and Engineering, the Vice-President Francophone Affairs & Research, and the Vice-President Academic and Provost. A meeting was also held with the two external stakeholder representatives, Dr. David Burrows (Vale Ltd.) and Dr. Mike Easton (Ontario Geological Survey).

In its report, received in early February 2013, the Reviewers observed that Laurentian University's Strategic Research Plan (2012–2017) posits that the university aspires to be known nationally for our world-class expertise in ... mining innovation and exploration.... Furthermore, the research plan includes mineral exploration research as a major component of one of Five Key Themes for the university, that of excellence in Engineering, Mineral and Material Science. Therefore, the reviewers concluded "the Department of Earth Sciences graduate program in Mineral Deposits and Precambrian Geology fits extremely well in the University's mission and plans."

The Reviewers noted that Admission requirements seemed "entirely appropriate" for program completion (minimum B average for M.Sc., and B+ for Ph.D. programs) and that "emphasis of the graduate program on Mineral Deposits and Precambrian Geology, and the supporting coursework curriculum, was definitely state-of-the-art," ... "highly innovative" and ahead of many other graduate programs in this area. Many of the instructors are "nationally-recognized

experts in these fields.” They added that the program “benefits from very close linkages to industry, the Ontario Geological Society (OGS) and the Geological Survey of Canada (GSC)” and that it also “provides unrivalled access to a wide variety of state-of-the-art analytical facilities in the Central Analytical Facility (CAF) and the OGS’s Geoscience labs (Geolabs).”

They also commented that the delivery of courses and instruction was “appropriate and effective” as were the methods used for assessment. In particular the Committee liked the emphasis placed on peer-reviewed publications by students, and it took note of their “high publication rate.” In many ways this also reflected the “uniformly high quality” of the faculty, with “excellent publication records and a high national and international standing.” Finally the reviewers observed that “graduates enjoy very high employment rates, and it was clear from the external stakeholders that these students are highly sought after by industry and government agencies.”

The Reviewers did include some concerns about the program. Students had some issues about various course components, including the range of courses available as well as the methodology of course delivery, especially the modular courses, and the Reviewers themselves were concerned about such matters as faculty and staff replacements, GTA funding and international student fee differentials, space, (especially for storage of research sample collections) and finally, student workload.

Despite these concerns, the Review Committee commended “the Department of Earth Sciences on its relatively new graduate program in Mineral Deposits and Precambrian Geology.” It noted “a very high degree of collegiality and cohesiveness within the Department, both among and between staff and students. All seem united in making the graduate program successful and competitive with other similar programs nationally and internationally. In general, students expressed a high degree of satisfaction with their program, and were at pains to mention that the concerns raised above were details that did not undermine their overall satisfaction.”

On 11 February 2013 the Department responded to the Reviewers’ Report, sending its comments to the Dean and to the Director, School of Graduate Studies as well as the Vice-President Academic and Provost. In its initial response, the Department chose to react to all comments in the review—most especially the concerns of students—rather than its specific recommendations. The Dean and the Director both made brief comments, but like the Department, neither spoke to the review’s specific recommendations. The Dean’s comments were sent to the Vice-President Academic and Provost two days after the Department’s, and the Director’s comments were sent on 15 June 2013. At its fall meeting, after ACAPLAN reviewed the recommendations as they stood, it determined to give the Chair, the Dean and the Director of Graduate Studies an opportunity to reflect again the Reviewers’ Report, focusing especially on their recommendations. The Chair of the Department agreed to this process and also asked the Department’s former Chair who was in office for the review for his thoughts. There was also a new Dean in place and he too responded to ACAPLAN’s request as did the Director of Graduate Studies.

**SUMMARY OF THE REVIEW TEAM'S (R) *PRIORITIZED* LIST OF RECOMMENDATIONS
AND THE RESPONSES OF THE DEPARTMENT (ES) and DEANS' (D) AND DIRECTOR OF GRADUATE
STUDIES (DGS)¹**

R1: Faculty replacement. Recent losses of key faculty and have undermined confidence that the Department advances and its graduate program are sustainable in the medium to long term. Given the recent successes and growth of the Department, it would be highly encouraging and invigorating if a commitment to staff replacement, and even expansion, were assured.

A reported trend within the University towards replacing faculty with “permanent sessional” instructors was a concern to many.

This concern about sustainability of the program was raised in particular by the external stakeholders, who fear that the initial momentum from 2005–2006 risks being lost if the Department cannot consolidate its faculty complement.

ES1 (Kontak): Over the past several years ... two faculty positions [have been] lost (S. Piercey-Lithogeochemistry and B. Kamber – Precambrian Geology), [and] a long-term medical leave for another faculty (A. Gallie) [has reduced the Department complement further].... All of this occurred when the BSc (presently 100 in Yrs 2-4), and graduate (M.Sc., Ph.D. 30+) enrolments have been increasing. The arrival this summer of a Tier II CRC (2 years after the departure of Prof. Kamber) will help alleviate some of the workload issues, but will not solve them. The loss of these positions have severely affected faculty members who have had to pick up new courses outside their normal teaching assignments, creating extra work for them and negatively impacting their other academic activities, and preventing us from addressing many of the issues raised in this review (e.g., lack of graduate courses outside of Mineral Deposits)....

The workload issue will soon be exacerbated when D. Long (Sedimentology) [retires], when P. Thurston (who as a resident Adjunct Professor teaches up to three courses) retires, and when M. Lesher is seconded to lead a pan-Canadian \$13M CMIC-NSERC research program.... The lack of any long-term planning by the university to replace these positions leaves us in danger of having to cut back if not close some of our programs.

Even if our faculty ... levels were restored to previous levels, we are still overworked compared to our colleagues in other units. All of our faculty supervise multiple M.Sc.-Ph.D. students (exceeding 3-5 in some cases) and/or several B.Sc. Honours theses, maintain active NSERC- and/or industry-supported research programs (with one of the highest publication rates in the university), and collaborate nationally and globally on other research-education programs, but are still required to teach the same number of courses as faculty in other disciplines with fewer programs, fewer commitments, and lower productivity. In the absence of a sensible workload

¹ Note: The reactions of the Department (ES), the Dean (D) and the Director of Graduate Studies (DGS) to the specific recommendations in the review have been deduced from the documentation they submitted.

policy, we desperately need for the university to bring our faculty and staffing levels that were in place when we developed, with ACAPLAN and VP Academic approval, all of these programs.

ES1 (Lafrance): D. Long (Sedimentology) is on sabbatical this year and will be retiring officially on July 1st. With his departure, we have lost all research and graduate teaching/supervision capacity in a key area of geology. All research intensive geology departments in Canada have sedimentologists on staff. This position must be replaced now, not next year or the following year, for the Department to regain its stature as one of the top geology departments in Canada.

D1: A tenure track Geochemist position has been approved and advertised. A replacement position in sedimentology to replace the retiring Dr. Darryl Long has been identified as top priority on the Faculty replacement list. Approval is pending on better financial situation.

DGS1: No comment.

R2: GTA funding and international student fee differentials. These concerns were raised repeatedly. The chief concerns are that: (i) GTA support for Ph.D. students is limited to two new awards per year; (ii) there is a very substantial differential between the financial awards for M.Sc. (\$7,200 p.a.) and Ph.D. GTAs (\$12,000 p.a.), while the work expectations for both are identical; (iii) no GTAs are available for international students, on top of which is the very high and increasing international student fee differential, and UHIP health care premiums which must be paid.

Students and staff viewed these latter points as inequitable and limiting for the Department. It is especially limiting in the current, perhaps transitory, recruiting environment in which it is extremely difficult to attract Canadian graduate students, and most especially Ph.D. students, partially due to the recent enhanced employment potential and salaries for geology graduates (although this may be changing with the current cyclical downturn of the minerals industry). The Department wishes to be able to attract more international students to its program, because they bring with them a wealth of different experiences from which all can benefit. The Federal and Ontario governments are also encouraging universities to recruit more international students, but the LU financial barriers make this very difficult to achieve.

ES2 (Kontak): Because of the very strong employment market in earth sciences, it is very difficult for us to find Canadian graduate students. Because foreign students are not eligible for GTAs and yet must also pay much higher tuition rates, the current cost of supporting a graduate student in our department is presently ~\$40k, which must come entirely from our research grants. At the same time, this leaves us with too few GTAs to cover our courses and we have been discussing the need to eliminate some of our laboratory requirements in lower-level courses, which would be devastating, but which appears to be our only option. These issues, combined with the limitations on GTAs for PhD students (presently 2 per year—not enough for our program to survive in the long term) are a triple-edged sword that threatens the long-term feasibility of our graduate and teaching programs, which were established at a time when foreign students were eligible for GTAs. The recent announcement by the university (January

15, 2013) to provide foreign GTAs (6 in each M.Sc. and Ph.D. to be shared in all departments) is a positive step, but we need something more than this ad hoc solution—something that we can plan on when we develop research proposals.... Another intangible aspect of this is the enriching effect that foreign students have in our department, where they bring a wealth of different experiences and approaches to teaching, research, and culture. Finally, it should be noted that having a student pay foreign tuition but receive a GTA is still less expensive than not having the student in terms of the negative effect it has on our ability to be competitive for NSERC grants, which provide significant amounts of Federal indirect costs. The policy of not granting GTAs to foreign students, if not changed, is going to ensure that most of us lose our NSERC grants, which will significantly lower the stature of the department within the academic community.

D2: The granting of graduate assistantship to international students will undoubtedly have a positive impact on the enrolment and productivity of these research-intensive programs, as well as on their undergraduate offerings.

DGS2: The suggestions made by the appraisal with regards to more support for graduate students., especially for non-resident students have been well-received and will be the focus of the coming years. As of today, Laurentian has already made some progress with regards to the financial support of graduate students in the Department of Earth Sciences. Both programs have been selected as signature programs and will thus receive additional GTAs, this is particularly true for the PhD in Mineral Deposits and Precambrian Geology where all the Canadian and permanent resident students are now eligible for a GTA. For international students, a fee waiver is available for one student per program and 2 Trillium Scholarships (\$40K/year for 4 years) are available every year on a competitive basis. Finally, the last Collective Agreement with the GTA students will see the difference between MSc and PhD reduced.

R3: Space. While the review committee felt that office and analytical laboratory space for faculty and graduate students was reasonable, there was a serious shortage of space for layout and storage of research sample collections. This is a non-trivial concern (albeit one shared by many Earth science departments nationally and worldwide): geology is a very visual and comparative science, which literally requires the side-by-side comparison of numerous (commonly dozens or hundreds) of samples for effective qualitative analysis as an essential precursor to detailed (and commonly very expensive) quantitative analysis. Sample collections are also compiled at very substantial expense (commonly tens to hundreds of thousands of dollars for annual field programs in remote areas of Canada and worldwide). These collections are therefore essentially irreplaceable; and their value lasts well beyond a specific graduate thesis. Archived collections thus have extraordinary value, as recognized by the Tri-Councils and the University's own policies on data preservation (5-year minimum retention). However, the committee heard alarming stories of the culling of archived collections to make room for current sample suites, and the storage of sample collections and field equipment at personal residences because of lack of archival and storage space. This is an issue that can be readily addressed by adoption of policies for sample suite retention and archiving, and provision of low-cost, long-term but accessible storage facilities. The

consultants noted that the Dean is aware of this issue and is attempting to address it in a proportionate manner; nevertheless, the importance of this issue for current and future researchers should not be underestimated.

ES3 (Kontak): The needs of earth science teaching and research are not the same as other faculty, not just at Laurentian, but any similar department where faculty have an active research program. Tens to hundreds of thousands of dollars are spent doing field work and collecting samples, which must be laid out in order for examination, comparison, and preparation for laboratory. Each student and faculty project typically involves hundreds of samples that must be cut, ground, sectioned, crushed, polished, examined microscopically prior to being analyzed. Although such space was allocated to us when we first moved to the WGMC, *the loss of space to MIRARCo at first and then Social Work has created the current situation.* In fact, we recently gave up significant amounts of space for the \$1M “Homeless” project—at a time when we are about to bring in a \$13M CMIC project, leaving us with even less space for teaching and research. We have discussed this with the Administration on numerous occasions, but they appear to be unable to do anything. The department has presented a plan to the Dean to convert our present computer lab (which we cannot afford to maintain despite it being used constantly by our students and for teaching courses) into graduate student space, freeing other offices for use by the CMIC project.

Storage space, although seemingly less important, is also critical, as the collection and archiving of samples is part of the profession (science must be reproducible and NSERC has regulations on the retention of samples), and such samples also contribute to teaching collections, which form a fundamental core to teaching earth science courses. The department is presently investigating the possibility of obtaining some on-campus long-term storage; however, the in-house storage issue has become so extreme that recently precious research collections have been discarded because of limited storage space.

ES4 (Lafrance): The computer lab is presently being converted into graduate student offices. This will liberate space for CMIC and for our incoming geochemist. More office and lab space will be needed for the sedimentology position, and even more space will be needed if the University of Limpopo initiative moves forward. This initiative has been instigated by the Goodman School of Mines and the Development Office which have spent considerable time and efforts in pursuing a collaboration between Limpopo and LU.

D3: Physical Plant is presently reviewing the special requirements of the Department regarding their Computer lab. Assessment and negotiation is undergoing.

DGS3: No comment.

R4: Commitments to external funding agencies. There was some concern expressed by a number of faculty members about negotiated university commitments to external funding agencies (e.g., CRCs, NSERC, etc.). Some faculty felt that the central administration has, in some cases, not completely fulfilled their commitments to individual grant/award recipients. The Consultants suggest that the Department and central administration engage in a dialogue

on this issue, and furthermore, that in future, negotiations concerning commitments and obligations should be mutually transparent.

ES4 (Kontak): This point addresses specifically one student and the related project whereby the university did not honour its commitment to the project by respecting its agreement to give a GTA to the Ph.D. project for its duration, as outlined in the plan signed by the administration. The result of this was to adversely affect the finances of the project in order to subsidize the living expenses and foreign tuition fees of the Ph.D. student.

D4: No comment.

DGS4: I believe that this has been partially repaired for the remaining of the student at Laurentian. The student is now receiving a GTA.

R5: Graduate Student Workload. Many graduate students felt that they were expected to work more than their contractual 10 hours per week as TAs; they did this partly out of loyalty to their supervisors. They also stated that much of that extra workload was caused by non-provision of answer keys, meaning that students had to generate these themselves; a factor which also led to inconsistencies between different TAs.

ES5 (Kontak): No comment.

ES5(Lafrance): At a faculty meeting this Fall, a motion was passed requiring all course instructors to provide answer keys to teaching assistants.

D5: No comment.

DGS5: To eliminate this issue, a duty-set is filled out by the student and his/her assigned supervisor for the specific duties. This duty-set is appended to the contract and help at the School of Graduate Studies. Any deviation from the prescribed duties and total of hours (averaged to 130 per term) is to be reported.

R6: Staff Replacement. The non-replacement of the Departmental technician was a problem for resolving IT issues, but more importantly this person used to provide GIS training, which is now not available to students.

ES6 (Kontak): This position was originally added in to fulfill our need to offer a course in Computer Geoscience (now taught by a sessional instructor), to maintain the departmental computers, website, and ftp site. The loss of this position has severely affected activity in the department, which is very heavily dependent on IT support. We are not talking about help with MS Office or computer hardware, we are talking about solving problems with our department, maintaining the DES and MERC, and ftp. Some of these activities have been taken over by one of the technicians, Ms. N. Tardif, but she is already overworked and does not have the skills needed to address all these issues.

The Department added that it was short of 0.5 secretarial help: The present system assigns secretarial support based on faculty numbers (which in our case have been reduced without reducing our workloads) rather than need. We are running B.Sc., B.Sc. Hons., B.Sc. Co-Op, M.Sc., Applied M.Sc., and Ph.D. programmes and still have the same secretarial support as departments with smaller programs and lower research and grant activity. A 0.5 position was originally given to support the Applied M.Sc. program (2001) and was up until 2010 occupied by Ms. E. Bozzato, but after growing and adding the Ph.D. and Co- Op B.Sc. programmes, it was cut without notice. This is unfair to us and to the students, so this position needs to be reinstated.

D6: A geological Technologist has been hired. A secretarial help shared 50/50 between the departments of Earth Science and Forensic Science is under consideration.

DGS6: No comment.

R7. Inconsistent Application of University Policies. There was a general sense of inconsistency in application of University policies to issues such as provision of GTAs and tuition waivers. It seemed that sometimes it was possible to negotiate extra GTAs and tuition waivers with administration for an individual faculty member's students, but that the rules were not clear and appeared to be inconsistently applied.

ES7: No comment.

D7: No comment.

DGS7: While this may have been the case in the past, the guidelines presented above are now applicable for everybody. Through the Research Office, it is possible that CRC negotiate access to GTAs funds but this is usually agreed upon at the start of their CRC appointment.

R8. Sharpen Focus of PhD Requirements. As the Ph.D. program becomes established, there will be a need to more clearly define the expectations as to what constitutes a Ph.D. In the words of one faculty member, "A Ph.D. should be more than just three M.Scs."²

ES8 (Kontak): No comment.

ES8 (Lafrance): The qualifying PhD exams and expectations for PhD theses have been discussed this Fall in Departmental Faculty meetings. Discussions will continue this semester.

D8: No comment.

DGS8: Clear learning objectives are described in the program brief and have been approved by the MTCU through IQAP. Whereby there is a need to modify this learning outcomes and the associated skills, a modification of the program can be requested and will have to go through IQAP.

² This is a reference to the fact that, as the Department noted in its response: "Most of our theses are now prepared as journal papers (1 for MSc, 3 for PhD), so they are now shorter and easier to edit."

Finally, it should be noted that within their report, the Reviewers made a number of suggestions to which the department responded, even though they were not ultimately included in their list of eight recommendations. These included the preparation of a Graduate Handbook which lays out program expectations, timelines and policies clearly and in this instance the Department concurred.

**LAURENTIAN QUALITY ASSURANCE IMPLEMENTATION PLAN FOR THE SCHOOL OF EARTH SCIENCES
NOVEMBER 2013**

Recommendations Requiring Follow-up	Laurentian Follow-up	Responsibility and Timeline
1. Replace departed—and retiring faculty	Dean will consult all department / schools within his purview concerning their faculty needs, will prioritize and make recommendations to Provost	Ongoing Dean of Science and Engineering
2. Provide GTA's for all international students enrolled in program.	The Departmental Chair will work with the Director of Graduate Studies to make recommendations to the Provost and Vice-President Academic (to whom Graduate Studies reports) to resolve this issue	2014-2015 Vice-President Academic and Provost
3. Find space for space for layout and storage of <i>all</i> research sample collections	The Chair, in consultation with Department, will identify space requirements and suggest options to Dean	2014-2015 Dean of Science and Engineering
5. Standardize and control TA workload	The chair will consult students and work with them and departmental colleagues to resolve issues	2014-2015 The Chair of the Department
6. Hire computer technician and 0.5 secretary	Dean will consult all departments/schools within his purview concerning their staff needs, will prioritize and make recommendations to Provost	2014-2015 Dean of Science and Engineering
7. Clarify rules and consistently apply university policies such as provision of GTAs and tuition waivers	The Departmental Chair will work with the Director of Graduate Studies to make recommendations to the Provost and Vice-President	30 June 2014 Vice-President, Academic and Provost

	Academic (to whom Graduate Studies reports) to resolve this issue	
8. Sharpen focus of PhD requirements	The Chair will prepare a review with recommendations for the Director of Graduate Studies and Graduate Studies Council for possible further action by Senate Committees	1 September 2014 Chair of the Department

MONITORING THE PLAN

The Dean of the Faculty of Science and Engineering, shall be responsible for monitoring the implementation plan. The details of progress made shall be presented in the Dean’s Annual Report and filed with the Vice-President Academic and Provost. By December 2014, after an elapse of 18 months, and per Laurentian’s IQAP policy, the Dean will report on each of these recommendations to ACAPLAN. An Executive Summary and the monitoring reports will be posted on Laurentian University’s web site.