REPORT OF ACADEMIC STANDARDS COMMITTEE
Report #W2015–5; June 2015

In this report the Academic Standards Committee (ASC) brings to Senate its evaluation and recommendation on the following items:

- **Periodic Program Review for Biology – Bachelor of Science (BSc)**
- **Periodic Program Review for Ryerson Theatre School – Bachelor of Fine Arts (BFA)**
- **Periodic Program Review for Hospitality and Tourism Management – Bachelor of Commerce (BComm)**
- **Periodic Program Review for Chemistry – Bachelor of Science (BSc)**

A. PERIODIC PROGRAM REVIEW – BIOLOGY (BSc)

1. BASIC INFORMATION

a) Program Description

The Bachelor of Science in Biology, which started in 2005, is a full time, four year or five year Co-operative degree program. Students are able to complete the regular program or opt to take an option in Biophysics, Bioinformatics and Computational Biology, or Environmental Biology.

The Biology Program has been the most popular choice for science students. Many students anticipate using their BSc in Biology to enter professional schools (dental or medical) although many will continue into graduate programs, the teaching profession and biological careers in agricultural, chemical, clinical, political, policy and industrial sectors of society.

b) Program History

1948 – Ryerson Institute of Technology was first established; three year Diploma in Chemical Technology offered.
Mid 1960's –Options in Industrial Chemistry, Applied Chemistry and Polymer Chemistry were added.
1967 – Laboratory Science, within the Department of Chemical Technology, was introduced.
1973 – the first Bachelor of Technology (Laboratory Science) was awarded.
1985 – the program was accredited by the Canadian Society for Chemistry and was the only program at that time to offer an accredited Bachelor of Technology degree as opposed to the more traditional Bachelor of Science degree.
1989 – the program changed its name to Applied Chemistry and Biology which more accurately reflected the content of the program and made it easier to interpret for prospective students, for employers and for the general public. The program was reviewed and re-accredited in 1992.
1994 – the program designation was changed from Bachelor of Technology to Bachelor of Science.
2004 – the Applied Chemistry and Biology Program underwent a major curriculum restructuring which concluded with the introduction of 11 new programs in Science in the fall of 2005, including a standalone program in Biology.

2. DEVELOPMENT SINCE PREVIOUS PROGRAM REVIEW

This is the first program review for Biology since its implementation in 2005. Although there was not a previous program review, the Biology Program has grown and evolved over the last seven years with the academic plans of both the University and the Faculty level.

The five key priority areas of the Ryerson Academic Plan, 2008-2013 are (1) new programs that are societally relevant; (2) enhance student satisfaction and success; (3) excellence in learning and teaching; (4) increase in Scholarly Research and Creative (SRC) activity; and (5) enhance Ryerson's reputation.

The goals of the Faculty of Engineering, Architecture and Science are (1) excellence in the quality of our undergraduate and graduate engineering, architecture and science programs; (2) development and

implementation of new societally relevant and needed high quality undergraduate and graduate programs; (3) Faculty restructuring; (4) establishment of national and international partnerships; (5) enhancement and strengthening SRC activities and outcomes; and (6) enhancement of the students' and graduates' engagement and satisfaction.

The overall mission of the Biology Department over the last seven years has been to (1) create a strong and comprehensive program in biology that is societally relevant; (2) prepare students to be competitive and successful in obtaining their post graduate goals, either in post graduate studies, professional pursuits or direct employment; (3) excel in student engagement, satisfaction and success; and (4) increase the marketability and visibility of our program through outreach, ombudsman and promotional activities.

The Biology Program's Objectives and Initiatives for 2005-2012 are to (1) improve SRC success; (2) improve quality of undergraduate programmes; (3) plan for growth and development in undergraduate and graduate programmes initiatives; (4) improve student engagement, satisfaction, and success; and (5) increase outreach activities.

3. SOCIETAL NEED

When the Biology Program was introduced in 2005 the new courses that were introduced were modelled after the most fundamental biology concepts offered by most Biology Programs at other Ontario Universities, and on the academic strengths of the faculty members at the time. Therefore the program maintained its microbiology/biotechnology focus and introduced new courses in genetics and cell biology. The Biophysics option courses were cross-listed with the Medical Physics program and the Computational Biology option courses were cross-listed with the Computer Science and Mathematics Department.

There is a strong desire among many students in the Common First Year Science programs (particularly Biology and Medical Physics) to pursue medical or dental school after graduation. The Greater Toronto Area supports a large biomedical and life sciences industry. The Canadian biomedical market is estimated at $30 billion. The pharmaceutical market alone is estimated at $21 billion annually and is growing at 6% per year. Many of the largest pharmaceutical companies in the world are located in the GTA. The biotech market in Canada is estimated at $5 billion. MaRS, the Province of Ontario's incubator for bioscience start-up companies and nexus for university-industry partnerships, is located within a ten minute walk of Ryerson, as are several major hospitals. There are approximately 1300 life science companies operating in the GTA. Clearly, biological science is a growth area for Ontario and Canada, and the demand for highly qualified personnel is likely to increase.

4. PROGRAM LEARNING OUTCOMES

The learning outcomes of the program are aligned with the Undergraduate Degree-Level Expectations of Ryerson University.

A graduate of the Biology program should be able to:

1. demonstrate basic competence in biological related sciences at the university level as well as mathematics, physics, chemistry and computer science and how they relate to biological systems.
   Supporting learning outcomes – Students should be able to:
   - apply the mathematical, chemical and physical basic knowledge to biological concepts
   - understand how basic mathematics, physics and chemistry are necessary for cross-disciplinary learning
   - use their general science information to advance their knowledge of how biological systems work
   - interpret and communicate using their basic knowledge to explain general biological concepts
   - demonstrate their knowledge and understanding using various presentation tools and communication methods

2. demonstrate competence in their knowledge base for the major areas of biology and the integration of these areas with each other and all sciences.
   Supporting learning outcomes – Students should be able to:

- understand how each of the 8 biological cornerstone courses is necessary for cross-disciplinary learning and integration of ideas in the biology field
- use their cornerstone course knowledge to advance their understanding of how biological systems work
- interpret and communicate using their science knowledge to explain current biological methodologies and advancements
- exhibit their knowledge and understanding of the biological theories and applications using various presentation tools and communication methods

3. demonstrate specialized scientific knowledge appropriate to program courses and program options, and be able to use the knowledge and skills to identify, formulate and analyze information in order to reach substantiated conclusions.
   Supporting learning outcomes – Students should be able to:
   - apply their advanced knowledge in the selected biological areas to overall scientific concepts
   - interpret and communicate using their advanced science knowledge to explain current biological methodologies and advancement and propose new ideas and innovations
   - propose an hypothesis to investigate a new phenomenon
   - integrate information obtained about one phenomenon to help explain another
   - demonstrate their knowledge and understanding using various presentation tools and communication methods

4. present competency in laboratory skills. To understand safety concerns and measures for working in laboratory areas and to give the appropriate attention to health and safety risks, applicable standards and environmental and societal considerations.
   Supporting learning outcomes – Students should be able to:
   - perform simple scientific procedures and measurements with proficiency and competency
   - carry out experiments safety with applicable attention to health and safety risks, and industry standards
   - demonstrate competent laboratory skills
   - explain the importance of implementing positive and negative controls in experimentation
   - explain the necessity of reproducibility, accuracy and statistical analysis in experimentation
   - demonstrate their knowledge and understanding of laboratory practice by complete appropriate laboratory documentation and preparing laboratory reports

5. exhibit familiarity with scientific literacy and demonstrate their knowledge by gathering, interpreting and analyzing scientific information using technologically current and content relevant approaches. To critically evaluate published biological works within a societal conscientious environment.
   Supporting learning outcomes – Students should be able to:
   - select appropriate methodology and tools to test a hypothesis based on theoretical knowledge on the uses,
   - understand the limitations and the ways in which different approaches complement each other.
   - collect, organize and interpret data from experimental protocols
   - apply statistical processes to data to determine correlations or similarities/differences.

6. articulate their knowledge of biology though illustrations, responses to technical and non-technical written instructions, and citation of evidence to construct and support an argument. To document and illustrate laboratory results in a comprehensive manner. To produce reports using appropriate formatting, grammar, spelling and references.
   Supporting learning outcomes – Students should be able to:
   - use library electronic resources to search for scientific information
   - use other internet sources to gather information about a biological problem
   - identify and recognize limits to knowledge, areas of speculation and interpretation
   - critically evaluate knowledge acquisition of ideas or thoughts

- recognize and explain limits of knowledge imposed by current conceptions, frameworks and methods that lead to uncertainty, erroneous interpretation, and bias.

7. design and apply solutions for open-ended biological problems in a socially relevant way. To implement experimental protocol and analyze and interpret data that is meaningful to biological communities, the environment and the welfare of humans as a whole.
   Supporting learning outcomes – Students should be able to:
   - communicate effectively in written form using formats such as essays, summaries, reviews or critiques of original research literature
   - deliver oral presentations that summarize, review or critique a research article or an entire topic
   - use a variety of communication tools including digital presentation, blogs and posters

The learning outcomes and curricular structure in the Biology Program are consistent with the Ryerson Academic Plan (2008-2013) and the Faculty's goals. The continued improvement in the program addresses two of the Department's Objectives and Initiatives (2005 – 2012) which are to improve the quality of the undergraduate programs and improve student engagement, satisfaction and success. Past program revisions and modifications targeted for improvement for the future have been made with student success and satisfaction in mind. Further additions to the elective package of the program will further enhance the quality and diversity of the education that the students receive.

5. ACADEMIC QUALITY

a) Curriculum

The curriculum in Biology covers life from the molecule, to the cell, to the organism, to the population, to the ecosystem, to the global community.

BACHELOR OF SCIENCE BIOLOGY	
1st SEMESTER BLG 143 Biology I CHY 103 General Chemistry I CPS 118 Introductory Programming for Scientists MTH 131 Modern Mathematics I PCS 120 Physics I SCI 180 * Orientation * This course is graded on a pass/fail basis.	**2nd SEMESTER** BLG 144 Biology II CHY 113 General Chemistry II MTH 231 Modern Mathematics II PCS 130 Physics II LIBERAL STUDIES: One course from Table A.
3rd SEMESTER BLG 151 Microbiology I BLG 311 Cell Biology CHY 142 Organic Chemistry I MTH 380 Probability and Statistics I LIBERAL STUDIES: One course from Table A.	**4th SEMESTER** BCH 261 Biochemistry BLG 251 Microbiology II CHY 242 Organic Chemistry II MTH 480 Probability and Statistics II LIBERAL STUDIES: One course from Table A.
5th SEMESTER BCH 361 Advanced Biochemistry I BLG 230 Botany BLG 307 Molecular Biology BLG 400 Genetics PROFESSIONAL AND PROFESSIONALLY-RELATED: One course from Table I.	**6th SEMESTER** BCH 362 Advanced Biochemistry II BLG 340 Environmental Biology CMN 600 Science, Communication and Society LIBERAL STUDIES: One course from the following: ENG 503 Science Fiction GEO 702 Technology and the Contemporary Environment HST 701 Scientific Technology and Modern Society PHL 709 Religion, Science and Philosophy POL 507 Power, Change in Technology PROFESSIONAL AND PROFESSIONALLY-RELATED: One course from Table I
7th SEMESTER BLG 888 Biotechnology Laboratory LIBERAL STUDIES: One course from Table B. PROFESSIONAL AND PROFESSIONALLY-RELATED: Three courses from Table I.	**8th SEMESTER** LIBERAL STUDIES: One course from Table B. PROFESSIONAL AND PROFESSIONALLY-RELATED: Four courses from Table I

Bioinformatics and Computational Biology Option	
5th SEMESTER	BCH 361 Advanced Biochemistry I BLG 307 Molecular Biology CHY 213 Analytical Chemistry I CPS 313 Advanced Programming for Scientists LIBERAL STUDIES: One course from the following: ENG 503 Science Fiction GEO 702 Technology and the Contemporary Environment HST 701 Scientific Technology and Modern Society PHL 709 Religion, Science and Philosophy POL 507 Power, Change and Technology
6th SEMESTER	BCH 362 Advanced Biochemistry II BLG 340 Environmental Biology CMN 600 Science, Communication and Society PCS 227 Biophysics PROFESSIONAL AND PROFESSIONALLY-RELATED: One course from Table III.
7th SEMESTER	LIBERAL STUDIES: One course from Table B. PROFESSIONAL AND PROFESSIONALLY-RELATED: Two courses from Table II. PROFESSIONAL AND PROFESSIONALLY-RELATED: Two courses from Table III
8th SEMESTER	LIBERAL STUDIES: One course from Table B. PROFESSIONAL AND PROFESSIONALLY-RELATED: Two courses from Table II. PROFESSIONAL AND PROFESSIONALLY-RELATED: Two courses from Table III

Biophysics Option	
5th SEMESTER	BCH 361 Advanced Biochemistry I BLG 307 Molecular Biology PCS 352 Nuclear Physics Radiation/Protection PCS 354 Radiation Biology LIBERAL STUDIES: One course of the following: ENG 503 Science Fiction GEO 702 Technology and the Contemporary Environment HST 701 Scientific Technology and Modern Society PHL 709 Religion, Science and Philosophy POL 507 Power, Change and Technology
6th SEMESTER	BCH 362 Advanced Biochemistry II BLG 340 Environmental Biology CMN 600 Science, Communication and Society PCS 227 Biophysics PROFESSIONAL AND PROFESSIONALLY-RELATED: One course from Table III
7th SEMESTER	LIBERAL STUDIES: One course from Table B. PROFESSIONAL AND PROFESSIONALLY-RELATED: Two courses from Table II. PROFESSIONAL AND PROFESSIONALLY-RELATED: Two courses from Table III.
8th SEMESTER	LIBERAL STUDIES: One course from Table B. PROFESSIONAL AND PROFESSIONALLY-RELATED: Two courses from Table II. PROFESSIONAL AND PROFESSIONALLY-RELATED: Two courses from Table III

See the Ryerson Calendar for Professional and Professionally-Related Electives, and Liberal Studies Electives

b) Curriculum Mapping

The curriculum within the program has been mapped to the program learning outcomes. The first year courses are general science courses and fulfill program Goal 1 which requires graduates to have basic competence in all areas of science. The knowledge at this level is introductory in the first semester and advances to a reinforced level in the second semester. Except for the chemistry area, none of the other areas reach the level of proficiency in those subjects since they are designed to only give the students a basic breadth of knowledge in physics, math and computer science. Chemistry courses in the second year concentrate on organic chemistry and move further into the proficiency level. However CHY 242, Organic Chemistry II, which is mapped as being a course where the students can be considered proficient in basic chemical theories and mechanisms, has now been moved to the elective package. Most students do not need this level of competence in chemistry for the rest of the biology degree; however, students wanting to continue into some disciplines after graduation such as dentistry will need to include this course in their degree requirements to satisfy dental school prerequisites.

Core courses offered in second, third and fourth year base their curriculum on the proficient level of understanding of basic principles from first year (Learning Outcome 1). They also introduce and reinforce more specialized areas of biology such as cell biology, microbiology, genetics, botany, zoology, evolution and ecology (Learning Outcome 2). The core third year courses such as molecular biology, molecular biology lab and the advanced biochemistry rely on some skills acquired in second year and train the student to be proficient in these areas of biology upon successful completion of the courses. These core courses also introduce and reinforce further specialized areas of biological sciences (Learning Outcome 3) on which students can build by taking biological electives from their elective package.

Biological science is a very practical and visual science where hands on activities are an essential teaching and learning tool (Learning Outcome 4). For this reason many of the core courses have laboratory exercises where students are able to practice their experimental skills in a controlled setting. These skills are introduced in early courses and reinforced throughout the curriculum.

Learning Outcomes 5, 6 and 7 concentrate on scientific literacy, communication proficiency and problem solving skills. We consider them to be universal skills for all students and are introduced and reinforced through a wide variety of ways in all of our courses. Most notably, the more advanced elective courses with smaller class sizes are an ideal setting to hone these skills in our students. Elective courses often use assessment methods such as essays, presentations, debates, and group work which contribute to student use and critic of current literature and development of higher thinking skills.

c) Diversity and Inclusion

Curriculum structure has evolved over the last 7 years to include a wide variety of biological areas based on the principle that is important to expose students in the program to as broad an education possible within the realm of general biology. The current core curriculum structure serves the students well in this respect. The establishment of more elective courses for the elective package will further increase our ability to provide a diverse and inclusive biological education.

d) Methods of Instruction

The course content and goals are presented through a combination of lectures, laboratories, and/or tutorials. This pedagogical mode of instruction is commonly employed in science-based programs both here at Ryerson and at comparator institutions. The most common method of instruction in science is lecturing due to the heavy fact driven content. However, our program does also incorporate on-line assignments, laboratory exercises, group work and independent research project to provide various student learning styles. Our program hopes to provide students with written and oral communication proficiency, resource surfing know-how, and critical thinking skills as outlined in program goals 5, 6 and 7 and therefore it is important to incorporate as many learning styles as possible.

We consistently provide both multiple choice and short answer sections on all tests and exams in many courses. This approach allows students the opportunity to excel in their preferred testing choice while continuing to improve in other areas. Furthermore, laboratory exercises can contribute to students' writing and comprehension skills and assignments and essays can improve both analytical and overall communication skills.

e) Curriculum Structure – Undergraduate Degree Level Expectations (UDLEs)

The Biology Program curriculum is designed to satisfy the program learning outcomes which comply with all the UDLEs set out by the Ontario Council of Universities. Overall, UDLE #1, 'Depth and breadth of knowledge' is satisfied by the majority of courses in the curriculum including the courses offered directly outside of the field of biology including chemistry, physics, mathematics and computer science. All 7 of the program's learning outcomes can be used to satisfy UDLE #1. While the courses in years 1 and 2 instill the fundamental knowledge required in biology, courses offered in years 3 and 4 build on that knowledge to expand the students' perception and understanding of biological concepts. Upper year biological electives further deepen the knowledge in a given area and develop the critical thinking needed to trouble shoot and solve complex biological issues.

For UDLE #2, 'Knowledge of methodologies', all of the program goals encapsulate this concept. The method of inquiry is a fundamental concept for biological sciences and the program begins in first semester in BLG 143 introducing the students to the use of this method for the design and proof of concept of hypothesis in biology. This is followed by the design of experiments, the collection of relevant data and the analysis of the results. Many courses in the curriculum, especially those with laboratories, extensively teach with methods of inquiry in mind. Finally, conclusions to explain the outcomes are formulated and future considerations are expected in many courses.

UDLE #3 addresses 'Application of knowledge'. The very nature of biology lends itself to this concept. All of the courses have some aspect of critically evaluating qualitative and quantitative information. Our program learning outcomes 2, 3, 4, 6 and 7 address applications of knowledge in various degrees and those with laboratories attend to this application by involving the student in hands laboratory experiments. Furthermore, the upper year electives both inside and outside of our program enable the student to practice proposing an argument, designing experiments to prove or disprove the argument and suggesting a solution. The students are expected to make use of scholarly journals and books to gather relevant background information and learn about appropriate methodologies that can be employed to test their hypothesis.

Communication in both written and oral form (UDLE #4) are expected in many of the core courses and most of the biological electives and as outlined in goals 5 and 6. Written communication is practiced in the form of lab reports, essays, critical reviews, and written answers on tests and exam. Oral communication is in the form of in class presentations and discussions. Additionally all biology students are required to take CMN600 a communication course designed for science students to learn how to express scientific concepts in layman's terms.

UDLEs # 5 and 6 concentrate on 'awareness of limits of knowledge' and 'autonomy and professional capacity'. Program learning outcomes 4, 5, 6 and 7 all take into account these two concepts. The biological electives in particular test the students' ability to interpret current literature and critically assess the meanings of experimentation and their limitations. Lastly, academic integrity and social responsibility are integral to all academic courses at Ryerson as outlined in Ryerson's Student Code of Conduct.

f) Curriculum Development

The curriculum of the Biology Program has implemented several changes over the past seven years. This has been in response to student feedback, implementation of curriculum rigor, and evolving societal demand. The latest curriculum revision took effect in Fall 2012 and satisfies a long term vision of delivering a well-rounded, comprehensive and inclusive core biology curriculum in the program.

To begin, the program identified major areas of biology that are recognized by the global biological community as necessary cornerstones of biological education that would introduce students to all the key concepts in biology. These key concepts would be taught through 9 major courses within the discipline including Biochemistry, Botany, Cell Biology, Ecology, Evolution, Genetics, Microbiology, Molecular Biology, and Zoology. It was our goal to teach most of these courses as a core component of our program to all our Biology students in their second year of study so that specialization courses that are built on these fundamentals could be offered in years 3 and 4 of their degree. Inclusion of these nine subject foci strengthened the delivery of Program Learning Outcomes 2, 3 and 4.

In Fall 2010 only 50% of the core package or 32.5% of the entire program were mandatory biology courses. The rest were science related courses such as physics, mathematics and chemistry that ensured that our students receive a solid foundation in the sciences. Compared to other university Biology Programs, Ryerson students were receiving a much lower number of core biology courses.

As a first step to ensure that our students are exposed to all fundamentals of Biology while allowing room in the curriculum so they can specialize in key areas of Biology in the upper years, three courses were moved into the core package. The course breakdown after the restructuring for the Biology students in the Regular Program is as follows:

13 Core courses in Biology and Biochemistry (required)
11 Professionally Related Science courses (required)
1 Communication course (required)
9 Electives
6 Liberal Studies

The program now consists of 35% biology and biology related courses and 22.5% other science courses. In addition, students are required to choose at least 3 biology or biology related courses from their elective package. Several new courses have been added to the list of Biology courses. Some new courses will become active when the new program in Biomedical Sciences commences in the fall of 2013 and these will also be offered to the regular Biology Program students as electives.

Recently several biology courses (BLG 181, BLG 599, BLG 699) have been designed to be offered to students outside of the science programs as Liberal Studies electives. In addition to these courses, all other biology courses are available for students outside of Department to take as open electives as long as they satisfy the prerequisites requirements and there is room in the class. Traditionally, very few students from non-science Departments have taken science courses as electives.

g) Enrolment in Program Courses

Enrolment has been on a steady incline over the last several years. The first year Biology course, taken by all first year science students, has reached the 500 students mark and now is offered as 2 groups of 250+ since there are no classrooms on campus that accommodate more than 500. These large numbers pose several issues, the first being the quality of education experience in such a large classroom with so many students with varying learning styles. These 500 students are further divided into groups of 24 for laboratories. Higher level courses are slightly lower in numbers than the first biology course but most of the biology core courses have enrolments above 100.

Professional electives are somewhat smaller in enrolment than the core courses. There are a limited number of electives that are offered in any one year due to lack of faculty and other resources. The lack of choice causes some of the elective courses to be large (i.e. BLG 600 Physiology, BLG 700 Anatomy).

h) Relationship to Current Discipline and Profession

Biology programs do not feed directly into a professional practice although many biology graduates seek further education in professional disciplines such as medicine, dentistry, pharmacy, physiotherapy and other health care occupations.

Biology Programs are not part of a program accreditation body. Each university self regulates their own biology and biology-related programs. Despite this, there remains significant consistency between programs across Ontario and across Canada.

i) Student Engagement

Data from NSSE indicate that while 36% participated in classroom discussions in first year 52% indicated they participated in classroom discussion by 4th year. Also 4th year students indicated that 49% prepared two or more drafts of papers and 94% indicated those papers required integration of ideas and information from various sources. Both these categories were higher than Ryerson's general student population of 42% and 91%, respectively. NSSE data suggests that the Biology Program uses more written than oral assessments than some other disciplines in general but that overall the students are exposed to a wide variety of assessments.

j) Collaborative Agreements

Currently, the Department has one collaborative agreement with Centennial College to accept graduates of the College's Biotechnology-Industrial MicroBiology Program to complete a BSc.

k) Experiential Learning Opportunities

Starting in first year, the students are introduced to concepts during laboratory and tutorial sessions in Chemistry, Physics, Mathematics, Computer Science and Biology. Second and third year core courses with

labs continue to hone the students skills. Recently the Department has added several new laboratories as components of courses, for example, botany (BLG 230) and evolution (BLG315).

The Department also offers a co-operative program which can provide students with 20 months of work experience (5 work terms) that enhances their organizational and technical abilities as well as their oral and written communication skills if they choose this option. The co-op option gives the students and opportunity to obtain practical experience in their field and a better understanding of their profession. This work experience puts the co-op graduate in an advantageous position to obtain permanent employment. 5 to 10% of our students participate in co-op.

l) Student Assessment

Science is a fact based discipline where it is important for the students to be able to recall the information precisely and rapidly. For these reasons, assessments are often in the form of multiple choice questions. Assessments in this form are very valuable for assessing the depth and breadth of recalled knowledge of the students over the topic areas. For the application of the material to biological problems, most courses also include some short/long answer questions on mid-terms and finals where students must demonstrate understanding and not just recall.

Many courses also contain a laboratory component where a variety of assessment are used to assess basic recall (short quizzes), networking (in-lab report forms), understanding and application of knowledge (lab reports) and writing skills (individual lab reports). Laboratories often also have a small 'best lab practice' component to their marking scheme which includes assessing students' 'at bench' lab skills when performing the required exercises.

The fourth year thesis course is an excellent example of a two-semester senior level course that incorporates hands-on experience with critical thinking skills, written and oral presentation skills along with the opportunity to interact directly with researcher in a lab setting. Approximately 1/3 of graduating students participate in this course and consider it a valuable learning experience.

m) Student Success and Achievement

Student success can be measured in several ways:

1) the recommendation of the program by the graduates of the program
   - 77% of alumni would recommend the Biology Program to others seeking a BSc in Biology (UPO data poll based on 13 respondents)
   - 100% would recommend the Program although 53% would do so with some reservation (program survey of alumni based on 18 respondents)
   - 77% of the students (UPO data) indicated that they were satisfied or very satisfied with the overall quality of the program
   - 100% of the students agreed or strongly agreed that the quality of the program was high (program survey)
2) the ability of graduates to obtain meaningful employment after graduation
   - 20% of graduates found jobs within 3 months but 13% took longer than 1 year
   - 53% were still in school, of that 38% in professional schools (such as medicine or dentistry) and 62% in Master or PhD programs
3) the ability of the program to retain students
   - Retention of students in the program was only slightly lower than retention in the Faculty or at Ryerson as a whole
4) the overall academic standing of the student in the program.
   - The overall academic standing of students in the program was lower that than the average at Ryerson where only approximately 50% achieved clear standing after one year in the program. Although there is an orientation course for first year science students to help them with the first year experience at Ryerson, it is possible that the biology students need a more aggressive integration experience to help them achieve more favourable grades at the end of first year.

Changes to the orientation class have been implemented each year in order to further aid the students although the perfect solution has yet to be found.

n) Library Resources

Overall, the library confirms that it is well equipped to support the undergraduate program in Biology. Electronic resources are available to students 24/7. The library noted that specialized in-class library instruction was under-utilized in the Department.

o) Surveys

Student Survey

Undergraduates in the years 2, 3 4 were surveyed about their satisfaction with various aspects of the Biology Program. In all, 166 students were polled, where 151 were in the regular program, 12 were in the co-op option, 1 in the Biophysics option and 3 in the Bioinformatics and Computational Biology option. The Environmental Biology option is new this year and the students were not asked to identify themselves in that option. 18% attended either another university or college prior to attending Ryerson and 9% had worked full time.

The following percentages indicate "agreed or agreed strongly":

- 100% – program was academically challenging
- 87% – professors were current and knowledgeable in their fields
- 87 % – professors were available to students outside of class time
- 83 % – most of their professors' teaching was academically challenging
- 82% – the teaching they experienced was of high quality
- 77% – the program helped with their research skills
- 74 % – professors were well organized in their teaching
- 70% – the program was of high quality
- 69-75% found that written assignments, textbooks, learning materials, classroom instruction and laboratory experiences effectively or very effectively contributed to their learning
- 61% found computer based resources to effectively or very effectively contribute to their learning
- 59% – the content in the course was well organized
- 58% –program prepared them for a career
- 58% found tests/exams to be effective or very effective
- 56% – professors provided useful feedback on their academic performance
- 54% – the program helped with their written communication skills
- 52% found the academic workload in the program manageable while 43% found it excessively high and 8% found it too low
- 49% – the program helped to improve their ability to work in teams
- 49% and 44% found the Department was useful at providing academic advice within the Department and outside the Department respectively
- 37% and 44% found group work to contribute effectively or very effectively to their learning
- 35% and 42% – their oral skills and critical thinking ability improved, respectively
- 32%, 37% and 38% – the program helped them to develop a broad knowledge of their career, computer skills and the ability to respond to technological innovations, and their understanding of professional/ethical responsibilities, respectively
- 33% found print based library resources to contribute effectively or very effectively to their learning
- 25% and 29% – the program helped to improve their leadership skills and improve specific employment related skills
- 24% and 25% – the program helped them with international context of their program or helped with understanding people of different cultures
- 13% and 22% – the program helped with their entrepreneurship or creative ability, respectively

Alumni Survey

Alumni of the Biology Program were polled for their satisfaction about the Biology Program. Responses were received from 17 alumni who graduated between 2009 and 2012.

- 100% agreed or agreed strongly that their program was academically challenging and that the quality of the program was high
- 93% agreed or agreed strongly that their professors were current and knowledgeable in their fields
- 87% agreed or agreed strongly that the teaching they experienced was of high quality
- 80% agreed or agreed strongly that their program prepared them for a career

In the Ryerson survey (UPO date based on Canadian Undergraduate Survey Consortium) 13 students responded.

- 77% found the overall quality of the program to be satisfactory or very satisfactory
- 47% would recommend Ryerson for their program without reservation while 53% would recommend Ryerson but with reservations

The NSSE survey found that 85% would come back to Ryerson if they were starting all over again.

Employer Survey

Employers that hire students from our Biology Program were asked to contribute their opinion about the quality of our students. Of the four companies that replied:

- all would prefer to hire students with degrees in chemistry
- 2 indicated that they would hire students with interdisciplinary degrees or those in other fields of science
- one preferred breadth of knowledge over too much depth in one area while another preferred a depth of knowledge over too much breadth
- if they hired a student with a biology degree they would consider additional skills in chemistry as valuable
- the most valuable skills were statistical analysis of data sets, general laboratory skills, sterile technique and microscopy
- two companies indicated that they were satisfied or very satisfied with Ryerson graduates in technical skills, and written and oral communication. They were also satisfied with Ryerson Science students' ability to run and plan projects, organization, initiative, creativity, leadership potential, and overall quality of work. All of the categories were comparable or better than graduates from other university science programs.
- one company indicated that data analysis and problem solving was unsatisfactory although they still considered our students to be compatible to other universities.

Overall too few companies replied to the survey and therefore no conclusions can be made.

6. ACADEMIC QUALITY INDICATOR ANALYSIS

a) Faculty

The core Biology faculty are drawn from the Department of Chemistry and Biology; however, faculty members from other Departments (e.g. Physics, Mathematics and Computer Science) also teach courses (mainly in the first year) in the program. The existing faculty complement for the program is a dynamic, vibrant and accomplished group who conduct teaching and research in a broad range of disciplines.

The external research equipment grants obtained by the faculty over the past decade, augmented by substantial investments from the Faculty and University, have enabled researchers in the Department of Chemistry and Biology to build a considerable infrastructure, much of which is shared. Leading-edge research facilities managed by the Department include an Advanced Microscopy and Imaging Facility, the Ryerson University Analytical Center, and a Clean Room.

In 2011-2012, the 19 research-active core faculty in the Department were supervising or co-supervising 35 Master's students and five Ph.D. students. The group has collectively mentored to degree completion at Ryerson 106 Master's students and 16 doctoral students (through Ryerson's programs or adjunct appointments to other institutions), as well as 11 post-doctoral fellows.

In the last seven years they have published 218 articles in peer-reviewed journals and have acquired over $9 million in research funding (operating and equipment tools combined) from peer reviewed funding agencies from a wide variety of sources.

The biological research activity that has developed over the past decade or so has resulted in many meaningful opportunities for undergraduate students as well. Between academic years 2005-6 and 2010-11, 104 Biology students completed a laboratory research thesis under the auspices and guidance of one of the

biology faculty members. Of those who completed a thesis, at least 49 are known to have gone on to graduate school or professional training after graduating.

b) Admission Requirements

Secondary school diploma with six Grade 12 U/M or OAC courses, including the following: Grade 12 U courses in: English, Chemistry (SCH4U), Biology (SBI4U) and Advanced Functions and Introductory Calculus (MCB4U) with a minimum of 60 percent or higher in each of these courses.

In 2010-2011, the admission average was 79%. This is a 4% increase over the six years since the program was initiated in 2005. Concurrently, the percentage of students who entered the program with an average over 80 % increased from 19% in 2005 to over 40% in 2010.

c) Enrolment, Retention and Graduation Data

The Biology Program has grown each year due to increasing demand for the program. There is a slightly higher enrolment of female students (355 female and 252 male in 2011). The number of students with a full course load has remained fairly constant while the number of students with a part time course load has increased significantly over the same time period. The Department is currently running at capacity for space and enrolment numbers need to be leveled off. The introduction of the new program in Biomedical Sciences in fall 2013 has decreased the interest in the regular Biology Program for this coming year.

First year headcount (University Planning Office data)	F2005 103	F2009 142
	F2006 136	F2010 163
	F2007 166	F2011 212
	F2008 157	F2012 208
Total headcount enrolment (University Planning Office data)	F2005 103	F2009 495
	F2006 232	F2010 529
	F2007 349	F2011 607
	F2008 467	F2012 645

The overall academic standing of students in the program was lower than the average at Ryerson with only approximately 50% achieving clear standing after one year in the program (Table 1).

Table 1. Percentage of students with a clear standing after one year in program

Program			**Year**				
	2005-06	**2006-07**	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**
Ryerson	64.2	66.9	66.8	74.7	76.1		
Engineering Architecture & Science	53.0	59.7	56.5	63.9	67.2		
Biology	46.3	54.3	50.0	52.1	64.8	54.7	52.4

Table 2. Percentage of students retained in program after 1 year in program (% retention)

Program	**2005/06**	**2006/07**	**2007/08**	**2008/09**	**2009/10**	**2010/11**	**2011/12**
Ryerson	81.04	81.34	82.09	79.96	80.98	82.3	82.1
Engineering Architecture & Science	75.63	77.40	74.72	73.37	74.20	-	-
Science						73.5	72.0
Biology	76.84	75.00	84.87	65.74	70.00	69.7	76.0

Table 3. Percentage of students retained in program after 2 years in program (% retention)

Program	**2005/06**	**2006/07**	**2007/08**	**2008/09**	**2009/10**	**2010/11**
Ryerson	70.22	74.76	75.31	72.86	75.9	74.3

Engineering Architecture & Science	62.55	69.19	65.54	60.32	-	-
Science					66.9	66.3
Biology	54.74	66.67	66.39	62.96	67.3	66.4

Table 4. Percentage of students in program after 3 years in program (% retention)

Program	**2005/06**	**2006/07**	**2007/08**	**2008/09**	**2009/10**
Ryerson	65.87	71.28	70.27	70.4	69.9
Engineering Architecture & Science	59.10	64.82	59.46	-	-
Science				56.6	58.3
Biology	47.37	54.63	54.62	58.3	60.0

d) Additional Program Feedback

The Biology Program Advisory Committee felt that the current curriculum was strong and provided "solid and comprehensive academic teaching in the areas of biology." They also stated that recent changes in the curriculum to include a basic course in each of the nine core areas "is a step in the right direction." They indicated that this was "positive initiative to move the program towards the goal of developing graduates with more globally and societally relevant skill sets." Additionally it was felt that "opportunities to develop specialization in third and fourth years and the focus on practical, technical and communication skills will position graduates to be successful in industry or further study."

On the other hand, several of the board members felt that:

- the curriculum in the environmental area could be expanded
- science students still need more instruction and practice at their soft skills within the science context including resume and cover letter writing, presentations on career paths, and networking skills and employment type situations
- curriculum development could include intradisciplinary courses in business law, scientific policy, programming and geographical information systems to name a few
- infrastructure is important for further growth of the program; specifically, laboratory space
- the introduction of part time studies in the sciences would create "an unique opportunity for growth
- the Department's commitment to cooperative education might be further promoted
- the Department should do more to maintain contact with alumni from the program

7. RESOURCES

The Biology Program is housed within the Department of Chemistry and Biology. The Department of Chemistry and Biology has one Chair, one Associate Chair, two program directors and two faculty co-op advisors. The First Year Common Science Office also has a Program Director that oversees all the first year students in all of the science programs. The departmental office is staffed by an Administrative Coordinator, and two Departmental Assistants. The Biology academic laboratories are managed by three biological technologists**.**

In 2005 there were 19 faculty members in the Department of Chemistry and Biology; currently there are 26. Although there have been 10 hires over the last 7 years, there has also been 1 retirement, 1 resignation and 1 faculty member assignment to university level administration. Since 2005, the number of biology students has increased from 103 to 645, dramatically increasing the ratio of students to faculty. All but one faculty member has additional student supervisory responsibilities with the School of Graduate Studies.

Most of the teaching assistants and graduate assistants are students from the graduate programs in Molecular Science and Environmental Applied Science and Management (EASM). 58 GA positions were filled in 2012-2013 along with 15 markers.

Additional laboratory space requirements for new courses such as Evolution, and Botany together with the additional lab space required for the increase in the first and second year courses have over-extended the capacity of the lab rooms. The Biology Program finds itself in a cramped location and with significant logistical challenges for laboratory delivery. Although the recent announcement of a new Science building

as the University's top priority for new capital construction projects is welcome news, it will be years before the dream becomes a reality.

8. STRENGTHS, WEAKNESSES AND OPPORTUNITIES

a) Strengths

Because the Biology Program at Ryerson was developed from a well-established interdisciplinary program (Applied Chemistry and Biology), it began with and has maintained a strong curricular structure and a dedicated teaching complement.

- The common first year gives all the students a strong basis in the required fundamental fields of science and ensures all the students have same level of knowledge to enter second year.
- More specialized courses in the subsequent years deliver a good foundation in the eight of the basic biological areas; microbiology, cell biology, genetics, zoology, botany, molecular biology, ecology, evolution and biochemistry. In 3rd and 4th year the students may opt to further specialize in a biological area or increase their breadth of knowledge by choosing appropriate electives.
- Changes to the curriculum have been implemented over the last several years.
- Three options are available to students after 2nd year: Bioinformatics and Computational Biology, Biophysics, and Environmental Biology.
- A strength of the Biology Department lies in its teaching knowledge breadth, depth and enthusiasm.
- Several faculty within the Department have a focus on education and learning pedagogy.
- Currency in scientific education helps all the faculty participate in new teaching models and learning techniques.
- Keeping reasonable student numbers in the classroom helps to increase student participation in the learning environment. Even with the large increase in student numbers the largest sections of first year classes is usually 300 or less. Courses with more than these numbers are divided into multiple sections to maintain a lower student to instructor ratio in the classroom although overall student to professor contact ratio throughout the whole program is quite high.
- The curriculum contains a large percentage of courses with lab components. This applied experience helps to prepare students for graduate programs or careers in biological fields directly after graduation.
- The co-op option increases the hands-on experience for those students who choose the option.
- Many professors teach courses at several different levels within the program permitting the professors and students to develop relationships that is very useful for allowing students to be comfortable enough to ask questions in and outside of class and for professors to be able to identify prospective graduate students.

b) Weaknesses

Although the development of the Biology Program from an existing interdisciplinary science provided a strong curricular structure and a dedicating teaching complement, it also required a substantial increase in the number and variety of biology courses offered. Several areas still needing to be addressed are as follows:

- The number of students in the common first year has more than doubled in biology but in some cases individual courses have seen considerable increases (e.g.90 students in BLG143 in 2005 to over 600 in fall 2013). The space in the Department has not increased accordingly and it is therefore becoming increasing difficult to maintain the quality of labs the Department has traditionally offered.
- Further curriculum constraints have been felt in the electives and option packages. Although the professional electives package has grown over the last 7 years and currently includes 19 biology electives and 3 biochemistry electives, the lack of teaching faculty and funds associated with hiring temporary lecturers limits the ability to offer more than 7 to 8 electives in a given year.
- The diversity of the electives is also restrictive as they have been developed as faculty expertise has come on board in the Department and do not necessarily cover all facets of biological knowledge.
- The popularity of elective courses in other disciplines (such as Psychology) have reduced the numbers of Biology students taking professional electives in their own discipline.

- The two options in Bioinformatics and Computational Biology, and Biophysics, developed when the Biology Program was first implemented, have not been popular. Such transdisciplinary options need to have more exposure and be more accessible from a timetabling and scheduling perspective; however, the low student numbers work against this.
- The increase in class size and the limitations in space constrict the ability to provide individual and selective learning strategies for every student.
- The advancement of technology that allows instructor to provide the learning material in many different formats can sometimes be administratively heavy due to technological difficulties or software interfaces requiring extensive time and effort for proficiency.
- The introduction of the environmental biology option has increased the interest in providing field work opportunities. Because Ryerson is located in the heart of the city, there are limitations when trying to provide greenhouse or field work opportunities for students.
- With the increasing number of sections of biology labs, we need to be able to run 3 labs per day. This is hard to accomplish when liberals bands are imposed during prime lab time.

c) Opportunities

- Admission numbers into the Biology Program at Ryerson has increased each year helping us to capitalize on our cohesive and comprehensive curriculum in biology. The stand-alone Biology Program has increased the visibility of science at Ryerson and the recent establishment of the Biomedical Science Program in 2013 has also positively affected Ryerson's reputation as a science school.
- The increase in the quality of student applicants will allow us in the near future to explore other program options such as interdisciplinary programs between science and business, journalism, or social media.

d) Obstacles and Challenges

- The most obvious obstacles are scheduling and timetabling, space and equipment, the requirements to run multiple sections of labs, and the lack of biology electives courses and faculty.
- The challenge is to maintain the integrity of our program and continue to strive for changes that will support the learning and teaching environment in the Department in the face of cutbacks and limitations in infrastructure.

9. DEVELOPMENTAL PLAN

The following developmental plan will focus on four main areas that can be addressed at the program level: a) curriculum development and delivery, b) student satisfaction, c) the learning and teaching environment and d) research growth.

Curriculum Development and Delivery

- The department will strive to continue to hire in our strategic areas, environmental biology, and cell and molecular biology.
- More higher level electives courses will be offered by the department.
- The department will promote the three Options (Bioinformatics and Computational Biology, Biophysics, and Environmental Biology) as viable alternative career directions and provide support to students that choose these non-conventional options. We will continue to track students to assess the impact of recent hires which will enhance the options in Bioinformatics and Computational Biology, and Environmental Biology.
- The department will encourage the Biology curriculum committee to explore a biochemistry option with the biochemistry faculty.
- The department will encourage the curriculum committees of the Chemistry and Biology programs to jointly propose an option in Biological Chemistry.
- The department will support the initiatives of faculty to enhance their course material with on-line modules, in class technology (such as clickers), alternatives modes of delivery (such as flipped and hybrid classrooms).

Student Satisfaction
- The department will continue to support the initiatives of faculty, students and alumni which will increase the involvement of students in activities that enhance their education and satisfaction within the program.

Learning and Teaching Environment
- The program will continue to support innovation and substance in the classroom and strive to create productive learning environments both inside and outside of the classroom. More opportunity to learn through workshops, shadowing experiences, and outdoor classrooms would benefit the engagement of the student and the retention of the material.
- The department will continue to look for other space saving ideas while trying to maintain the experiential education delivered currently through laboratory exercises.

Research Growth
- A well rounded and robust Biology Program requires researchers whose research programs advance not only graduate education in the Department but also undergraduate involvement in the research environment. Many undergrads are keen to experience life in a research lab and gain valuable skills that they can include on their resumes and use in their future careers. The Department and the program will continue to strive to support the faculty engaged in biological science research so that more students have the opportunity to use their knowledge in real life research and the department will continue to support the student mentoring student lab experience program to help integrate more undergraduates into research labs.
- The department will seek additional support for faculty so that they can increase their ability to take on undergraduate students in their labs as volunteers, fourth year thesis students (BLG 040) and graduate students.

10. PEER REVIEW REPORT

i) REVIEWERS

Dr. Roberta R. Fulthorpe, Department of Physical and Environmental Sciences, University of Toronto Scarborough (Chair of Peer Review Team)
Dr. Paula Wilson, Department of Biology, York University
Dr. James Smith, Department of Electrical and Computer Engineering, Ryerson University

ii) OUTLINE OF THE VISIT (June 2, 2014)

- introductory meetings with administrators and a tour of the research and teaching laboratory facilities
- meeting with administrative support staff and technologists
- meeting with two graduate students (graduated from the undergraduate program) and two recent graduates of the program
- meeting with twelve faculty members
- further discussion when joined by Chris Evans (Vice Provost Academic), Imogen Coe (Dean, Faculty of Science) and Darrick Heyd (Associate Dean, Faculty of Science)

Note that we were asked to assess the program as it existed between Fall 2005 and the end of the 2011-2012 academic year. Major curricular changes have occurred in the two years since; therefore, this report may be, even before it is written, obsolete, as we are commenting to some extent on a program that no longer exists.

iii) EVALUATION CRITERIA

a) Objectives

Evidence in the written documentation and from the site visit indicates that the program is well aligned with the mission and academic plans of the university. The program combines theoretical and applied knowledge in the biological sciences together with research skills and opportunities. It provides students with the foundation for further study in the field, careers in the biotechnology and life science sector, and various health-related professions.

The program is providing a modern education in biology which includes the development of professional knowledge and skills, critical enquiry and ethical standards. It is clear that those engaged in teaching students and those supporting the program in other ways are engaged, committed and student-focused. The curriculum provides the breadth to explore other ways of knowing and the broader issues confronting modern society.

In general the program requirements and learning outcomes are clear, appropriate and in alignment with undergraduate degree level expectations. Mapping to courses suggests that the outcomes are being addressed throughout the curriculum. The Self Study and visit provided clear evidence that the program is responsive to changes in the discipline and its students.

The articulation of program goals and their alignment with assessment, outcomes and learning objectives is an iterative process. One area to consider revisiting for better alignment would be the mapping of Program Goals to Knowledge/skills/values and Learning Outcomes, with special attention to mapping for goals 6 and 7.

b) Program Identity

The Biology Program employs a standard lecture-based classroom plus experiential laboratory approach to program delivery. The Biology Program is also taking advantage of the student-centric "Zone Learning", successfully pioneered in the Digital Media Zone, to develop a "Biology Zone" at the nearby MaRS centre. Initiatives with direct impact on pedagogical goals such as "sequential team teaching" in BLG 143 complement important indirect activities like faculty and staff social retreats to give the impression of a contemporary, adaptable, and multi-faceted biology program.

The Biology Program has some potential weaknesses, as perceived by the reviewers. First is the insufficient number of rooms for lab activities, as attested to the reviewers by students and staff, and described in the program's self-assessment document. This combines with an apparently growing number of students and a limited number of staff resulting in students having to conduct labs late in the evening. In addition, while it is clear that the first two years include intensive practical experience, it is not clear whether the fourth year courses include significant laboratory opportunities.

While the Environmental Biology option appears to be popular, the Biophysics and Bioinformatics and Computational Biology options are under-subscribed. In particular the trend seen in Bioinformatics and Computational Biology could be due to the same external forces that are driving down Computer Science enrolments at many universities. Regardless, internally, the Computer Science (CPS 118) and Mathematics (MTH 131, 231 and 380) could be tuned to make this important option better understood and more appealing. The switch from a C-based CPS 118 course to Matlab is a step in the right direction towards the programming languages commonly used professionally in biology. Finally, the Program's self-assessment document highlights a concern with respect to approximately 50% of students having a clear standing the end of first year. This is a concern to the reviewers, as well, and it is unclear what roles low entry grades or program delivery in first year play in this matter.

Admission requirements are appropriately aligned with the learning outcomes and are in line with requirements for similar programs across the province.

c) Curriculum

The Ryerson program does a good job providing the foundational sciences (basic biology, chemistry, math, physics and computer science) in the first year. It builds on this in second year with fundamental biology courses including cell biology, genetics, botany, zoology microbiology, ecology, organic chemistry and biochemistry and the statistics important to the experimental sciences. While the program used to lack the ecology, evolution and zoology of comparator institutions these seem to have been partially remedied. In the third and four years students do study evolution, but also molecular biology, biochemistry. So the Ryerson program is meeting its basic requirements.

To deepen their studies, students choose from a variety of "professional or professional related courses" (P/PR). This is where the curriculum will benefit from continuous review and improvement. The scope for students to specialize in particular areas of biology is limited. Options in Biophysics and Informatics and Computational Biology are being offered, and according to the Self Study, an option in Environmental Biology has been added. While nineteen other offerings in Biology are listed under the P/PR category in the appendices given to the review team, the reality is the students do not have much to choose from. More should be done to make more of these courses available to students.

Overall the offerings are strong in microbiology, biochemistry and the molecular sciences, but somewhat weak in overall organismal biology and ecosystem level courses. As Ryerson cannot be expected to offer specialization in all areas of biology, they are doing an admirable job of trying to find options for the students that can reflect faculty strengths. This needs to be an ongoing process, a fact clearly recognized by the faculty as demonstrated by the curriculum improvements highlighted in the Self Study. It should be noted that the Biology group has limited credit space due to the liberal arts requirements of Ryerson, that both limit science course content and impinge greatly on the scheduling of lab based courses.

Ryerson Biology has the lowest science content of all comparator programs listed (61% science courses). Students identify the lack of diversity of fields in the program as a weakness.

With respect to the content of particular courses, the reviewer noted when talking with graduates that some content may lag current industry standards. In particular, Python appears not be taught within the Bioinformatics and Computational Biology option courses, and yet Python and Perl are the standard programming tools for Bioinformaticians. Collaboration with Ryerson's Biomedical Engineering program, which currently suffers from a lack of option diversity in its final program year, could improve the viability of course offerings for Bioinformatics and Computational Biology and/or Biophysics.

Our meeting with students revealed dissatisfaction with the general Orientation course, which is currently used to provide information on lab health and safety (WHMIS) certificates, coop options and the available fields. Students refer to it as being "monotonous" and suggest a course that focuses on basic technical proficiencies important to both research and the work force (word, excel, graphics training) and gives some exposure to potential employers or at least their areas. Students felt the second year statistics course was too general and they had difficulty putting it into the context of their discipline. Based on student comments, the program might benefit from integrating more enquiry into the laboratories.

The Biology program relies on standard lectures with lots of visual content, class discussions and a great deal of laboratory exercises and demonstrations in the early years. The latter have always been a key part of Biology instruction, but their survival in current form is challenged in the face of growing class enrolments and limited space and resources. The curriculum does not seem to include any field courses or field components. These are often as effective as laboratories in dramatically increasing students' comprehension of course materials. The Dean's office appears poised to explore non-standard alternatives to laboratory classrooms, in particular computer simulations.

d) Teaching and Assessment

A review of the material provided indicates that the program is using all of the assessment tools typical for Biology programs, and we are satisfied that basic learning outcomes are being assessed within the program. Information in the appendices of the self study suggests that senior courses generally lack assessments such as critiques, oral presentations and essays. These types of assessments are particularly useful in assessing learning outcomes/goals that involve science literacy, communication skills and critical thinking and analysis (Program Goals 6 and 7); the department may want to consider increasing those types of assessments, as is possible within the limitations of teaching resources and class size, to better align assessment with program outcomes.

e) Resources

There are an insufficient number of rooms for lab activities, as attested to the reviewers by students and staff, and described in the program's self-assessment document. This combines with an apparently growing number of students and a limited number of staff resulting in students having to conduct labs late in the evening. There are far too few microscopes and fume-hoods, and some rooms are in real need of updating and renovation. Collaboration and coordination with other programs such as Chemical Engineering, leveraging future resource allocation to programs such as Biomedical Engineering or accessing external partner facilities such as those at St. Michael's Hospital could help alleviate some of these concerns.

The reviewers feel that the Biology Program is making do with the financial resources allocated to it and shares the concern outlined in the Self Study that continued use of and "absolute reliance" on one-time-only hiring is not an appropriate long-term human resource staffing strategy.

The Library resources appear to be sufficient and inter-library loan services permit students to obtain literature from other schools, particularly medical schools with biology-related materials. Furthermore the Library's electronic resources, including web-based search engine and an e-book collection are competitive vis-à-vis other Canadian universities.

Computing resources are shared with other Ryerson programs. As is commonplace elsewhere, Ryerson's Campus Computing Services provides sufficient widespread and robust "bring your own device" support for students through wireless services, virtual applications, web access to teaching resources (Blackboard) that there is little need for dedicated computer labs.

Other campus resources include the student-focused Writing Centre and Access Centre for academic accommodations. In addition, faculty are supported by resources such as the Learning and Teaching Office and an Academic Integrity Office.

f) Quality Indicators

Neither the Ministry of Training, Colleges and University nor the Self Study provide data on graduation or employment rates specific to Ryerson's Biology program (or even the Chemistry and Biology Department). In the Self Study the lack of data was attributed to the fact that the first graduates would have been in 2009, and data only available from 2006.

The faculty members in the Department are well qualified and for the most part research active. The research output of faculty is variable but includes a significant number of individuals who are running highly productive research operations and attracting diverse sources of funding. All but one faculty member are associated with the School of Graduate Studies. It is encouraging that many of these high output individuals are found amongst the Assistant Professor pool. One concern is the demographic structure of the Department – there appears not to be enough Assistant Professors to support the planned increase in program enrolments.

The program "currently" requires the support of Limited Term Faculty and Sessional Instructors in order to run efficiently. Student to faculty ratios are increasing. It is our understanding that Limited Term Faculty, while highly valued for their teaching support, cannot be made permanent. This would seem to be a waste of the investment of training and preparation time for both the permanent faculty and the LTF's. Other institutions have the option of hiring full time Lecturers, members of faculty who are hired primarily for teaching who can be granted tenure and rise up promotional ranks. At UTSC, in both Physical and Environmental Sciences and in the Biology Department, lecturers are critical members of the teaching staff without whom our programs would be seriously cut back. It is curious these kinds of positions are not used at Ryerson, and we encourage the institution to explore this option.

Many concerns surrounding the statistics that reveal student quality appear to have been resolved by the recent introduction of a Biomedical option. The program has also seen an overall increase in the average GPA (up from 76 to 80%). Retention has improved since retakes of first year courses has been allowed.

There is a clear concern that the enrolments in Biomedical will overshadow those in Biology. This reveals a need to review the current Biology options carefully with a view to improving course offerings, content and marketing.

g) Quality Enhancement

Innovative and non-traditional approaches are being conducted within the program. Dean Coe pointed out that there is an explicit focus on improving the quality of the program while deliberately not growing the program. With this in mind, the Biology Program is taking advantage of the student-centric "Zone Learning", successfully pioneered in the Digital Media Zone, to develop a "Biology Zone" at the nearby MaRS centre.

The continued emphasis on practical skill development in laboratory settings has a positive impact on learning. The conversion of CPS 118 from a C-programming oriented course to one based on Matlab leads in the correct direction. The initiative to conduct makeup exams on Mondays at 7am, while unconventional, appears to have countered the recent growth in missed midterm examinations seen in other departments at Ryerson. Continuing education (Chang School) resources appear to be used effectively, permitting students to take core and elective classes outside of the standard schedule, thereby using available resources efficiently.

iv) SUMMARY AND RECOMMENDATIONS

Overall the Ryerson Program in Biology is doing an admirable job of training general Biologists. It provides students the background for moving on to more specialized training in biology related discipline. It produces generally high quality graduates with good hands-on skills. The Biology faculty are of high quality and the program meets quality expectations set by Ryerson. We expect the program will need to continually evolve and adapt to accelerations in the sciences over the years to come, but there is strong evidence the Faculty are collegial and already engaging in a process of adaptive change. We recommendation the University and Department keep the following recommendations in mind as they proceed.

- The organization of the curriculum with essentially all senior disciplinary courses referred to as "professional courses", and with an unfathomable course numbering system, is atypical for university curricula.
- Needing immediate attention is planning for handling increasing enrolments, in terms of full time faculty, laboratory and classroom space, and support staff. Possible options regarding limited lab resources include obtaining additional facilities and staff, carefully controlling and limiting enrolments, or revisiting current lab space and delivery with an eye to optimizing efficiency through creativity and innovation, changes to course scheduling, etc. While administrators always advocate replacing hands on activity with online simulations, we feel that hands on is always best.
- Some of the existing lab space seemed to be in great need of renovation and updating.
- In spite of the restrictive lab space and the emphasis the program places on hands-on practical experience, it seemed to us there were few or no senior lab courses. There should be sufficient lab offerings in fourth year courses to provide all students with the opportunity to have a senior laboratory opportunity.
- As the program grows, pressure will increase to move away from some of the aspects of the program students seemed to like best and the department feels distinguishes it from local competitors such as lots of hands-on experience, small classes, and the opportunity to develop personal relationships with professors. The department will have to seriously consider the implications of such changes.
- We recommend the program continue to revisit fourth year course assessments, to ensure assessments are constructively aligned with program learning goals – i.e. that they are assessing the key skills/knowledge they want their graduates to have.

11. PROGRAM RESPONSE TO PEER REVIEW REPORT

a) Introduction

Overall, the PRT found the Biology Program to uphold the institution's mission statement by providing applied knowledge and research with a balance between theory and application. They found the curriculum

to provide a solid foundation in the biological sciences and that the program satisfied all the criteria for university level education. However, the PRT did note that the mapping of program goals 6 and 7 to learning outcomes and knowledge/skills and values were vague and the means of assessment difficult. These issues will be re-visited by the Biology Curriculum Committee and the language changed to better express the intention of these goals.

The PRT noted that the curriculum was strong and well-balanced. The current curriculum was achieved through well-planned progressive changes over the last several years. We will continue to monitor our curriculum to ensure its appropriateness to current societal need and continue to uphold the necessary teaching and delivery methods to foster high quality education in biology. The PRT, however, did find that the infrastructure of our department was being stretched and that the program was weak in terms of senior level lab course offerings to our students. Given the limited space available and continued enrolment growth in Biomedical Sciences, there is no current prospect for addressing either of these concerns.

The PRT also commented on the low enrolment in two of the options, Biophysics, and Bioinformatics and Computational Biology. This results, in part, from the difficulty students in these options face in accessing courses outside the Department: these courses often create scheduling conflicts and may not even be offered by the other department. We continue each year to improve the options by working with the other departments to promote student access, but ultimately we do not have control over the availability of these required courses. As suggested by the PRT, programming tools such as Python and Perl are not taught in the current courses of the Bioinformatics and Computational Biology option and should be. The recent faculty hire in spatial ecology/big data may be able to help us launch a course that addresses this issue.

The Program Review determined that approximately 50% of Biology students do not have Clear standing at the end of their first year and this was seen as a concern by the PRT. With the introduction of the Biomedical Sciences Program, and reduction of Biology program admissions by almost 25%, the admission averages have significantly risen over the last 2 years. Attracting better students should help us to increase our retention. Unverified data from last year shows that the percentage of students with Clear standing at the end of first year had risen to almost 70%. This result may also be due in part to a change last year in the Ryerson G.P.A. policy that lowered the requirement for Clear standing to a cGPA of 1.67 from 2.00.

b) Details

While the PRT felt that the program delivered a good basic education in the foundational biological sciences, they also noted that upper level biology course offerings in the elective package were very limited and lacked laboratory components. We are aware of this weakness in the curriculum but, due to space and financial resource limitations, it is not currently possible to offer laboratory-based upper year electives to our students. The addition of a Faculty of Science building at some point in the future may help to eliminate this shortcoming. Additionally, the PRT suggested that the program introduce field study labs, a suggestion that we also feel would be exciting for our students, especially those in the environmental biology option. Although more resources will be necessary to implement such a project, it should be achievable.

Furthermore, the PRT noted that liberal bands negatively impacted on the delivery of Biology labs. Although the Department is well aware of this fact, it is a university issue and beyond the scope of this exercise.

The PRT noted the challenge we face in trying to retain labs as curricular components with the growing number of admissions, especially the substantial enrolment increases associated with the Biomedical Sciences Program. Some curricular changes proposed to go into effect next year will reduce the delivery requirements of some lab courses. This will help to reduce the number of lab sections required and provide increased scheduling flexibility. Although it allows us to continue to deliver all of the fundamental lab skills as part of our curriculum, it also removes required lab hours from the Biology Program curriculum. This is a concern, shared by the PRT.

Overall, we concur with the laboratory space limitation concerns expressed by the PRT and have lobbied for more and better facilities for our students. Although neither the PRT nor the Department has the power to improve or acquire space, we implore the university to help us resolve this serious issue in curriculum delivery.

The other issue raised by the PRT is the number of faculty available to teach the growing number of students. The PRT notes the growth in both the faculty and student numbers although the rate of increase in student numbers is far higher. With additional students coming from other programs first year biology course numbers are over 600. The delivery of the program has gone from classrooms to theatre halls. The unique teaching and learning experience that students received in this program are being seriously eroded. Although we attempt to retain a friendly, welcoming environment, our program can no longer boast of small classroom experiences as a point of differentiation with local competitors with large science programs. More faculty, staff and technical support is one way to ensure that the educational experience of the students remains commendable and allows them to succeed and pursue their careers post-graduation.

The PRT's meeting with current senior Biology students suggested that they were disinterested in the Orientation course. However, we continue to believe that the course is a valuable asset to new students. Due to student dissatisfaction, the course was recently re-vamped (2013-2014) so it can be delivered almost exclusively on-line. The new format has been well received by the newer students.

c) Summary

The Department agrees that there should be a rational course numbering scheme implemented, but it is outside the context of this study.

- The PRT would like to see more planning in regard to lab and classroom space requirements, and the faculty and staff complement needed for the growing number of students in the program. The Department agrees. Planning at the local level is frustrated by limited options and a notable lack of institutional clarity in how additional resources are allocated for growing programs. Ryerson's current inability to deliver promised new laboratory teaching space for Biomedical Sciences has seriously impacted students in the Biology program. These problems can only be addressed at the institutional level.

- The PRT noted that renovations were in order for some of the older lab spaces. A number of lab spaces have not been renovated since originally built. The Department agrees that running up-to-date experiments in antiquated facilities is not ideal for high quality student training. The construction of a new Faculty of Science building in the future will eventually resolve this issue. In the meantime, the high costs of renovating a building not expected to house Science for more than 8-10 years undermines institutional willingness to address this problem.

- The PRT noted that upper year courses do not contain any lab experience component, which they felt would increase the student learning aspect and train them for additional career opportunities. We agree with this assessment but currently there is no space in the Department available for additional upper year course lab components. All available space is needed to run required lower level courses.

- The PRT cautioned that as we grow away from the small intimate classes and take on larger and a more comprehensive program, we should consider the implications this will have on our reputation, both as a Program and for the Department at large. We are excited by the growth in the enrolment in Biology but we also worry that our standards for teaching and learning are being impacted. We would like to be assured that renewed support for this popular program will be forthcoming in terms of spaces, staff and teaching capacity as we can continue to graduate sought after biologists.

- The last recommendation of the PRT was to ensure we re-visit our fourth year student assessments ensure they are aligned with our program goals. The program is very grateful for this comment and we will certainly work on this issue. With the strong foundational courses in our program being well

established now, we can turn our focus to the upper year elective biology courses to improve implementation and assessment of skills the students will need post-graduation.

12. DEAN'S RESPONSE (Dr. I. Coe)

a) Overall state of the program based on the data and analysis contained in the self-study

The time frame of the current PPR (2005-2012) covers a time of enormous change and growth in the sciences at Ryerson, including (but not limited to the Biology program) and culminates in the formation of the new Faculty of Science in 2012. This is the first review for the Biology program, which is one of the most popular programs within the sciences. The faculty and staff involved in the program are continually monitoring outcomes in order to improve and further develop the program to meet increasing demands and to deal with the enormous increase in new knowledge regarding the life sciences. Overall, the program is rigorous, has a solid curricular structure, experiences strong enrolment pressure and a gradually increasing quality of student coming into the program.

b) Plans and recommendations proposed in the self-study report

The self-study is an extremely comprehensive and thorough document that clearly describes the program and highlights a number of strengths, weaknesses, opportunities and threats. The Department is well aware of areas that need attention while continuing to build on established strengths. For the most part, the plans and recommendations proposed in the self-study are echoed by the reviewers and the departmental response is appropriate.

c) Recommendations of the PRT and the response by Department

i) *Rational course numbering*

Rational course numbering is a long-standing recommendation across the university. In consultation with the Department (and others within the Faculty) we will investigate options so as to provide more clarity for students in terms of planning their programming.

ii) *Planning for growing enrolments*

Since I became Dean in 2012, improved enrolment management has been an area of priority. There are several approaches that I advocate and which are already in development a) enrolment management through reduced intake and enhanced retention, b) curricular innovation allowing strategic and directed use of resources and c) transparent and empowered budgeting

Enrolment management – in consultation with the Chair of the Department, the first year intakes into the life science will be reduced with a concomitant increased focus on improved retention to off-set a potential overall drop in revenues to the program as a consequence of decreased intake. This modification of targets represents a first step towards rational enrolment management, and this is possible because of the opportunity presented by strong enrolment pressures.

Innovation in pedagogy –Supporting and promoting innovation in the content and delivery of laboratory courses, while costly and time-intensive up front, can pay off later in both improved learning outcomes, better retention rates and more effective use of resources. This is the approach I encourage, in full recognition that it may not lead to cost savings overall – but it may certainly lead to better use of the overall budget with, most importantly, improved outcomes.

Being proactive about the challenges ahead, Department has already made some adjustments in programming to split labs from lectures and create a stand-alone course (BCH880). There are both pedagogical and resource reasons for doing this. An extension of this approach is the development of a "mega-lab" course, which, if well designed, has solid pedagogical value and which can mimic more closely the nature of scientific inquiry. This approach also allows technical staff and resources to be used in a more directed and strategic manner and reduces the sense that both are being spread ever more and more thinly. There is also some evidence that students have a higher level of satisfaction and improved learning through these approaches. I encourage the program to consider the approach and will support initiatives in this direction as required/requested.

Enhanced clarity in revenues and budgets – to assist Departments planning for their programs, all Chairs in the Faculty of Science are now provided with detailed budgets at the beginning of every financial year, which outline income/revenues into dedicated cost centres associated with different activities - along with anticipated costs (based on the previous year's data). This enhanced and detailed budgeting process provides increased clarity as to the actual costs of all aspects of program and helps to identify to both the Chair and the Dean, the specific areas that require remediation, additional investment or attention. Chairs now have increased clarity regarding their resources and more autonomy than in the past in terms of how those funds are to be used in support of their programming. One benefit to the program of growth in the life sciences is the acquisition of new faculty positions and the Department has gained 2 new biology positions as well as two new positions as a result of the growth in the Biomedical Sciences program. These four new hires represent a significant injection of expertise, enthusiasm and, in one case, experience in internationally recognized research, which will provide a strong positive boost to the program in many ways.

iii) *Existing lab space – some of it seemed to be in great need of renovation and updating*
Since I arrived as Dean in 2012, I have been advocating vigorously for new and improved space for science and this is recognized as a top priority for the institution. Ryerson University recently submitted a proposal for a Science and Innovation Zone in response to the provincial call for Major Capacity Expansion in the Post-Secondary Sector (PSE). This provides some hope for longer term but in the short term, there are no obvious or easy solutions. Curricular innovation may allow for ingenious solutions for making more use of current space – as may changes to the currently assigned shifts of technical support staff. However, there is no single or simple answer to the space crisis and it will be an on-going challenge for all the laboratory sciences that are based in Kerr Hall. We will continue to regularly assess space needs and space use to ensure that it is being used as efficiently as possible and to look for short-term solutions through partnerships with other programs or for under-used space in other areas outside of science.

iv) *Few or no senior lab courses*
The research project honours thesis course provides a good number of students with high quality opportunities in research labs under the guidance of highly engaged and supportive faculty members. In addition, many undergraduate students are involved in volunteer activities within research labs. While these types of more advanced laboratory experiential opportunities do not replace formal, traditional laboratory courses, they do provide upper level students with high quality laboratory experiences for the most part.

Addition of upper level courses may be possible as lower level lab programming is addressed. To address both the limited options in Environmental Biology (as mentioned by the reviewers) and provide hands-on experience in a wide variety of field type settings, I strongly encourage the Department to join the Ontario University Program http://www.oupfb.ca/. This program will provide Ryerson students with access to a very wide range of field biology/ecology courses offered by other universities in Ontario. The Dean's office can facilitate interactions and development of offerings, particularly given my direct experience with the OUPFB within the context of an active and diverse biology program.

v) *As program grows pressure will increase to move away from some of the aspects of the program students seemed to like best and the department feels distinguishes it from local competitors: lots of hands-on experience, small classes, and the opportunity to develop personal relationships with professors. The department will have to seriously consider the implications of such changes.*

This is a valid concern for any program undergoing the rapid transformation that the life science programming has experienced at Ryerson University. The program has managed to increase its faculty complement by an additional four new hires in the last 2 years, representing diversity in disciplinary areas, molecular and cellular biology, microbiology, to community ecology and eco-toxicology. Enrolment targets for first year have been held constant or decreased, with the aim of increasing retention and improving the quality of the experience for the more senior students. New programming and initiatives are underway to optimize and promote faculty: student interactions and to maintain the close connection between faculty and students. As discussed with all Chairs within the Faculty, I am willing to provide supports for events and initiatives that the program feels will help to maintain, support and promote the community feeling that we

hear is so highly valued by undergraduates. Moreover, efforts to improve enrolment management and increase resources are on-going and will continue.

vi) *The PRT recommends that the program continue to revisit fourth year course assessments, to ensure assessment is constructively aligned with program learning goals – i.e. that they are assessing the key skills/knowledge they want their graduates to have*.
The Department is appropriately addressing this recommendation, as outlined in their response, part of the on-going curriculum review and as a standard part of academic planning going forward.

d) Additional Comments
While not specific recommendations, both the department and the reviewers noted the challenges associated with scheduling "across the liberal bands". One of these issues was the "protection" of the Liberal Bands, in the middle of the day, at peak time when laboratory sections needed to be offered. With small numbers of students (as the program experienced in the early days), it was possible to accommodate this "protected" status. It is no longer possible and this challenge to the effective delivery of the Biology program was noted as a major weakness, in the self-study, by the external reviewers, and in the response from the Department to the reviewers.

Consequently, in Fall 2014, positive discussions with the VP-Students and the Manager of University Scheduling about the pressing needs of science programming and the reality of how science students actually access liberal studies courses resulted in an agreement that science could request and be accommodated in the scheduling of lab sections as required across this time slot. Program requirements for science students at Ryerson exceed requirements of our comparators (noted for the Biology program by the external reviewers and by Medical Physics as part of their self-study in advance of their own PPR). Given that our students tend to take whatever courses they can access towards the end of their program – simply as a means of completion – begs the question of the real value of this programming requirement for science students (especially compared against our competitors). While the principle of enforced breadth within a program through mandatory courses outside the discipline is a noble one, the reality, from my perspective, is that the current approach fails to meet the overall learning goals or mission of either the faculty or the university as a whole. We need to find other ways, perhaps in parallel with the current approach, or with a modified version of the current approach, to achieve the aims of the breadth requirements.

Similarly, the challenges associated with students being able to meet the "professionally related" course requirements were noted in this review and continue to plague many programs in the sciences The institution is well aware, this programmatic structure for our majors needs overhaul or review since it no longer serves the students (at least those in science) well and this will need to be addressed in a larger forum.

Curricular innovation and development continues to be discussed institutionally and, no doubt, new and different approaches may be proposed and adopted. The Faculty of Science is committed to producing well-rounded global citizens who possess a solid and rigorous foundational knowledge in science with an understanding of the way that science permeates every aspect of life and the recognition of the natural and power synergies between the sciences and the arts and humanities.

13. ASC EVALUATION
The Academic Standards Committee assessment of the Periodic Program Review for Biology (Bachelor of Science) indicated that the review provided a well-written, informative evaluation of the program. The ASC also noted the curriculum revisions that have been undertaken since the launch of the program in 2005 to produce high quality, competitive graduates.

The Academic Standards Committee recommends that the program provide a follow-up report on the status of the initiatives outlined in the Developmental Plan. The follow-up should also include (1) an update on discussions regarding a biochemistry option and an option in biological chemistry, (2) updated faculty CVs, (3) a statement on the outcomes of the plan to promote the three Options: Bioinformatics and Computational

Biology, Biophysics, and Environmental Biology, and (4) any update on initiatives that have been started to engage the students and to deliver the curriculum in innovative ways, as outlined in the developmental plan.

Follow-up Report
In keeping with usual practice, the follow-up report which addresses the recommendation stated in the ASC Evaluation Section is to be submitted to the Dean of the Faculty of Science, the Provost and Vice President Academic, and the Vice Provost Academic by the end of June, 2016.

Date of next Periodic Program Review
2022 - 2023

Recommendation

- Having satisfied itself of the merit of this proposal, ASC recommends: *That Senate approve the Periodic Program Review for Biology – Bachelor of Science (BSc)*

B. PERIODIC PROGRAM REVIEW FOR RYERSON THEATRE SCHOOL – BACHELOR OF FINE ARTS (BFA)

1. BASIC INFORMATION

a) Program Description

The Ryerson Theatre School (RTS) offers three Performance programs in Acting, Dance, and Production. Graduates receive a Bachelor of Fine Arts (BFA) degree that is internationally recognized and gives them the option of pursuing further studies at the graduate level, either within Ryerson itself, or at other universities.

RTS' three Performance programs use a conservatory approach that combines intensive practical training within a multidisciplinary liberal arts curriculum. They are trained as artists, thinkers, and entrepreneurs capable of launching their own businesses. The problem solving, critical thinking, research, and communication skills that students develop are essential to success in the current arts and cultural industries and enrich other facets of their lives.

In the four year Performance Acting and Performance Dance programs, students spend part of each day in the studio. Every year brings opportunities to perform in productions of new and established works. The goal is to give performers the capacity to bring a rich mixture of skills to bear in a multidisciplinary environment. Graduates of the program are ready for immediate entry into a wide range of performance related careers.

The four year Performance Production program focuses on the technical production side of the performing arts and entertainment industries including design, construction, technical operation, production management, arts administration, publicity, promotion, and sales. As an RTS student progresses through the program, they assume positions of increasing responsibility for all elements of RTS dance and theatre productions. This brings them into close working contact with the professional directors, designers and choreographers engaged by the School. Production students also network with their Acting and Dance peers in shows and within common courses, forming creative partnerships that can continue well beyond graduation.

b) Program Administration and Faculty

RTS has a nationally and internationally renowned faculty and staff. The creative activity of faculty and staff within the School – as it relates to the training of students in the studio, theatre, or scene and costume shops – is a key measure of teaching performance, but it too is seen as a contribution to the performing arts field. While there is no generally accepted, or accredited, ranking of professional theatre training programs in Canada, there are several features of the RTS program that have contributed to growing recognition of its leadership in the field. These include the fact that the School's experienced team of faculty and staff have

worked together successfully for over a decade; an especially strong record of graduate employment and professional success; and a distinctive program training structure.

The School's administration includes a Chair, Associate Chair, Program Manager, Academic Coordinator, Departmental Assistant, Program Coordinators of Acting (1), Dance (2) and Production (1), Production & Operations Manager, Technical Director, Coordinator of Development, Scene Shop Supervisor, Costume Shop Supervisor, Marketing & Public Relations (appointed student position), and Audience Services/Box Office Manager (appointed student position).

c) Program History

The Ryerson Theatre School was founded in 1971 as an autonomous department within Ryerson University (then Ryerson Polytechnic Institute), but its roots go back to 1950. That year, the School of Radio and Television Arts introduced an acting course which ran until 1970. In the early 1960s, another theatre course was created within the English department.

RTS began when the University absorbed the Canadian College of Dance, a private school originally based in Montreal, as a three-year diploma program. At that point, RTS was one of only two schools in North America offering full-time, professional training in acting and dance. In 1972, a three-year Production diploma was established to provide a training ground for theatre technicians and crafts persons interested in set design and building, costume design and construction, lighting, sound, stage machinery, and stage management. In 1994, the program was upgraded to a four-year degree that would produce graduates capable of managing personnel and resources in live production environments and/or pursuing graduate studies. In 2001, the Production program was approved for a designation change from a Bachelor of Applied Arts (BAA) to a BFA, in order to better represent the nature of the curriculum and the competencies of the program's graduates.

d) Program Goals

The RTS mission is to deliver an interrelated, four-year Bachelor of Fine Arts degree program that combines practical skills development with theoretical, multidisciplinary and interdisciplinary courses. The RTS pedagogical goals focus on developing a versatile performance professional with a strong technical base in dance, acting or production capable of launching and maintaining a career in presentation, performance and/or teaching.

The academic and professional goals of the School's three programs are:

- To provide a multidisciplinary and interdisciplinary education that will enable students to succeed in the performing arts by applying knowledge from such diverse fields as classical and experimental cultural studies, business management and communications, labour law, organizational behaviour, and information technology.
- To complement students' professional training with related academic courses that provide essential historical and theoretical context, as well as liberal arts courses that broaden their intellectual horizons and inspire artistic curiosity.
- To immerse students in a collaborative learning environment, in which the integration of key areas of instruction enriches the artistic endeavour.
- To foster in students a passion for their art, and to help them develop the discipline and teamwork skills needed to work in a project-oriented environment under the pressure of rigid deadlines.
- To enhance students' understanding of the creative process and to foster sensitivity for work requirements and processes, pressures, and expectations of other artists, in order to cultivate effective professional communication and interaction.
- To nurture students' creativity, diversify their performance skills, and provide experience of the rigorous demands of their chosen career, through participation in traditional as well as experimental pieces, conceived and staged by professional choreographers, directors, and designers;
- To support performance experience with supplementary training – acting, singing, voice, on-camera performance, improvisation, stage design, direction, etc. – delivered by faculty, guest artists and arts managers.

- To empower emerging artists to develop their personal voices and present their work at such forums as the Sunday evening Guerilla Theatre Series, the New Voices Festival and the Toronto Fringe Festival.
- To facilitate students' entry into graduate programs (usually Teacher Training or Masters of Fine Arts) in Canada or abroad.
- To prepare students for entry into the arts marketplace by developing the entrepreneurial skills needed to promote, start, market, and run a new arts-related venture.
- To ensure students graduate with a confident professional attitude, prospects for employment, a clear understanding of the financial realities of their careers in the professional arts, and a commitment to lifelong learning.
- To contribute to, influence, and expand the arts in Canada through innovative course materials, faculty research and creative activities.

2. ENVIRONMENT

Until the late 1960s, post-secondary theatre and dance training was limited to activities within university physical education departments, rather than being acknowledged as a discipline in its own right. By the early 1970s, several Canadian universities had introduced Performance Arts as a legitimate degree, modelled to some extent on established programs at American universities. While most of these programs focused on acting – as opposed to dance and production, or the creation of new work -- they were instrumental in giving artists the skills and independence to work outside of established groups or traditional organizational structures.

The National Ballet School is the oldest and most established of the Canadian schools attached to major ballet companies, offering classical ballet training and academic studies in a residential program. Of similar stature are the Winnipeg Ballet School and L'École supérieure de ballet du Québec in Montreal, and all three Schools attract students from abroad as well as from Canada. Smaller ballet centres across the country include the Quinte Ballet School in Belleville, the School of Dance in Ottawa, the Alberta Ballet School in Edmonton and the GohBallet Academy in Vancouver. Jazz and modern dance training is provided at Les Atéliers de Danse Moderne de Montréal, the Toronto Dance Theatre School, and the School of Contemporary Dancers in Winnipeg.

Degree programs in theatre and dance are offered at York University in Toronto, the Université du Québec and Concordia University in Montreal, the University of Calgary, and Simon Fraser University in Vancouver. Some universities also offer dance as a component of other disciplines, such as music, drama, or physical education. At the college level, theatre training is offered at the CÉGEP colleges throughout Quebec, George Brown College in Toronto, and Grant MacEwan College in Edmonton.

Despite the availability of other post-secondary performing arts training in Canada, RTS remains the only program of its kind, thanks to its focus on multi-disciplinary opportunities, its mix of conservatory training with the academic courses required for a BFA degree, and its mandatory production schedule. Another measurement of the currency and relevance of the RTS program is the high employment rate of its graduates, even relative to that of other faculties at Ryerson University.

RTS is deeply committed to increasing public, institutional and government understanding of the value of the arts to education and social development, and to fostering national interest in contemporary theatre and dance. The reality, however, is that positions for playwrights, directors, actors, dancers, choreographers, and designers are still limited, and RTS is aware of the need to intensify its approach to give its graduates a competitive edge. More specialized courses and greater emphasis on conservatory training are needed to ensure that graduates are equipped to work not only in theatre, musical theatre, dance and film, but also in the fast-paced media industry, and to take on creative roles in the business world.

Assessing Future Societal Needs – RTS aims to promote and develop an understanding and awareness of the value of the arts in the educational process and their usage for social development purposes. Society's question on the supply-demand imbalance in higher education in theatre is a huge pressure for theatre educationists. To deal with this question, RTS has further intensify the paradigm of conservatory training in

order that students can become eminent in the competition for the limited positions of playwriting, directing, acting, dance, choreographing and design. Changing the paradigm of liberal arts education (offering Bachelor of Arts degree) into the one of conservatory training (offering Bachelor of Fine Arts degree), means more specialized courses are offered to the students in the RTS programs. Our graduates may work in professional theatrical companies, but they will also have the skills to enter the fast development media industry and other non-theatrical fields. More and more graduates of theatre programs become the creative workers in many fields of the business world.

3. PROGRAM GOALS (Learning Outcomes)

The educational goals of RTS are to "Demonstrate a high level of creative, technical, and theatrical skills necessary to become a theatre (Acting/Dance/or Production) professional."

By the end of this program a student will be able to:

1. Demonstrate and apply knowledge of the history, culture, and context of the performing arts;
2. Demonstrate the theoretical and practical knowledge of professional methods, techniques, and problem solving;
3. Design, carry out and present independent and collaborative research in various forms using qualitative and comparative research methods;
4. Demonstrate excellent academic written, oral communication skills demonstrating logical and persuasive argumentation;
5. Demonstrate excellent creative written, oral and performance based communication using creative forms, styles and media;
6. Work independently, proactively and demonstrate leadership and an entrepreneurial spirit.
7. Be able to accept and implement feedback, respond constructively and integrate critique for improvement as an artistic professional as part of an ongoing commitment to lifelong learning;
8. Demonstrate excellent interpersonal skills and be able to work collaboratively in teams to develop creative performances;
9. Demonstrate creativity, academic and artistic integrity, a unique artistic voice; and
10. Demonstrate discipline, commitment, and pursuit of the artistic ideal.

4. PROGRAM CURRICULUM

The combination of intensive practical training with academic courses is a core feature of RTS's Performance programs. While honing skills required for a particular discipline through studio work and performance-related assignments, students also receive a well-rounded education in the humanities and liberal arts. Students are challenged to learn creatively, think critically, and apply their growing performance skills in both traditional and innovative areas, under the guidance of working professionals who are leaders in the arts community. RTS's location in Toronto – one of the major performing arts centres in North America – also helps foster the development of critical skills and brings training into sharper focus. Students have access to thousands of live dance and theatre performances each year, and are afforded the valuable opportunity to interact with working professionals from over 125 commercial and non-profit theatre and dance companies.

a) Performance Acting and Performance Dance

The Performance Acting and Performance Dance programs are driven by the expressed needs of today's performing arts and live entertainment sector in Canada – a diversified, technologically sophisticated, and labour-intensive industry that has experienced unprecedented growth over the last several decades. Each program is based on 'umbrella' courses that cover the fundamental elements of the two disciplines.

Students in each program also share a number of academic courses in the first two years, including Art History, Anatomy of Movement, Film, Timelines of Performance History, Performance Arts in Canada, Rudiments of Music, Acting and Dance, Elements of Performance and Basics of Theatrical Production. The Creative Performance Studies course enables students in both the acting and dance programs to work together in a laboratory environment, cross-fertilizing their particular skills through the creation of an original, experimental work.

In the third and fourth years, students can further refine their career goals by taking professional and professionally-related electives – from business-oriented to more comprehensive arts-oriented courses. Fourth-year students who have enrolled in Audition Preparation have the opportunity to showcase their talents at Theatre Ontario's annual audition presentation in front of more than 100 casting directors, artistic directors, and agents.

Performance Acting Program

The Performance Acting Program gives students the skills to work in theatre, musical theatre, film, television and radio. The curriculum combines academic and dramaturgical training, studio class work in acting, voice, music, dance and movement, and extensive rehearsal and performance experience to develop:

- A high level of skill in the craft of acting, and the discipline to support that skill;
- The strength and stamina necessary to fulfill the demands of classical, contemporary and new works in even the most challenging of circumstances; and
- The business knowledge needed to start a professional theatre career.

During the first two years, students concentrate on developing expressiveness in speech, voice, and movement, enabling them to use the theatrical space with awareness and purpose. Training in script analysis and interpretation teaches students to think beyond a single character role in order to contextualize and historicize an entire dramatic work. Training in rehearsal techniques is essential, as is the preparation of full-length plays where all students are offered substantial roles to foster necessary exploration of the acting process.

The third year continues and intensifies the studio work in voice, speech, movement, acting, and script analysis. Along with regularly scheduled classes, each student receives individual tutorials. In the fourth and final year, the studio and tutorial instruction focusses on areas needing improvement. As well, students may choose from a range of electives.

Fourth-year students gain valuable on-stage experience by performing in two major productions, which may include a classic and a contemporary play or musical; they also perform in an original work they have created as part of the New Voices Festival, Each season, the productions are directed and designed by guest artists from Canadian and international professional theatres, as well as faculty members.

Performance Dance Program

Throughout the four years, the Dance program offers intensive training with daily classes in ballet, jazz, and modern dance. This program is designed to develop versatile, creative, and interpretive dancers. Related studies in courses such as information technology, media arts, early childhood education, anatomy, musical theatre and singing round out their training. For students with an interest in teaching, the Performance Dance program provides an overview of the coursework and prescribed pedagogical instruction required for internationally recognized certification through the Royal Academy of Dancing.

Experienced professional choreographers are invited to create, rehearse, and stage works for annual productions that are open to the public. Fourth year dancers are showcased in Ryerson Dances, a week-long event held in the fall that features the work of well-known choreographers; in the spring, students have the opportunity to create and exhibit their own dance compositions in Choreographic Works.

BACHELOR OF FINE ARTS IN PERFORMANCE ACTING and PERFORMANCE DANCE (2014/15 calendar)	
YEAR ONE 1st & 2nd Semester	
REQUIRED: THF10A/B* Music I: Introduction THF11A/B*Creative Performance Studies I THF 100 Anatomy of Movement and Lifestyle I THF 101 Elements of Production I THF 200 Timelines of Performance History I LIBERAL STUDIES: One course from Table A.	REQUIRED GROUP 1: Two courses from the following: THA100 Fundamentals of Tech I: Acting THA101 Fundamentals of Tech II: Acting OR THD100 Fundamentals of Tech I: Dance THD101 Fundamentals of Tech II: Dance LIBERAL STUDIES: Two courses from Table A.
YEAR TWO 3rd & 4th Semester	
REQUIRED: FPN200 The Moving Image in Performance I THF20A/B* Music II: Singing THF 21A/B Creative Performance Studies II	REQUIRED GROUP 1: Three courses from the following: THA200 Intermediary Tech I: Acting THA201 Intermediary Tech II: Acting THF 403 Landmarks in Canadian Theatre OR THD200 Intermediary Tech I: Dance THD201 Intermediary Tech II: Dance THF 404 Landmarks of Choreographic Development LIBERAL STUDIES: One courses from Table A. PROFESSIONALLY-RELATED: One course from Table II.
YEAR THREE 5th & 6th Semester	
REQUIRED: THF31A/B Creative Performance Studies III THP 500 Conceiving the Production	REQUIRED GROUP 1: Two courses from the following (one of two pairs): THA300Performance Tech I: Acting THA301Performance Tech II: Acting OR THD300Performance Tech I: Dance THD301Performance Tech II: Dance LIBERAL STUDIES: Two courses from Table B. PROFESSIONAL: Two courses from Table I. PROFESSIONALLY-RELATED: One course from Table II.
YEAR FOUR 7th & 8th semester	
REQUIRED THF400 Creative Performance Studies IV THF401 Independent Study Seminars	REQUIRED GROUP 1: Two courses from the following (one of two pairs): THA400Adv Performance Tech I: Acting THA401Adv Performance Tech II: Acting OR THD400Advanced Performance Tech I: Dance THD401Advanced Performance Tech II: Dance LIBERAL STUDIES: One course from Table B. PROFESSIONAL: Two courses from Table I. PROFESSIONALLY-RELATED: Two courses from Table II.

Professional Electives Table I	
THF 30A/B* Dance Pedagogy: Children	THF 314 Musical Theatre Repertoire
THF 32A/B* Vocal Pedagogy: Speech Arts	THF 315 Drama/Dance in Education: Elementary
THF 33A/B* Singing for Performers	THF 411 Dance Styles: Modern Social
THF 40A/B* Dance Pedagogy: Adolescence	THF 415 Drama/Dance in Education: Secondary
THF 310 Professional Preparation	THG32A/B* Staging the Theatrical Production
THF 311 Dance Styles: Historical Period	THG42A/B* Advanced Practicum in Production
THF 313 Special Topics	THP 312 Make-Up and Wiggery

* This course has a weight of 2.00

Note that RTS has a number of year-long courses which are all assigned a weight of 2.00 as they are deemed fundamental to progress through the program. Each course is taught for ten to twelve hours per week, and students may not advance to the next year without attaining a specific grade due to the Academic Variation that applies to the three programs.

b) Performance Production Program

The Performance Production program provides students with a broad theoretical and practical understanding of all aspects of production work in the performing arts, as well as specialized training in:

- Lighting and sound;
- Scenic design, construction, rigging and painting;

- Props design, construction and management;
- Costume design and construction;
- CAD and other computer skills; and
- Stage management and arts administration.

The first year provides a foundation in all areas of technical production as well as professional practices. In the first semester, the content of three courses is applied to class projects that use the script of a production seen in September at either the Shaw Festival or the Stratford Shakespeare Festival. In the second semester, students begin studio work, taught by professionals engaged as part-time instructors. Throughout the year, students broaden their knowledge with courses in administration, occupational health and safety, electrical work, and the construction of properties, scenery and costumes, and begin taking electives such as art history, business, and management techniques.

At the end of their first year, students choose one principal area of study from five options: administration, costuming, lighting, sound, or wardrobe. Over the next three years, rigorous training in an identified primary area is complemented by electives in one of the other programs and/or within the liberal arts.

In the fourth year, students focus almost entirely on production. Under the guidance of faculty and professional directors, designers and choreographers from Canada and abroad, students work with their acting and dance peers on more than ten plays and evenings of dance repertoire, as well as the creation of new student work. Classroom work is limited to elective courses in a range of advanced topics that are selected on the basis of student needs and interests. Fourth-year students also supervise and manage first-year students in a variety of shop and crew assignments.

The Performance Production program is designed to provide the maximum number of production opportunities to each student, and to effectively integrate studio class work with the rehearsal and performance process. Production assignments are based on a careful assessment of each student's needs and potential. Assignments ensure ample opportunity for development and strengthening of skills, and the gaining of practical experience. This combination of skill acquisition, enhancement of skills, and practical application through hands-on experience prepares graduates for careers as technical directors, property masters, set/prop/costume designers, audio and lighting engineers, and/or shop supervisors, and managers.

BACHELOR OF FINE ARTS PERFORMANCE PRODUCTION (2014/15 calendar)	
YEAR ONE **1st Semester** REQUIRED: THF 101 Elements of Production I THF 200 Time Lines of Performance History I THP 101* Production Technique I THT 100 Design Communication I LIBERAL STUDIES: One course from Table A.	**2nd Semester** REQUIRED: THF 102 Elements of Production II THF 201 Time Lines of Performance History II THM 200 Production Communication I THP 102* Production Technique II THT 200 Design Communication II
YEAR TWO **3rd Semester** REQUIRED: THF 403 Landmarks in Canadian Theatre THM 300 Production Communication II THP 201* Production Technique III LIBERAL STUDIES: One course from Table A.	**4th Semester** REQUIRED: THF 404 Landmarks of Choreographic Development THF 501 Research Methods THP 202* Production Technique IV THT 418 Design Communication III LIBERAL STUDIES: One course from Table A.
YEAR THREE **5th Semester** REQUIRED: MUS 300 Musicology THP 301* Production Technique V THP 500 Conceiving the Production PROFESSIONAL: Two courses from Table I. LIBERAL STUDIES: One course from Table B.	**6th Semester** REQUIRED: THP 302* Production Technique VI PROFESSIONAL: One course from Table I. PROFESSIONALLY-RELATED: One course from Table II. LIBERAL STUDIES: One course from Table B.

YEAR FOUR **7th semester** REQUIRED: THP 401* Production Technique VII PROFESSIONAL: Three courses from Table I. PROFESSIONALLY-RELATED: One course from Table II.	**8th Semester** REQUIRED: THP 403* Production Technique VIII THP 800 Independent Study PROFESSIONAL: Two courses from Table I. LIBERAL STUDIES: One course from Table B.

Professional Electives Table I	
FSN 302 History of Costume I	THP 404 Lighting Design Special Topics
THG 32A/B* Staging the Theatrical Production	THP 422 Scenic Painting
THM 114 Advanced Stage Management	THP 515 Theatre Safety and Occupational Health
THM 301 Technical Direction	THP 538 Properties: Design and Construction
THM 303 Theatre Administration Special Topics	THP 612 Fabric Dyeing and Costume Painting
THM 327 Theatre Administration	THP 648 Scenic Construction: Special Topics
THM 401 Production Management	THP 843 Pyrotechnics
THM 503 Tour and Company Management	THT 318 Set Design
THP 312 Make-Up and Wiggery	THT 319 Costume Design I
THP 315 Corsetry: History and Construction	THT 383 Sound Design
THP 325 Theatre Costume	THT 500 Structure for Performing Arts
THP 328 Scenic Construction	THT 582 Scenic Automation in Theatre
THP 333 Costume: Special Topics	THT 893 Sound Special Topics
THP 337 Lighting Design	

* This course has a weight of 2.00

Note that RTS has a number of year-long courses which are all assigned a weight of 2.00 as they are deemed fundamental to progress through the program. Each course is taught for ten to twelve hours per week, and students may not advance to the next year without attaining a specific grade due to the Academic Variation that applies to the three programs.

See the Ryerson Calendar for Professionally-Related Electives and Liberal Studies.

c) Advanced Courses

The advanced courses offered by RTS give a limited number of exceptional students the opportunity to work in stage design, directing, playwriting and dance, under the leadership of professionals. Admission to these courses is based on an audition and/or a portfolio review of the applicant's work, along with the student's background and talent. While individual timetables are prepared for successful applicants, they can also enroll in other Ryerson University courses provided they meet the prerequisites; on the other hand, if there are specific areas in which their knowledge is considered to be limited, students may be required to take additional RTS courses to enhance their skills and knowledge.

Performance Advanced Courses: Acting Practicum II, THD 151 Dance Master Class I, THD 251 Dance Master Class II, THG 32A/B Staging the Theatrical Production, THG 42A/B Advanced Practicum in Production

d) Minor

A new Acting/Dance Studies Minor was approved by Senate in Winter 2014 and was formally launched in Fall 2014. Ryerson University students (including Performance Production students enrolled in the Theatre School) are permitted to take the Minor. This Minor is intended to foster cultural sensitivity and awareness of the way that art informs, reflects and contributes to culture and the Canadian economy. The interdisciplinary aspect of sharing of courses with students in other programs at Ryerson is intended to enrich the student experience and promote accessibility between the various schools within the greater University.

5. ADMISSIONS

The minimum requirement for admission to Ryerson University is an Ontario Secondary School Diploma (OSSD) or equivalent (i.e. in the case of applicants educated outside Ontario). The University reserves the right to be the final arbiter of acceptable equivalencies.

Each applicant must have completed at least six Grade 12 U or M courses, including:

- English/Anglais (ENG 4U/EAE 4U preferred); and

- Program-specific prerequisites, with a minimum grade of 65-70%.

Because the number of applications received by RTS greatly exceeds the number of spaces available, the possession of the minimum requirements in no way guarantees acceptance. While applicants with a minimum overall average of 65% are eligible for consideration, competition in individual programs may require higher prerequisite grades and/or higher overall averages.

Alternate/equivalent standings are set for transitional students. Ryerson's 3-year diploma holders who seek entry to RTS to complete a BFA degree may be readmitted into level four courses depending on their work history and course summary. Their liberal studies requirements are reduced to reflect courses already completed in their original program.

Non-Academic Requirements

Acting and Dance applicants must audition before a three to four member Panel as well as other candidates. Production applicants must attend an entrance interview. Students who live more than 420km from Toronto may mail in a DVD audition and/or portfolio.

Performance Acting	**Performance Dance**	**Performance Production**
Personal Information Profile • Recent 8x10" photograph with applicant's name, Ryerson ID Number and audition date on back; • Prepared statement, explaining why applicant wishes to be a performing artist; • Current resume, including theatre/dance experience or training, special skills, hobbies; and • Letters of recommendation.	***Prior Training*** • All candidates must have a minimum of five years' prior training in at least one of following disciplines: Ballet, Modern, Jazz, or Contemporary Dance. • ***Personal Information Profile*** • Recent 8x10" photograph with applicant's name, Ryerson ID Number and audition date on back; • Resume of dance training, including name/address of dance schools and names of teachers; and • Letters of recommendation.	***Personal Information Profile*** • Recent 8x10" photograph with applicant's name, Ryerson ID Number and interview date on back; • Prepared statement, listing special areas of interest, goals in theatre, and reasons for choosing RTS Performance program; • Current resume; and • Two letters of reference (one work-related, one school-related or personal).
Audition Pieces • Full play of applicant's choice, delivered in three minutes or less, from any period, any genre (including musicals), and in any language; and • One classical and one contemporary two-minute monologue.	***Audition Pieces*** • Participation in one-hour ballet class and one-hour jazz class; and • One-minute solo in dance form of choice.	***Portfolio*** • Any materials that demonstrate theatrical and/or creative skills, including sketches, drawings, models, samples, writing, production documentation, etc.

6. ACADEMIC QUALITY INDICATOR ANALYSIS

a) Applicant to Registrant Ratio, Enrolment, International Students

Over the past eight years, the Acting program has been accepting fewer applicants into First Year due to a low attrition rate, and the fact that studio classrooms can only accommodate 35 students safely. The Dance and Production programs have slightly increased the number of offers made to achieve optimal numbers for September of each year (44 for Dance and 76 for Production).

Applicants (all choices) to Registrants								
	2006-07	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**
Ryerson	10.2	10.4	10.2	10.0	9.2	8.7	8.5	8.4
FCAD	9.5	10.3	10.1	9.8	8.8	8.1	7.5	7.5
Acting	**32.9**	**35.0**	**29.2**	**28.1**	**27.4**	**25.4**	**23.7**	**25.0**
Dance	**6.3**	**8.2**	**7.4**	**6.7**	**6.3**	**7.2**	**6.4**	**5.2**
Production	**4.1**	**4.5**	**4.1**	**4.1**	**3.9**	**2.9**	**2.8**	**3.0**

Enrolment 2008 vs 2011						
	Nov 1 Head Count	**% from Ontario secondary schools**	**% from other universities**	**% from CAATs**	**% Female**	**% Male**
2008						
Ryerson	5,290	71.4	13.2	3.4	53.3	46.7
FCAD	936	67.7	12.2	1.7	71.6	28.4
Acting	**27**	**63.0**	**18.5**	**3.7**	**48.1**	**51.9**
Dance	**39**	**61.5**	**12.8**	**0.0**	**89.7**	**10.3**
Production	**58**	**72.4**	**3.4**	**5.2**	**69.0**	**31.0**
2011						
Ryerson	6,020	74.5	10.4	3.3	51.8	48.2
FCAD	989	65.0	13.4	3.3	70.1	29.9
Acting	**26**	**65.4**	**7.7**	**3.8**	**42.3**	**57.7**
Dance	**38**	**57.9**	**10.5**	**5.3**	**76.3**	**23.7**
Production	**65**	**60.0**	**13.8**	**3.1**	**76.9**	**23.1**

Year 1 Registrants New to Ryerson – Percentage Paying International Fees									
	Fall 2004	**Fall 2005**	**Fall 2006**	**Fall 2007**	**Fall 2008**	**Fall 2009**	**Fall 2010**	**Fall 2011**	
Ryerson	5.3	4.8	3.5	4.2	4.7	1.7	1.9	3.6	
FCAD	2.3	3.1	1.6	1.9	4.1	4.1	1.9	2.6	
Acting	**0**	**0**	**0**	**0**	**0**	**3.7**	**7.7**	**3.8**	
Dance	**5.0**	**0**	**0**	**2.9**	**5.1**	**4.9**	**0**	**2.6**	
Production	**1.7**	**1.6**	**1.7**	**0**	**1.7**	**0.4**	**0**	**1.5**	

Although the School's current student base is primarily regional, a number of 2013-18 goals relate to increasing the number of international students enrolled, both through exchange programs with foreign universities and a new summer residency program for international high school students.

b) Entering Averages, Retention

Mean entering average of newly-admitted students registered in First Year on November 1, who were admitted directly from an Ontario secondary school									
	2004-05	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**	
Ryerson	79.8	78.8	79.8	80.2	80.6	81.5	81.4	81.9	
FCAD	83.2	82.9	83.8	83.9	84.0	84.9	84.4	84.6	
Acting	**86.0**	**83.6**	**83.4**	**87.7**	**84.0**	**84.9**	**86.0**	**85.8**	
Dance	**80.1**	**80.2**	**82.8**	**81.7**	**81.9**	**84.4**	**83.4**	**81.5**	
Production	**79.4**	**80.3**	**81.2**	**82.2**	**82.3**	**82.3**	**82.0**	**81.6**	

The RTS student body is well-qualified academically. Entering class averages across all three programs have remained relatively consistent since 2004-05. These averages range from a low of 79.4% in the Production program in 2004-05 to a high of 86% in the Acting Program in 2010-11; they are higher than the averages for Ryerson University as a whole, and in line with those of the Faculty of Communication and Design.

Percentage of students registered in first year on November 1 who were admitted directly from an Ontario secondary school with an entering average of 80% or higher								
	2004-05	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**
Ryerson	46.0	41.3	48.4	52.2	55.1	61.7	61.6	66.0
FCAD	71.4	70.0	76.2	76.0	74.0	79.7	78.5	80.5
Acting	**82.6**	**64.3**	**73.3**	**100.0**	**64.7**	**72.2**	**83.3**	**82.4**
Dance	**37.5**	**31.8**	**61.3**	**57.1**	**75.0**	**74.1**	**65.6**	**63.6**
Production	**43.2**	**54.3**	**64.1**	**69.0**	**64.3**	**67.5**	**64.4**	**61.5**

There are a high number of Ontario Scholars among first-year RTS students, especially in the Acting stream. At 61% and 58% respectively, the average number of Production and Dance students with entering averages of 80% or higher represents a significant increase since the last Program Review.

Percentage of students retained in any year level of *same program* after ONE year of study								
	2004	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Ryerson	84.6	81.0	81.3	82.1	80.0	81.0	82.3	82.2
FCAD	89.6	85.2	85.7	88.1	85.3	88.7	88.3	88.2
Acting	**69.0**	**64.3**	**68.0**	**90.9**	**73.1**	**74.1**	**76.9**	**84.6**
Dance	**79.5**	**75.0**	**68.4**	**77.1**	**82.1**	**66.7**	**73.8**	**67.6**
Production	**84.5**	**85.0**	**84.2**	**82.8**	**86.2**	**85.2**	**88.9**	**95.2**

Percentage of students retained in any year level of *same program* after TWO years of study							
	2004	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Ryerson	77.3	70.2	74.8	75.3	72.9	75.9	74.3
FCAD	81.9	77.7	80.9	80.8	79.7	82.3	82.4
Acting	**58.6**	**57.1**	**72.0**	**90.9**	**73.1**	**66.7**	**61.5**
Dance	**66.7**	**55.0**	**68.4**	**68.6**	**66.7**	**61.5**	**69.0**
Production	**72.4**	**76.7**	**78.9**	**72.4**	**79.3**	**75.4**	**82.5**

Percentage of students retained in any year level of *same program* after THREE years of study							
	2004	**2005**	**2006**	**2007**	**2008**	**2009**	
Ryerson	74.1	65.9	71.3	70.3	70.4	69.9	
FCAD	79.9	75.4	79.6	78.0	78.1	80.2	
Acting	**62.1**	**60.7**	**72.0**	**86.4**	**73.1**	**66.7**	
Dance	**66.7**	**52.5**	**68.4**	**65.7**	**71.8**	**59.0**	
Production	**72.4**	**68.3**	**75.4**	**65.5**	**79.3**	**78.7**	

The Production Program experiences a consistently high level of retention averaging around 79% after three years of study. Acting, which takes in the fewest number of first year students, is the program with the second highest retention rate after three years, averaging 73%. Dance has a retention rate of just fewer than 72% after three years in the program.

7. STUDENT SURVEY

	(%) Agree Strongly	**Agree**
The University supports the needs of the theatre school	8	30
My program is academically challenging	42	70
My program provides good preparation….	86	32
My program is of high quality	86	32
	a great deal	**very much**
Problem solving	25	41
creativity	58	42
written communication	18	35
oral communication	33	43
research skills	30	32
leadership	39	38
computer	11	17
understanding professional	51	38
entrepreneurship	37	30
understanding the international	36	32
understanding people	18	37
developing a broad knowledge	54	35
mastering specific	53	40
working in teams	55	43
responding to technological	25	23
	very effective	**effective**
tests/ examinations	22	74
written	24	75
learning	32	67
classroom	65	48
studio	94	22
experience with computer	8	29
group work	47	57
mastering specific employment	46	52
understand professional	48	56
understanding the nature	50	53
development an awareness	65	41

	Agree Strongly	Agree
most of my professor are current	97	19
are well organized	68	48
are available outside	56	52
teaching is intellectually challenging	60	49
teaching of high quality	80	35
provide useful feedback	49	56
	very effective	**effective**
helpful academic advising	23	52
directing you to useful sources	26	42
	Yes	**No**
Would you recommend to others: Program?	113	6
Ryerson?	109	10

8. PREVIOUS PROGRAM REVIEW

The School's last Program Review was conducted in 2003. Strengths included the high demand for entrance into the Performance Acting Program; high entrance averages across all three programs; strong connections with industry, leading to high graduate employment; a strong and dedicated faculty; the interdisciplinary and multidisciplinary benefits of shared courses with the Schools of Fashion, Radio and Television Arts, and Image Arts; and a general consensus that RTS offers students an education that fully prepares them for a career in professional theatre and dance.

Major concerns centred around the need to improve and enlarge the production and teaching facilities, and the dissatisfaction of students in the Production Program with a perceived lack of critical thinking and communications skills training. Key recommendations included the building of a new facility, and a curricular restructuring of the Production Program.

The Peer Review Team made the following recommendations in response to the issues identified:

- That the studio equipment used by Production students be upgraded to meet current industry standards;
- That student dissatisfaction with the Production Program be immediately addressed by faculty and staff;
- To provide curriculum that offers opportunities for developing research skills, critical thinking, and applied knowledge;
- That full-time hires be made in Technical Direction and Wardrobe to support students in linking classroom and studio work to the heavy demands of the more than ten annual productions;
- That increased mentoring be provided to Production students by guest artists from the design community as well as faculty; and
- That the School develop a long-term solution to its equipment and facilities challenges.

Progress to Date

a) Performance Production Curriculum

During the self study component of the Program Review process, an analysis of the Production curriculum clearly revealed that some aspects of individual courses did not meet the standards required of a four-year BFA program. Since then, certain courses have been rewritten, and grading matrices and assessment tools have been revised. In addition, common courses across all three programs have been increased, including the courses Elements of Production, Timelines I and II (a two-term theatre history course) and The Global Stage.

b) Guest Designers for Performance Production

Although budget cuts have long restricted the frequent use of guest artists in the Production Program, the Provost and the Dean have seen the importance of hiring professional artists to augment the teaching faculty whenever possible.

c) Facilities

The RTS student body grew from 426 in 2003 to 510 in 2013. This growth was capped due to limited classroom, studio and performance space. While the University has helped with several upgrades such as floor replacements and wardrobe ventilation systems, the current venue remains inadequate for the delivery

of three undergraduate programs. This pressing issue is on the agenda of both the Academic Standards Committee and the Ryerson administration

d) Professional Electives

While the Peer Review Team did not identify a need for additional professional electives, the Faculty believe it would be in the School's best interest to develop larger, lecture-based courses. This option is currently being realized through the launch of the Acting/Dance Studies Minor and the new School of Creative Industries Acting/Dance Studies Module.

e) Multi-Disciplinary Opportunities with other Ryerson Schools

Co-curricular offerings have begun with shared courses between Image Arts and RTS, English, Fashion, and RTA/Image Arts/RTS.

9. STRENGTHS, WEAKNESSES

a) Strengths

- RTS enjoys a positive national reputation and is well supported by the University administration. Faculty and staff are well-qualified and productive within the performing arts, with several recognized as being among the best in their field. The curriculum is stable, relevant, and has proven to be effective, based on student output and graduate employment. RTS has a nationally and internationally renowned faculty and staff. The ratio of students to faculty reflects the studio-based approach to training. The creative activity of faculty and staff within the School – as it relates to the training of students in the studio, theatre, or scene and costume shops – is a key measure of teaching performance, but it too is seen as a contribution to the performing arts field.
- In terms of the providing the intellectual, practical, and business skills needed for long-term careers in the performing arts, the School's three programs (Acting, Dance, and Production) fulfill professional criteria. Graduates leave with a solid foundation in their area of specialization as well as with a broad academic education that enables them to pursue related fields or enter graduate education in various fields such as arts education, arts management, drama therapy, dance therapy, acting, directing, design, management, and choreography.
- According to Ryerson University Alumni reports and anecdotal information captured through in-house telephone conversations with employers, RTS graduates function well as independent artists or as leaders or members of performing arts organizations, and integrate well into the workplace.
- RTS takes its public service role seriously, using it to broaden and enrich its program for students, and to benefit the community.
- Experiential learning has always been a cornerstone of the School's program. In addition to giving students the opportunity to work on professional productions under the supervision of guest artists each year, Agreements of Cooperation have been signed with the University of Athens in Greece, the University of Edinburgh, and and the University of Southern California to support formal work study, internship, and exchange programs for all RTS students. In the last six years, there have been international tours and installations/exhibitions of student and faculty work in Greece, Scotland and the Czech Republic. Planning is currently underway for additional tours, symposia and exchange programs in South Africa, Japan, China, Israel, the United States, Spain, England, Croatia and India, involving students and faculty from all RTS programs.
- The Production program has always offered experiential learning opportunities through the historic practice of selecting two interns and apprentices from graduates of its program. This type of paid internship has not been as present for graduating Acting and Dance students. However, there is now a strong interest at the faculty level in revising the curriculum to include Dance and Acting internship opportunities.
- All applicants to RTS are selected through an extensive audition and interview process that supplements their academic achievements. Each year, approximately 1,100 students apply, audition and interview for the incoming classes of 29 actors, 44 dancers, and 74 production students.
- A commitment to partnering with other Schools within Ryerson University provides important new learning opportunities for RTS students.

- Because of its focus on connecting curriculum to practice through a conservatory approach, RTS has become known for producing graduates with reliably strong skill levels in voice, speech, movement, various dance genre, production craft and arts management. The curriculum in all three Programs ensures that RTS students gain experience in major roles and production assignments throughout their four years. Ryerson's location in a cultural centre, and its close proximity to New York City and other major theatre centres, gives students remarkable access to professional productions and to professional artists.
- RTS strongly encourages and supports the Scholarly Research and Creative activity (SRC) of its faculty. The ability to contribute to this area is an important consideration in new hires. RTS faculty frequently present papers and sit on panels at national and international conferences, and several hold research grants. At the same time, faculty members are regularly involved in professional productions as actors, directors, designers, coaches, choreographers, dancers, technical directors, production managers, and stage managers.

b) Weaknesses

- In recent surveys, students indicated that they do not receive enough writing development within the curriculum offered by the Theatre School.
- At present, RTS is basing many of its planning and development decisions on anecdotal evidence. Because of their external activities and combined experience, faculty can be fairly confident that their assumptions are correct, but the risk of continuing without hard data has been recognized. RTS needs to undertake a formal analysis of the environment in which Canadian theatre/dance programs and companies operate, as well as industry trends and their impact on the School's programs.
- During the 2003 Program Review, one of the main issues identified was the fact that the RTS facilities are inferior to those of any other comparable program in Canada, given that RTS has inadequate and out-of-date studio equipment, and limited classroom, studio, and performance space. Ten years later, with technical advances in the field, an increase in student enrolment, and a rapidly aging building, the situation has become much more acute.
- The School's production and administrative staff component remains inadequate to its needs.
- The lack of diversity within the faculty and staff has been identified as an area for growth. RTS sees the importance of fully representing the community in which it operates. Future recruitment efforts must focus on broadening the ethnic, geographic, linguistic and social make-up of the School's own community.
- Like many post-secondary programs, RTS struggles to balance the growing needs of its students, faculty and staff with the challenge of increasing its operating budget. The 2003 Program Review Team focused on the limited production and guest artist budgets in particular, but the reality is that all elements of the School's programs need more funding, especially if future plans are to be realized.
- RTS competes for students, faculty and staff, with programs throughout North America. Many of these programs have large, state-of-the-art facilities, and some have a professional resident performance company, both lacking at RTS.

10. VISION, GOALS AND STRATEGIES FOR 2013 – 2018 (Developmental Plan)

The RTS faculty and senior staff have developed goals and strategies which have been cemented by the program review process.

i. CURRICULUM

a) Undergraduate Curriculum – During the academic year of 2013-14, the School undertook a full review of its academic structure and all related curricula. Options under consideration include:

1. Upper level Professional and Professionally Related Electives – Given the current budget constraints, RTS eliminated a great number of electives and technical specializations. For now, the School will offer one, or at most two electives per semester per program.

2. Adding new lecture based courses, available university wide – THF 316: The Global Stage, THF 317: World Theatre and Dance, and THF 416: Twentieth Century Performance Methods/Style. All three have strong research and writing components.

3. Adding up to three new Minors. These will include Performance Studies (in collaboration with the English Department); Textile Design (in collaboration with the Schools of Interior Design and Fashion, and Drama Therapy (in collaboration with the Psychology Department).
4. The Theatre School's modular offerings to the School of Creative Industries include a Performance Studies module and an Acting/Dance Studies module which offer dance and theatre performance history courses, studio courses in acting and dance, and courses in entrepreneurship and theatre management. In September 2014, the Theatre School launched its new Acting/Dance Studies Minor.

b) Critical Theory – In addition to the liberal studies, RTS students receive instruction in various critical theories and methodologies in a range of courses.

c) Guest Artists – To give students access to the best performing arts practices and artistry from all over the world, RTS invites prominent Canadian and international artists to direct, choreograph, design and manage productions each year, as well as to teach courses. Over the next five years, the School hopes to enhance this vital curricular dimension by increasing the number of playwrights, directors, designers, and choreographers engaged each year.

d) International – RTS is active in raising its profile beyond Canada's borders. In the future, RTS plans to offer summer training programs, exchanges, and/or research opportunities in other countries. A long-term goal is to have 50% of the RTS student body engaged in international classes, exchanges, exhibitions, and production opportunities by 2018.

e) Graduate Programming – As part of its commitment to making ongoing contributions to the arts, RTS developed a proposal to establish its first Master's level program, an MFA in dramatic writing along with Image Arts and Radio Television Arts. The involvement of the three FCAD Schools would ensure the availability of sufficient faculty and facilities to launch the Master's level dramatic writing program, making it unique in Canada. The proposal has not yet been presented to the Academic Council.

f) SRC Output – Despite the relatively small number of tenured faculty at RTS, the School's SRC output has grown significantly over the past five years, including creative activities, conference presentations, the hosting of a major international theatre tour and conference, published works, and original research. Until more full-time faculty members are hired, it is unlikely that the amount of SRC will increase; rather, the School will focus on supporting new kinds of research and creative activity that support its future needs and increase its relevance to the industry and the community. Priority will be given to original, practical research that feeds back into the program to improve academic and professional methodology and positions RTS at the cutting edge of theatre and dance.

g) Multidisciplinary Integration – Much like the performing arts industry, the RTS curriculum is strengthened by the successful blending of the work that takes place on and off stage and the administration of that process. The school has refined the integration of acting, dance and production by delivering discipline-specific studio training and multidisciplinary academic courses. These courses further enhance students' understanding and skills in critical thinking and writing, as well as the relationship between the two.

ii. ARTISTIC

The Artistic Goals of RTS are to:

- Launch a professional resident theatre company in 2018, similar to the Yale Repertory Theatre, the Actors Company at Juilliard, or the Resident Ensemble Players at the University of Delaware.
- Nurture and promote new work by commissioning and developing pieces by emerging and professional playwrights, and staging these works using theatre's most daring directors, innovative designers, and celebrated actors.
- Present dance and theatre productions that celebrate the human experience and transcend cultural differences to foster unity and harmony within communities;

- Present dance and theatre productions at national and international theatres and performance festivals;
- Clearly and regularly articulate and promote the economic benefits such as increased tourism, job creation, hotel and restaurant patronage that RTS may incite to elected and community leaders, key stakeholders and the general public.

a) Artists-in-Residence – The practice of employing professional guest artists, directors, designers, and stage managers for short-term projects – in particular, fourth-year student productions – has served the School well and will continue. Future plans include the continued engagement of established Canadian playwrights to develop original scripts that are workshopped by senior students.

b) Professional Performance Company (PPC)

Once established, the goal is to build the PPC into a leading professional North American theatre company that offers patrons artistic excellence, contributes to the development of dance and theatrical art forms, and attracts local, provincial, national, and international audiences. Supported by top-calibre artists, artisans, managers and staffand volunteers, the PPC will be dedicated to producing bold interpretations of the classics and new theatrical, dance and multimedia works that connect immediately with contemporary audiences. Educational lectures and outreach programs will complement this mix.

c) Relationship-Building

Over the last 42 years, RTS has established strong relationships with professional dance companies, theatres and associations, artists' unions and associations, cultural organizations, theatre industries and a range of manufacturers. These links play an important role in students' development. It is anticipated that these relationships will continue to grow in the future.

iii) INSTITUTIONAL

The institutional goals of RTS are to:

- Distinguish RTS from other Canadian theatre and dance training programs by promoting the comprehensiveness of its program, including three distinct programs of training: Performance Acting, Performance Dance, and Performance Production a professional artistic/educational team whose members are affiliated with professional unions; fully–staged productions originating from RTS' artistic mission; and a professional resident performance company.

a) Admissions and Enrolment

- Changes to Admissions/Enrolment procedures were made in 2003 and 2011, to provide additional funding to the School. Minimum admission requirements (OAC/Grade 12) and the Audition/Interview procedure remained the same. Over the next year, the per-applicant audition and portfolio fee – currently set at $50.00 – may increase slightly.

- In 2011-12, the total student population was 450. With the reappropriation of the Ryerson Theatre -- and more space and faculty resources provided by the University -- this could be increased to 550 by 2018, increasing both the BFA student population and the number of students enrolled in various Minors and the Creative Industries Acting/Dance Studies Module. The School's international outreach is also designed to strengthen student recruitment.

iv) COMMUNITY ENGAGEMENT AND AUDIENCE DEVELOPMENT

The goals of RTS for community engagement and audience development are to:

- Increase single ticket sales by 25% (an increase of 5% per year over next five years).
- Enhance community understanding of, and support for, the RTS mission.
- Develop, diversify and increase the audience base for all RTS productions.
- Reach populations unable to travel to Ryerson to attend performances by taking performances out into the community.

a) Audience Development

RTS is currently undertaking a data analysis of ticket sales over the past decade and gathering survey data from existing patrons in order to gain a better understanding of public expectations and to inform future programming. This will be complemented by expanding and improving audience services.

b) Audience Diversification

Diversifying the audience base for the RTS work and brand will be accomplished in various ways, including entering into co-productions with other regional theatres and dance companies. More Ryerson students can be attracted to RTS productions by forging curricular alliances with all Faculties, and/or making attendance mandatory for students in certain non-RTS courses.

To develop off-campus audiences – and build future student recruitment -- the School plans to stage matinee productions of literary classics for local and regional students in Grades 7-12 at the 1000-seat Ryerson Theatre. The School also plans to market matinees to seniors.

c) Internships/Apprenticeships

Over the past few years, senior students have been involved in ad hoc study placements – costume work at the Textile Museum, prop-making at the Canadian Opera Company -- as part of their training. Although many larger theatre and dance companies have their own post-graduate conservatory programs from which they draw apprentices, RTS has approached several organizations about offering undergraduate apprenticeships.

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v) HUMAN RESOURCES

The goals of RTS for human resources are:

- Attract and retain first-rate faculty and staff to lead RTS through a time of expansion and professional growth.
- Increase the diversity among RTS faculty, staff, students, interns, and members of advisory boards and councils to fully represent the myriad of communities within Toronto.

a) Staff Recruitment

To achieve its future organizational goals – including an increased student population -- the School must now rebuild and expand its team. Between now and 2018, four key positions must be filled: Evening Technical Director, Public Relations/Marketing Director, and a Wardrobe Assistant.

vi) FACILITIES

The facilities goals of RTS are to:

- Upgrade the RTS facilities and equipment to accommodate future growth and become competitive with other post-secondary theatre/dance programs in Canada.
- Expand the number of studio teaching spaces to include a home room for the 4th year acting class;
- Create a performing arts centre that is a vibrant, state-of-the art facility at Ryerson University, and a landmark of Toronto.

Ryerson University administration addressed the dire need for new facilities in Fall 2014. After safety and space analyses, it was decided that academic year 2015/2016 would be the last year RTS would reside in the 44 Gerrard St. building. A phased approach to temporary and permanent facilities was planned. Phase 1 includes a $7 million building project for temporary space in the Phase 2new Student Learning Centre, leased administrative space, and three additional studio/classrooms in Kerr Hall on campus. Phase 2 involves the design and construction of a new building that will house the new home of RTS with multi-use spaces that can be used as classrooms, rehearsal space, shops, administrative offices and hopefully a performance space. The development work of Phase 2 will begin in 2016.

vii) FINANCIAL

The financial goals of RTS are to:

- Maintain and increase financial resources to ensure future expansion and institutional stability.
- Build an endowment fund for the Ryerson Theatre School.

a) Earned Revenue

The long-term goal is to enroll over five hundred students in the summer camp program (started in 2011) by the summer of 2018. The School hopes eventually offer Saturday classes and matinees for seniors and high school students during the academic year, and rentals of costumes, props, equipment and facilities, all of which will be vigorously promoted to the surrounding community.

b) Fundraising

To strengthen the School's fundraising capacity, efforts will be made to substantially increase corporate sponsorships and grants from government agencies and foundations. Both an Annual Fund and a Major Gifts program will be established, and new fundraising events will be launched. Finally, an Endowment Fund will be established.

11. PEER REVIEW TEAM REPORT

1. OUTLINE OF THE VISIT

Reviewers: Dr. Selma Landen Odom, Department of Dance, York University; Susan Stackhouse, Associate Professor Acting, Dalhousie University; David Vivian, Chair, Department of Dramatic Arts, Brock University (note: PRT Report written by Selma Landen Odom and Susan Stackhouse with a focus on Performance – Acting and Dance)

The Peer Review Team conducted a site visit of the Ryerson Theatre School on Friday, February 14, 2014, and met with the Vice Provost, Academic, the Dean, Faculty of Communication and Design, the Chair, Ryerson Theatre School, the Production and Operations Manager for the RTS, the Program Directors of Dance, Production and Acting, four faculty and staff members of the Production Department, three faculty members of the Acting Program, student representatives from 2nd, 3rd and 4th years and from all streams (this group also included 2 students who were alumni from the Production Program and are acting in a mentoring capacity for present students), the Admissions Officer for the RTS, and the Provost and Vice-President Academic.

2. GENERAL OVERVIEW

The Acting Program at Ryerson Theatre School offers a conservatory approach that combines intensive practical training with academic courses based in critical theory. It enjoys a very strong reputation in the Canadian theatrical community and a large number of graduates from the Program continue on to postgraduate studies and/or professional success. Each year there are many opportunities for students to showcase their talent and knowledge. The quality/level of the faculty and staff is of the highest caliber and the foundation of the training is strong. Faculty participate in local, national and international conferences, outreach and creative activities and are committed to growing in this area which only strengthens the reputation of Ryerson Theatre School. Recently RTS has achieved great success in the area of fundraising and these efforts have resulted in the establishment of several new scholarship funds. The programs, faculty, staff and students of the Theatre School definitely enhance the University profile as a "City Builder" and the Ryerson Theatre School might even be considered a 'jewel in the crown' of Ryerson University.

The Dance Program offers rigorous training in ballet, modern dance and jazz as well as extensive performance and creative opportunities. The strengths of the Dance Program are demonstrated in *Ryerson Dances,* the fully produced shows of original works by guest and faculty choreographers that are presented annually in the 1,100 seat Ryerson Theatre. They draw large attendance and much interest from the dance community and from alumni as well as current and prospective students. Every year *Choreographic Works*

presents a week of student- choreographed works which are more intimately staged within the reduced Ryerson Theatre, in programs that are typically sold out. In 2014, 36 works were selected from the 115 that auditioned. Students also present their works in the *EnChoreo* programs in the McAlister Studio, and many participate in the *New Voices Festival,* which features collaborations of upper-level students from all three RTS programs. Some Ryerson students perform in professional dance companies and venues during their undergraduate years. Full-time and part-time faculty in Dance teach and choreograph, nationally and internationally, and they frequently present their research in conferences. Ryerson produces outstanding graduates who perform, choreograph, teach and work in the arts and related fields such as fitness and therapy; some pursue graduate study.

3. STRENGTHS, AREAS FOR IMPROVEMENT, OPPORTUNITIES FOR ENHANCEMENT

Recommendations:

1. Ryerson University should make it a top priority to build/find new, adequate, facilities to house Ryerson Theatre School.
2. While new facilities are being built, a concerted effort should be made to find 3 to 4 rehearsal spaces in buildings close to RTS (or in the surrounding area).
3. FCAD and RTS should make it a priority to augment upper-level elective course choices.
4. FCAD and RTS should make it a priority to improve faculty-student ratios.
5. RTS should review the use of part-time faculty.
6. FCAD and RTS must address areas of acute need such as set and costume design. A resident set and costume designer should be hired, or alternatively a part-time set and costume designer should be hired per production.

7. The following three staff positions should be added in Audience Engagement – Publicity Director, Marketing Assistant and Development Assistant.
8. A full-time Academic Counsellor should be hired.
9. The position of Assistant Technical Director should be added as a key position in RTS.
10. Regular meetings should be set between RTS Faculty/Staff and the Dean of FCAD.
11. The University and FCAD should work with RTS in their efforts to complete a full Market Research analysis.
12. Ryerson University's Development and Advancement Office should be directed, by all levels of Senior Administration, to work with RTS to design an effective, long-term fundraising strategy.
13. RTS should follow through on its goal to institute a national audition tour as soon as is financially feasible.
14. The RTS Curriculum Task Force and all colleagues at RTS should work together to develop and implement an easily accessible Acting/Dance Studies Minor as soon as possible.
15. RTS should provide strong academic advising to encourage interested students early in their university careers to identify a larger number and variety of liberal studies courses to consider.
16. RTS should make a concerted effort to help all students, at every level of their studies, to become aware of the support systems in place and on offer by Ryerson University.

4. FEEDBACK ON EVALUATION CRITERIA

a) Objectives (alignment with institution's plans)

The program is consistent with the institution's mission and academic plans and with the Faculty's academic plan.

The RTS Program Review 2013 articulates the School's and the three Programs' interpretations of UDLES (Undergraduate Degree Level Expectations) which relate closely to the School's ten program learning outcomes. The Program Mapping section provides analysis of how the ten curriculum goals relate to the content and delivery of individual required courses through the four-year programs. The School confirms that requirements and learning outcomes are clear, appropriate and in alignment with the UDLES.

b) Admission Requirements
The RTS Program Review 2013 explains the academic and non-academic requirements for applications to RTS. We assume that the high standards necessary for admission align directly with the potential for student achievement as implied in the learning outcomes identified by RTS.

c) Curriculum
The Acting Program offers a conservatory approach that combines intensive practical training with academic courses based in critical theory. The Program is unique in that it focuses on multi-disciplinary opportunities and at the same time it is quite similar to many post-secondary degree programs across the country in that it offers a mix of conservatory training with academic courses and a mandatory production schedule. The curriculum is stable, relevant and has proven to be effective. There is the promise of exciting and innovative theatrical production programming in the future.

Dance provides rigorous daily training distributed across ballet, modern (Limon and Graham) and contemporary styles and jazz, augmented by work in improvisation, Pilates, vernacular dance genres and partnering/Contact Improvisation. Intensive teaching and mentoring occurs in rehearsals for productions and development of student choreography. In all of these studies, the involvement of professional choreographers and guest teachers gives students very current connections with the profession. It is harder to assess the intellectual content of Dance courses, since course outlines incorporate few or no reading and viewing assignments, bibliography and media resources.

Unlike other Acting Programs (that are discipline specific only), the RTS curriculum is significantly innovative in that it weaves a successful blending of the work that takes place on and off stage. The School has refined the integration of the Acting, Dance and Production Programs by bringing the student body together for many of its integral courses. Students benefit in several key courses from making group trips to see productions, so that live theatre experience of plays, opera and ballet is incorporated directly into teaching and learning.

The current program enjoys a positive national reputation and classes are taught by master teachers in the field. It is the nature of any acting program to contain experiential learning and this is so at RTS. In addition to giving students the opportunity to act in public performances directed by professional artists, Agreements of Cooperation have been signed with the University of Athens and the Hydrama Theatre and Arts Centre in Greece, the University of Southern California, and the University of Edinburgh to support formal work study, internship, and exchange programs for RTS Students. According to the 2014 Program Review, planning "is currently underway for tours, symposia and exchange programs in South Africa, Japan, China, Israel, the United States, Spain, England, Croatia and India, involving students and faculty from all three RTS streams." The faculty of RTS is interested in revising the curriculum to include Dance and Acting internship opportunities.

As well, in 2013, RTS and the English Department offered a joint symposium for their respective writers-in-residence and have plans to continue this practice in the future.

RTS and Dance Collection Danse, the archive and museum of Canadian theatrical dance, have teamed up for three consecutive years to hang and digitally archive mid-twentieth-century painted backdrops from the Dance Collection Danse collection.

THF 500 Performing Arts in the Media is a state-of-the-art course taught by an internationally known choreographer-filmmaker. Although the enrolment identified is huge for a hands-on practical course – 62 students in Fall 2012 – the instructor has an excellent reputation and the course is uniquely offered by Ryerson.

In the Acting Program the modes of delivery are appropriate and effective to meet with the program's identified learning outcomes. However, if it were possible for the number of students admitted to the

Program to be around twenty-two (rather than the present twenty-eight) faculty would definitely be in a position to strengthen modes of delivery. This year there are ninety-five students, in total, in all three years of the Program and this is an extremely high number for the faculty to continually ensure effective delivery of learning outcomes.

Dance faces similar challenges because of the recent decision to admit increased numbers of students. This results in seriously overcrowded studio courses, and also very large numbers of students in theory courses. Given these realities and the small cohort of faculty, can there be enough opportunity for discussion, feedback in class, guidance on choreography and performance, not to mention individual response to writing? The faulty make a valiant effort to achieve elite quality training and education, but they do so in extremely difficult working conditions. The PRT saw few outlines for upper-level elective courses in any of the three programs – few were provided and then as taught by different part-time faculty in different years – so it is hard to discern whether RTS offers sufficiently consistent advanced curriculum.

d) Teaching and Assessment

Course syllabi for Acting students are, for the most part, in-depth and clear. Students would benefit from receiving a more comprehensive and thorough syllabus from some CUPE instructors and so RTS is encouraged to ensure that there is continuity regarding each syllabus within this program. Students are evaluated and receive written comments at the end of every term. Marks are determined by individual faculty members as well as by a panel made up of faculty members. These methods are deemed appropriate and effective and yet the PRT heard from students that they would welcome even more feedback, on an ongoing basis, throughout the year. Faculty members are encouraged to carve out even more time for one-on-one, formal, feedback sessions.

Dance students are assessed on in-class performance at regular intervals by clearly explained grading criteria. Meetings of the faculty teaching team are held with each individual student every term beginning in Year 1 regarding progress in core courses. Students also receive plenty of direct feedback in rehearsals on performance and choreography throughout the year. But in large non-studio courses, is there sufficient feedback on critical thinking and writing?

The means of assessment in the students' final year of the Acting Program are appropriate and effective. This final year at RTS is a non-stop, capstone experience for the students. Students are introduced to working professionals through panel auditions, guest artists, rehearsals and performances and receive necessary feedback as they progress.

Dance students have meetings with their teachers every term to focus on their individual work in class, rehearsals and performances. In the last year, they receive guidance on auditioning and entering the post-university world. Faculty are well connected and respected in the Canadian dance community, so are able to provide significant assessment, advice and help as graduates launch their careers.

e) Resources

The use of human resources has been discussed earlier in the PRT report along with discussion of essential faculty and staff hires. Regarding the use of physical resources, the PRT completely agrees with the assessment of the Theatre School building that "RTS' rapidly aging facility is in urgent need of upgrades, due to lack of space, and below-standard technological capacity and lack of accessibility."
Current classes in excess of 40 students create hazardous study and rehearsal conditions. Pianos need to be upgraded. Faculty offices are inadequate.

The summary of Ryerson Library resources shows a concerted effort to build the collection to support RTS, especially in the area of e-resources, which are readily accessible to students 24 hours a day. Ryerson has acquired print and online items that York and the University of Toronto do not have. The Ryerson Library seems to be robust in video, DVDs, music and art, among other areas. The Information Literacy Program, Reference and Information support, the Writing Centre, as well as workshops and tutorials ("live" and online) available to students seem to be excellent.

f) Quality Indicators

The Acting Program at RTS produces graduates who are confident and prepared to enter the competitive worlds of professional theatre and film. Upon graduation students from RTS hold an internationally recognized degree that gives them an option of pursuing further studies at the graduate level. The Dance Program at RTS produces outstanding graduates who perform, choreograph, teach and work in the arts and related fields such as fitness and therapy; some pursue graduate study.

The faculty CVs attest to an outstanding cohort of leaders in Acting, Dance and Production as academic areas. They have successfully attained advanced degrees, pursued and presented innovative research, published books and engaged in public, professional work such as exhibitions, films and productions. Their track records show that RTS faculty find dynamic ways to integrate teaching and research, and thus RTS students benefit from being involved in an intensive practice-based research culture.

In Fall Term 2012, the proportion of permanent to part-time CUPE faculty was 48.58% full to 51.42% CUPE. In Winter Term, 2013 the relationship is weaker: 46.45% full to 53.55% CUPE. The relationship seems to be 9 or 10 full-time/permanent faculty compared to 45 part-time/contractual. Is the curriculum and part-time faculty consistently deployed enough to ensure content and quality? The outlines provided in the Program Review 2013 come from various years and offerings.

Poor faculty to student ratios in courses are a serious concern, because large course numbers make it difficult for faculty to give adequate individual guidance and response to students on creative and written work. Another part of the problem is the retention of CUPE faculty. As previously recommended, upper-level elective courses should be augmented, faculty-student ratios strengthened and the use of part-time faculty reviewed.

Our meeting with the Admissions Officer made us aware of the very high demand for places in RTS. In 2013, a remarkable 1,237 applicants competed for admission to the entering class of 148 students (29 in Acting, 44 in Dance and 75 in Production).

Regarding times-to-completion and graduation rates, we did not find information in the Program Review Report beyond the data presented in chart form on student retention, which seems robust. Attrition rates would therefore not seem to be a concern.

At present RTS bases much of its information on anecdotal evidence. Evidence on employment after graduation and post graduate study should be collected through extensive market research, as discussed in Recommendation #11. The employment statistics as reported suggest strong results soon after graduation. Detailed surveys and communication with alumni could provide additional useful information for future development, and a robust network of alumni could also be helpful to new graduates.

g) Quality Enhancement

See the comments under the Curriculum. Additional specific initiatives include the clarity of the RTS handbook and the procedure for booking rehearsal space (application form to ensure that times and spaces can be scheduled for fair and maximum use). Such practices go a long way to creating a professional, productive work environment.

5. OTHER OBSERVATIONS

The RTS Program self-study document summarizes the 2003 program review recommendations: “Major concerns centred around the need to improve and enlarge the production and teaching facilities, and the dissatisfaction of students in the Production Program with a perceived lack of critical thinking and communications skills training. Key recommendations included the building of a new facility, and a curricular restructuring of the Production Program”. The 2013 Program Review Weaknesses section reiterates the 2003 concerns and discusses the situation further in relation to facilities.

6. SUMMARY

The current Peer Review Team, visiting more than a decade after the previous Program Review, observes that except for changes in the Production Program's curriculum, little progress has been made to improve and enlarge production and teaching facilities, except for new audio equipment, minimal renovations and basic maintenance. Meanwhile, student numbers have increased in a context of inadequate staffing, at the same time RTS faculty have made significant strides in research, teaching and fund-raising. Ryerson University needs to step up investment in one of its most successful and distinguished Programs.

12. PROGRAM RESPONSE TO THE PEER REVIEW TEAM REPORT

The Chair and faculty of the Theatre School strongly support the findings of the PRT report. All concur that students greatly benefit from a strong, dedicated faculty. While the current RTS facility presents many obstacles, the faculty continue to deliver and enhance an innovative and exciting curriculum. However, as the PRT points out, this momentum is severely hampered by constraints pertaining to the state of the facilities. As in the previous Peer Review Team Report issued in 2003, this PRT also strongly argues for new facilities for the Theatre School. RTS concurs with the PRT that very little has transpired in terms of facility or increased financial support for the Theatre School over the past decade.

The following addresses the 2014 PRT's list of recommendations:

- Despite a number of gestures by the university to improve the physical situation in the Theatre School building (i.e. floor replacements, wardrobe ventilation, and the recent renovation of two acting studios in Kerr Hall West etc.), the primary building at 44 Gerrard Street remains an unsafe and inappropriate venue in which to deliver three undergraduate programs in theatre performance: that of acting, dance, and production. New studios without pillars are essential.

- Given the budget situation, the School has eliminated a great number of electives and technical specializations. For the immediate future, we foresee offering one, or at most two electives per semester per stream.
- As RTS programs have grown and class sizes are now larger, it is difficult to deliver high caliber studio-based training just as it is difficult to offer the large lecture classes with little or no teaching assistant support. If RTS could increase its TA budget and, whenever possible, offer additional sections of large courses, pedagogy would be enhanced.
- The Theatre School currently has 10 full-time teaching faculty, with three additional RFA faculty holding administrative positions of chair (2) and dean (1) and teaching on reduced loads. RTS employs 45 or so part-time faculty to deliver its complex curriculum. Having additional full-time faculty (specifically, 1-2 more full-time faculty in production and at least one more full-time faculty in dance) would provide stronger continuity of pedagogy and student oversight.
- As noted by the PRT, the Theatre School is in dire need of replacing three staff positions that were cut over the past ten years due to budget cuts. They are: Publicity Director, Marketing Assistant and Development Assistant.
- Since the PRT issued its report, a new faculty hire has occurred. Our newest Assistant Professor has expertise in both scenic and costume design.
- With the recent hire of a new Administrative Coordinator, we also have a full-time Academic Coordinator as well as a part-time, non-union administrative assistant serving both positions.
- The full time position of Assistant Technical Director should be added as soon as possible to ensure that all thirteen productions presented by RTS on an annual basis have staff expertise and supervision for all aspects of each build. Students are often inexperienced and to maintain safety while training students on power equipment, staff supervision is essential.
- All faculty members concur that a much stronger relationship be established between the Dean of FCAD and the Theatre School.
- We endorse the recommendation to complete a full Market Research analysis.

- RTS would welcome the assistance and support of the University Office of Advancement in developing a clear strategic plan for fund development in the following areas: student scholarships; special projects; creative research; and capital improvements.
- RTS acknowledges that a national audition tour would provide several crucial opportunities for the School. Such a tour would brand the school nationally; garner the interest of the most talented Canadian actors, dancers, and production students; and increase enrolment numbers substantially.
- An Acting/Dance Minor was approved late last academic year and was launched in Fall 2014 to great success.
- With the full-time position of an RTS Academic Coordinator it is now possible to better serve the RTS students in identifying a broader variety of liberal studies courses and open electives. We believe that the full time Academic Coordinator will be able to assist RTS students to become aware of the support systems offered by the Theatre School and by Ryerson University.

13. DEAN'S RESPONSE (Dr. G. Hauck)

To begin with, I would like to extend my sincerest gratitude to the members of the Peer Review Team—Professors Selma Landen Odom (Chair), Susan Stackhouse and David Vivian for the time they spent visiting the Theatre School and composing the comprehensive, frank and fair report based on their assessment of the Theatre School's three undergraduate programs vis-à-vis the Self Study offered by the School. The peer review team had been chosen according to the expertise each reviewer was able to bring to the three distinct programs in the School, with the understanding that each would contribute his/her expertise to the report. Unfortunately, Professor Vivian was unable to submit his assessment of the Production Program, which left Professors Odom (Dance) and Stackhouse (Acting) with the unenviable task of incorporating what they had observed about the Production program into their assessment of their respective areas of expertise. I am especially grateful to them for going well beyond the original agreement to ensure that the report would be as comprehensive and detailed as possible on all three programs.

The PRT report covers the School's self-study in considerable depth and provides a thoughtful and fair appraisal of the School's strengths and challenges.

I am also grateful to members of the Theater School—students, staff, and faculty—who volunteered their time and made themselves available to interviews by the PRT. Special thanks go to the Chair of the School, Professor Peggy Shannon, for overseeing the compilation of the Self Study and for her response to the Peer Review Team's report. Her suggestions on how to implement the recommendations offered by the PRT are welcomed and much appreciated. I will be responding to both documents jointly below.

STRENGTHS

I was pleased to read that the PRT found much to commend about Ryerson's Theatre School and identified numerous strengths across the entire spectrum of the School's activities. In summary, these include:

- The School's distinction of offering a conservatory-style training program in an academic setting.
- The numerous opportunities for students to showcase the skill and knowledge they have acquired in the course of their training through public performances and workshops.
- The rigorous nature of the training offered by the School in all three programs, which prepares students well for a demanding career.
- The high calibre of faculty and staff who "have successfully attained advanced degrees, pursued and presented innovative research, published books and engaged in public, professional work such as exhibitions, films and productions." While this doesn't apply across the board, the School has made noticeable progress in this regard since the 2003 review. This includes considerable strides taken in fundraising and research partnerships.
- The School's international orientation and outreach, most notably the *Women in War* Project, which has taken numerous students and faculty to Greece for joint theatrical ventures and research enterprises over the past three years.

- The evident professional success of some of the graduates in all three programs, even though no hard data are provided which compare the Ryerson Theatre School's graduates to graduates from other Theatre training programs in Ontario or Canada-wide.
- The School's successes in fundraising and developing training programs for external partners (e.g. the summer program which after three years of incurring deficits is finally breaking even).
- The School's success in integrating students in all three programs in a small number of shared courses.

In combination, these strengths lead the PRT to conclude that the Theatre School at Ryerson "enjoys a very strong reputation in the Canadian theatrical community" and that "Ryerson produces outstanding graduates who perform, choreograph, teach and work in the arts and related fields."

CHALLENGES AND OPPORTUNITIES

While acknowledging that there is much to celebrate at the Ryerson Theatre School, the PRT also identifies numerous challenges that would benefit from careful consideration and review; and it does so in some detail. Here is a summary of the most pertinent ones and some recommendations on possible remedies or solutions.

Space

It is important to recognize that many of the most serious challenges the PRT report identifies are intimately connected with the School's long-standing space issues. Although the School is situated ideally in close proximity to North America's third most important English-language theatre centre with multiple opportunities for experiencing live theatre, the School's physical facilities are "absolutely not adequate for the present needs of the programs." The problems with the School's dire physical attributes are legion and cover the gamut of inadequate performance spaces, overcrowded offices and infestations of vermin, to floods, termite infestations and unacceptable temperature fluctuations. With an increase in the number of students over the past ten years, the School's spaces are also too confined to accommodate students adequately for training purposes.

Following years of deferred maintenance and numerous false starts to comprehensively address the School's space challenges, the University has finally committed to a two-pronged approach to move the School out of its present building at 44 Gerrard Street. Initially, as an intermediate solution, the School's rehearsal and performance spaces will be moved to a combination of locations on campus comprising Kerr Hall West, the Student Learning Centre and ancillary spaces yet to be determined. In the long term, the University has committed to moving the School to a dedicated location in close proximity to campus. Details have yet to be finalized, but it is anticipated that the new building will be ready for occupancy by 2019/2020.

Also part of the pervasive space dilemma, the PRT report notes that faculty offices are entirely inadequate; as many as five faculty members share a small room, leaving few opportunities for private meetings with individual students and/or colleagues. The move from 44 Gerrard Street will also address the inadequate offices spaces. In other words, the University has begun to act vigorously on Recommendations 1 & 2 offered by the Peer Review Team.

Curriculum

The dearth of upper-level electives identified by the PRT in Recommendation 3, according to the RTS chair, results from the budget cuts experienced over the past few years. However, the relationship between budget cuts and lack of *upper*-level electives is not entirely apparent to me given that the Theatre School (like most departments at Ryerson) has been able to mitigate budget reductions by increasing its student cohort. I see the problem more as a result of curriculum planning challenges. The School has not revised its curriculum for some time and would be well advised to consider introducing more courses that offer upper-level students a broader choice of offerings. The proposed new Ryerson curriculum structure should assist the School in accommodating the necessary changes. A similar predicament is addressed in Recommendation 14 with respect to the implementation of a Dance Minor. However, as the School's chair indicates in her response, such an Acting/Dance Minor "was launched in Fall 2014."

Faculty/Staff

The majority of recommendations made by the PRT concern faculty and staff complement and related issues. Improving the faculty-student ratio (Recommendation 4) is a commendable objective, but this is difficult to achieve for most Ontario Universities at a time of shrinking budgets and greater-than-ever reliance on increasing student numbers to mitigate the shrinkage. Since hiring more full-time faculty is not a viable option for most Ontario universities, the School might investigate opportunities to counteract the widening faculty-student ratio by (a) reducing production and ancillary costs (without jeopardizing pedagogy or the students' learning experience); and (b) reorganizing the curriculum in such a way that lower student intake remains financially viable. The latter option references especially the unusually high number of part-time instructors (45) required to "deliver [the School's] complex curriculum." I will be happy to act on the PRT's Recommendation 5 to "review the use of part-time faculty" with the School's curriculum committee.

The remainder of the PRT's recommendations regarding perceived faculty or staff deficits (Recommendations 6, 7, 8 and 9) have either been addressed already or are being investigated at the time of writing. Thus, as the School's chair confirms in her response, the hires referenced in Recommendations 7 and 8 have been made to the satisfaction of the School.

Regarding Recommendations 6 and 9, I observe the same issue as in other areas of the School's operations, namely the propensity to seek solutions locally without giving full consideration to services available across the Faculty or to consider best practices at other Theatre Departments. The principal rationale offered for hiring an Assistant Technical Director, for example, is that the present Technical Director is unable to meet the challenges of 13 annual productions. For any theatre school in Ontario (or even across Canada) this is an unusually large number of productions—even for a school (such as ours) based on the model of a conservatory. Most college and university-based theatre and dance programs produce fewer than half a dozen productions per year, without jeopardizing their students' learning experience. Moreover, some schools hire senior students as Assistant Technical Directors, providing them not only with a valuable learning experience but also a small income. For a School that offers a full Production option this might be a relatively inexpensive yet pedagogically profitable opportunity. A precedent for this alternative is evident in that the School has taken advantage of the experience of senior Production students for its publicity outreach and audience engagement efforts. As well, in response to Recommendation 6 to add three staff positions to the School's staff complement, the School might consider taking greater advantage of the Marketing, Outreach, Web Development and Development opportunities offered by the Faculty than it has done so far to overcome its challenges in these areas. These services are offered to all schools in FCAD and might ease the pressures the School feels to bring to the public's attention its "high level of artistic work, increase the market brand of the school, grow a new audience and strengthen ties with the schools within the GTA."

Administration

Following the opening statement that "RTS enjoys a positive working relationship with Ryerson University's senior administration, including President, Provost and Dean," the PRT report asserts at a later point that "relations between the Faculty/Staff of RTS and the Dean of FCAD would benefit from increased opportunities to listen to, and learn from, each other" and recommends that "regular meetings should be set between RTS Faculty/Staff and the Dean of FCAD." …The Dean, Associate Deans and Deanery staff are very open to a facilitated meeting as proposed in the PRT's Recommendation 10.

Development/Outreach

The PRT report observes that numerous performances presented annually at the School are "not as widely attended as they deserve to be." According to the report, marketing efforts fall short of their goals, partly because there is no dedicated marketing and public relations staff at the School. At the same time, however, it must be noted that RTS has not taken advantage of the services offered by FCAD's Director of Outreach and Communication. In the Fall semester 2014, for example, the Dean's office was not informed of … any of the planned performances. The claim that students who had been put in charge of marketing and public relations were over-extended is noted; however, it also raises the question of why students chosen for this task were ill prepared to seek out some of the most obvious resources, such as the Director of Outreach and Communication or the Ryerson Communication and Design Society (RCDS).

I agree with the PRT's observation that much of the information RTS needs for effective outreach and communication (graduation rates, employment numbers post graduation, reports on program quality, etc.) is based on anecdotal rather than factual evidence. This can be the cause of confusion and provides an unstable database on which to plan for the future. This dilemma is evidenced in the provision of information offered the Peer Review Team *outside* the self-study. The "Corrections" section below provides more information in this regard.

Student Experience

Recommendations 15 and 16 address the apparent lack of awareness RTS students have with respect to many of the services and opportunities offered by the Faculty of Communication & Design and across campus. For reasons that may require further investigation there is a perception that Theatre students are not as well integrated into the campus community as students in other programs. Their relative "isolation" on the periphery of campus may be responsible for that, as may the unusually significant demands the program makes on their time. It is my hope that the more open curricular structure being considered for all Ryerson students will help address Recommendations 15 and 16, as will the new Student Learning Centre with its legion of student support services. Like the School's chair, I fully endorse the PRT's final recommendation that "RTS should make a concerted effort to help all students, at every level of their studies, to become aware of the support systems in place and on offer by Ryerson University" and, I might add, the FCAD Dean's office and the Ryerson Communication and Design Society (RCDS).

Corrections

For the record, some of the comments and assessments made in the PRT's report require correction and/or expansion. On several occasions, for example, the PRT assumes that the training program combines "intensive practical training with academic courses in critical theory." This is not accurate. Except for a theatre history course and a course in Creative Performance Studies, there are no required academic courses in what could be described as "critical theory". Interestingly, the PRT itself makes reference to the lack of "intellectual content" in the Dance program, with the sole exception of a course taught by a part-time instructor.

The assertion that "figures indicate that in 2011 and 2009…applications to RTS represented nearly half the number of applicants to all programs in FCAD, and in 2011 Acting alone drew almost a quarter of the total number of applicants to FCAD (775 out of 3,231)" is demonstrably incorrect. In fact, in both 2009 and 2011 the number of applicants to RTS represented about 13% of the total number of applicants (1431 out of 10,650 in 2009 and 1,288 out of 9,365 in 2011). Since the RTS programs represent one quarter of all FCAD programs, that number is actually well below the average. Similarly, the applications for the Acting program alone did not draw 25% of the total number of FCAD applicants as the PRT report suggests but rather 8%, roughly the exact average for one out of 12 programs. These misrepresentations are unfortunate in the context of an otherwise clear, thoughtful and fair analysis of the data provided in the Theatre School's Self-study and the observations made during the site visit.

CONCLUSION

The PRT concludes its report by suggesting that "more than a decade after the previous Program Review…little progress has been made to improve and enlarge production and teaching facilities, except for new audio equipment, minimal renovations and basic maintenance. Meanwhile, student numbers have increased in a context of inadequate staffing, at the same time RTS faculty have made significant strides in research, teaching and fund-raising. Ryerson University needs to step up investment in one of the most successful and distinguished Programs." As mentioned above, following numerous unsuccessful attempts during the past 20 years, the University has finally made a full commitment to improving production, teaching and office facilities, thus providing students, staff and faculty with the opportunity to work and learn in an environment that physically reflects the high calibre of its human capital. This should go a long way to ensuring that the Ryerson Theatre School will maintain its position as one of the premiere theatre schools in Canada.

As per our best practices, I will be engaging in an ongoing discourse with the faculty and staff of the Theatre School, the Vice-Provost Academic and the Provost and Vice-President Academic about opportunities to implement those recommendations offered by the PRT that have not yet been addressed.

14. ASC EVALUATION

The Academic Standards Committee assessment of the Periodic Program Review of the Ryerson Theatre School (Bachelor of Fine Arts) indicated that overall the review provided an informative evaluation of the program. The ASC also noted the recent positive developments with regards to space issues.

The Academic Standards Committee recommends that the program provide a follow-up report on the status of the initiatives outlined in the section entitled Vision, Goals and Strategies for 2013 – 2018. Also, the follow-up should include an update on (1) the review of upper-level course offerings in order to give students a broader choice, as noted by the program, the PRT, and the Dean, (2) the examination of assignments and course content (e.g., critical theory) to identify and resolve gaps and overlaps, and (3) the progress on the development of new minors.

Follow-up Report

In keeping with usual practice, the follow-up report which addresses the recommendation stated in the ASC Evaluation Section is to be submitted to the Dean of the Faculty of Communication and Design, the Provost and Vice President Academic, and the Vice Provost Academic by the end of June, 2016.

Date of next Periodic Program Review

2022 - 2023

Recommendation

- Having satisfied itself of the merit of this proposal, ASC recommends: *That Senate approve the Periodic Program Review of the Ryerson Theatre School – Bachelor of Fine Arts*

C. PERIODIC PROGRAM REVIEW FOR HOSPITALITY AND TOURISM MANAGEMENT – BACHELOR OF COMMERCE (BComm)

1. BASIC INFORMATION

a) Program Description: The four-year Bachelor of Commerce in Hospitality and Tourism Management (HTM) is a full time program. HTM is one of six schools in the Ted Rogers School of Management.

b) Program History:

- Established in 1950 (then known as the Food Technology Department); the first hospitality program in Canada
- During the last 64 years, in order to maintain its reputation for providing innovative and responsive programming in hospitality and tourism management, the history of the School has been marked by constant change in response to the dynamics of market needs, competition, and other influences in the external environment. Program name changes, granting degrees rather than diplomas, broadening the curriculum to encompass both hospitality and tourism management, the acquisition of a hotel to house the program, and an extension of the program's outreach to international markets are among the many changes.
- The School moved into a new Faculty of Business Building during the summer of 2006; HTM built a demonstration restaurant and test kitchen.
- The Faculty of Business was named the Ted Rogers School of Management in 2007.
- The HTM Research Facility was renamed the Institute for Tourism and Hospitality Research in 2010

2. DEVELOPMENTS SINCE PREVIOUS PROGRAM REVIEW

Below is a description of the developments that have taken place since the 2007 program review.

- The program has reviewed each course to ensure that advanced/emerging theoretical and management concepts have been incorporated in response the recommendation made by Academic Standards in their Report to Senate in the previous academic review. A new simulation in restaurant management was added in the revenue management course. The research course has been changed to focus on evaluation and market research and where possible working with industry partners on live projects.
- The school introduced new courses in (1) Asset Management and (2) Ethics. Sustainability and Corporate Social Responsibility have become a significant focus in today's business world and the school has reflected this in course offerings.
- The school has continued it efforts to ensure that each course has a significant written assignment component and that the students' research and enquiry skills are being taught in the two required research courses. These skills are further refined in research based assignments given in their other required courses.
- Each course has been reviewed and mapped for rigour in course content, testing and duplication. Course flow has been reviewed to ensure that concepts are introduced and reinforced to increase students' proficiency.
- In the fall of 2011 faculty members from HTM embarked on a strategic planning process for scholarship, research, and creative (SRC) engagement and the School's Research Institute.
- Connection to industry and partnerships are a hallmark of HTM and are important to facilitating research. To maintain connections, HTM faculty continue to contribute their expertise to several international, national, provincial and local boards/organizations.
- HTM faculty members who are members of the Yeates School of Graduate Studies are involved mainly in the interdisciplinary Environmental Applied Science and Management, advising MBA Major Research Papers, or as adjunct professors at external universities (e.g., University of Waterloo; University of Manitoba).
- The School has reviewed its business curriculum to align with all of the other Schools in the Ted Rogers School of Management, embedding within its own core curriculum the requirements agreed upon by all schools to represent a Bachelor of Commerce Degree.
- Since 2007, student intake has increased, however it is still a challenge to meet the high academic quality we are seeking. The School continues to work with undergraduate recruitment to develop exciting materials to tell the story of the school.
- With the introduction of a mentoring program with 1st year students as part of the HTH102 course Service and Professionalism, there has been a marked improvement with the first year student's academic success.
- Mandatory testing for math skills and written skills was introduced in 2008.
- TRSM has invested heavily in the area of counselling with learning strategists for all years and program coordinators and assistants have been given further training on academic advising. The school's website has been updated to provide students with more information on where they can receive academic advising and help programs. The school continually works at providing opportunities for social gatherings with the students to provide exchange with industry and faculty outside of the classroom and faculty office hours.
- In 2009 the school signed a MOU with UQAM and its Hospitality and Tourism Department to run a joint annual research conference. The conference also includes a student case competition.
- All courses have been vetted and have incorporated Assurances of Learning Goals as outlined in the AACSB accreditation standards and faculty are working to meet the research standards as agreed upon by AACSB accreditation standards committee in order that the school be in a position to meet the required standards by the next review of the TRSM current accreditation.
- The school offers 4 executive education/professional development programs targeted to three sectors of the industry – event management, hotel management and restaurant management.

Annual Academic Plan
The School's Annual Academic Plan was developed in 2007. HTM continues to (a) pursue AACSB accreditation when the re-accreditation review for TRSM occurs (2015), (b) redress the unequal workload, (c) support program innovations, and (d) improve the quality of our programs.

3. SOCIETAL NEED

a) Current and Anticipated Societal Need

- Tourism is considered the world's largest industry. According to the United Nations World Tourism Organization (UMTO), in 2012 it was estimated to account for $6.6 trillion of economic activity (USD) and 260 million jobs worldwide. By 2021 it is estimated tourism will account for $11.9 trillion of economic activity and 323.8 million jobs.
- In Canada, the Canadian Tourism Human Resources Council (CTHRC, 2010) reports that the industry generates 1.6 million jobs or 9.2% of all jobs in Canada.
- Canadian tourism businesses are finding it increasingly difficult to recruit and retain employees. According the Tourism Industry Association of Canada and the CTHRC Canada is facing growing skill shortages across all sectors. The Conference Board of Canada, indicates there will be a shortfall of 950,000 workers in the Canadian economy by 2020.
- University Planning Office data shows that HTM had 100% of degree graduates employed in a related field 6 months after graduation in 2000 with the exception of a dip in 2003. The most recent figures for 2008 show almost 89% employed. These rates are consistently higher than for Ryerson and TRSM. Two years after graduation, the exceptionally high rate of employment holds, with a most recent high of 94.4%, again ahead of Ryerson and TRSM.
- A survey of alumni who have graduated in the last five years, revealed that about two-thirds were able to find a job in the sector of the industry they most wanted to work in upon graduation and agreed that their degree provided good preparation for a career. Also 43% of recent alumni felt they were able to advance more quickly because of their degree.

b) Existing and Anticipated Student Demand

Existing student demand has been steady and HTM enrolment has been growing. HTM had a high of 9.9 applicants to registrants in 2006-07 (Table 1). More recently in 2011-12 the ratio has declined to 6.1. The decline in ratio of first choice applicants to actual registrants reflects the decision to admit more students in recent years. Despite the decreasing ratio, these data indicate a continued demand for and interest in the program. Another factor may be related to the recent ability of colleges to grant four year degrees.

Table 1
Applications all choices to registrants

	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Ryerson	8.9	10.2	10.4	10.2	10.0	9.2	8.7
Ted Rogers School of Management	8.3	8.5	9.2	9.2	8.0	7.4	6.9
Hospitality & Tourism Mgt.	**7.2**	**9.9**	**8.7**	**7.7**	**7.6**	**6.4**	**6.1**

The intake numbers in HTM increased from 545 in Fall 2005 to a high of 717 in Fall 2012. The student body population in HTM by gender has remained consistent over the last seven years, with approximately two-thirds female to one third male.

Graduate Satisfaction (Table 2) shows results of the 2006, 2009, and 2012 graduate surveys. The percentages indicating "satisfied" or "very satisfied" were approximately 90% for HTM. Since 2006 the percent who would recommend HTM to others has declined slightly from 93% to 87%. Overall, alumni respondents (75%) agreed the program was high quality, and the vast majority (83%) reported HTM was their first choice to pursue their education. The top five reasons they chose HTM were: their interest in the field; campus location; variety of courses; value of a business degree; and the School's reputation.

Table 2

Graduate Satisfaction - Degree of Satisfaction with Overall Quality of Education 2012 (%)

		N	Very Satisfied	Satisfied	Dis-satisfied	Very Dissatisfied
Ryerson	**2012**	1332	16.0	66.5	13.6	4.0
Ted Rogers School of Mgmt	**2012**	426	14.1	67.4	14.3	4.2
Hospitality & Tourism Mgmt	**2012**	38	10.5	79.0	7.9	2.6

4. PROGRAM OUTCOMES

a) Program Outcomes

HTM developed 10 overarching learning outcomes based on the curriculum's three component structure of hospitality and tourism operations management, research and analytic skills, and business and strategic management.

A graduate of the Ted Rogers School of Hospitality and Tourism Management will be able to:

1. Demonstrate basic competencies in running profitable Hospitality and Tourism Operations in the lodging, food and beverage, meetings/conferences/events and tourism industry sectors. Students should be able to:
    a. Plan and manage a breadth of department operations in the lodging industry
    b. Plan and manage food and beverage operations
    c. Describe the tourism system including delivery and distribution of tourism products/services/ experiences
    d. Describe the characteristics and behaviour of tourists/guests
    e. Explain and demonstrate service quality management and value creation (delivering on customers' expectations and creating a valuable experience for the customer)
    f. Demonstrate operational knowledge and experience – "walking around knowledge" (can explain the core facts and figures of the hospitality and tourism)
    g. Recognize and describe the impact of the social, economic, cultural and environmental contexts of a global tourism and hospitality industry
    h. Explain sustainability and apply principles of sustainability in the tourism and hospitality industry
    i. Plan and manage meetings and events
    j. Identify and manage key drivers of profitability
    k. Apply supply and demand analysis within the hospitality and tourism industry

2. Exhibit competencies in and knowledge about the role of IT in Hospitality and Tourism Operations Management. Student should be able to:
    a. Demonstrate effective use of communications and information technology (CIT) for HTM applications and identify the role of IT in advancing strategic business goals
    b. Demonstrate use of computer technology in operations management and utilize systems and software to improve understanding of business concepts

3. Understand the importance of multiculturalism and diversity in the workplace. Students should be able to:
    a. Demonstrate self-awareness, sensitivity, and respect for diversity in terms of people, cultures, business, and management issues

4. Demonstrate individual attributes that will lead to success in Hospitality and Tourism Operations Management. Students should be able to:
    a. Manage one's own time, behaviour, motivation, and initiative
    b. Identify characteristics required for success in the industry and assess one's own strengths and weaknesses (e.g. people oriented, emotional intelligence)

5. Demonstrate basic leadership skills. Students should be able to:
    a. Use evidence-based knowledge of the industry to provide leadership in advancing the field of hospitality and tourism
    b. Practice effective team and group leadership including active listening, negotiating, persuasion, and conflict resolution

6. Exhibit competencies in critical thinking and problem solving. Students should be able to:
    a. Use appropriate quantitative analysis, problem solving, and decision making techniques to identify issues, trends, and solve business problems
    b. Use appropriate qualitative analysis, problem solving, and decision making techniques to identify issues, trends, and solve business problems
    c. Identify assumptions, evaluate statements in terms of evidence, detect false logic or reasoning, identify implicit values, define terms adequately, and generalize appropriately
    d. Synthesize, analyze, and interpret a range of information using qualitative and quantitative techniques for the purpose of making sound and ethical decisions

7. Demonstrate competent research skills. Students should be able to:
    a. Relate and compare data from different sources, identifying issues, securing relevant information and identifying relationships
    b. Apply the research process to identify issues and trends in the hospitality and tourism industry, inform decision making, and create business development opportunities

8. Demonstrate ethical and reasoning skills. Students should be able to:
    a. Recognize and analyze ethical dilemmas, identify possible solutions, and defend resolutions for practical situations that occur in organizational environments
    b. Employ ethical decision making
    c. Describe and apply principles of corporate social responsibility

9. Display competent communication skills. Students should be able to:
    a. Express ideas and convey information effectively, accurately, and appropriately in writing
    b. Express ideas and convey information effectively, accurately, and appropriately through verbal presentation
    c. Express ideas and convey information effectively, accurately, and appropriately through use of media commonly used in business settings.

10. Demonstrate competent business management skills. Students should be able to:
    a. Apply principles of accounting and reporting to summarize and communicate the economic condition of an organization
    b. Interpret the financial side of the balance sheet to review and evaluate the corporate structure and return on investment of an organization
    c. Apply organizational behaviour theory to analyze and solve organizational problems
    d. Describe the strategic role of human resources in an organization and apply sound HR practices to hire, supervise, and evaluate employees
    e. Prepare a marketing plan/strategy and apply marketing concepts in a service and experience industry
    f. Prepare a strategic plan
    g. Prepare a business plan
    h. Apply managerial skills and cultural understanding to function effectively in the changing business environment
    i. Appraise the contexts of business (political, social, cultural, technological, demographic, environmental and micro- and macro-economic) from all stakeholder perspectives in order to make decisions

b) Program Consistency with other Academic Plans

Shaping Our Future: School Academic Plan (2008-2013)

The School's Academic Plan was based on the Six Major Goals of the Faculty's Academic Plan which was based on the Universities 5 key Goals. The School also added two of its own goals: attracting highly qualified and motivated students and improving the quality of the curriculum. All goals are in line with the University and Faculty Plans and all have been completed except for our Goal of Graduate Programming.

5. ACADEMIC QUALITY

a) Description of the Program Curriculum and Structure

The curriculum was designed to provide breadth of knowledge across a diverse field. All students are exposed to the lodging, food and beverage, and tourism sectors. The program has a strong business management orientation, validated by the fact that at least 54% of the courses taken by all HTM students relate to business disciplines. The curriculum has capstone courses with direct linkages to industry practice and most have an industry associated project providing the student with real life situations and ethical practices of business.

Professional Required - 20
Professional Elective – 7
Professionally Related Required - 7
Professionally Related Electives - 5
Liberal Studies - 6
TOTAL - 45

HOSPITALITY AND TOURISM MANAGEMENT CURRICULUM	
1st SEMESTER REQUIRED: ECN 104 Introductory Microeconomics HTF 100* Introduction to Foodservice HTH 102 Service and Professionalism HTL 101* Lodging Organization and Operations HTT 202 Tourism Concepts ITM 102 Business Information Systems I * Students will be assigned one of HTF 100 or HTL 101	**2nd SEMESTER** REQUIRED: ACC 100 Introductory Financial Accounting CMN 207 Communication in Hosp and Tourism Mgt ECN 204 Introductory Macroeconomics HTF 100* Introduction to Foodservice HTH 503 Human Resources Administration HTL 101* Lodging Organization and Operations LIBERAL STUDIES: One course from Table A * Students will be assigned one of HTF 100 or HTL 101
3rd SEMESTER REQUIRED: HTH 601 Organizational Behaviour I HTL 507 Lodging Facility Management HTM 302 Marketing Principles HTT 303 Travel Production Distribution QMS 102 Business Statistics I LIBERAL STUDIES: One course from Table A	**4th SEMESTER** REQUIRED: HTA 402 Managerial Accounting for Hosp/Tourism HTF 201 Food and Beverage Cost Control Systems HTM 402 Strategic Market Planning HTR 741 Research Concepts LAW 122 Business Law LIBERAL STUDIES: One course from Table A
5th SEMESTER REQUIRED: HTA 602 Financial Management for Hosp/Tourism HTD 500 Concepts, Design and Feasibility LIBERAL STUDIES: One course from Table B PROFESSIONAL: Two courses from Table I PROFESSIONALLY-RELATED: One course from Table II	**6th SEMESTER** REQUIRED: HTH 501 Advanced Service Management Systems HTI 404 Hospitality Information Systems LIBERAL STUDIES: One course from Table B. PROFESSIONAL: Two courses from Table I. PROFESSIONALLY-RELATED: One course from Table II
7th SEMESTER REQUIRED: HTA 708† Revenue Management for Hosp/Tourism HTH 901 Management Career Strategies HTR 841† Research and Data Analysis PROFESSIONAL: One course from Table I PROFESSIONALLY-RELATED: Two courses from Table II † Students will select one of HTA 708 or HTR 841 in 7th semester.	**8th SEMESTER** REQUIRED: HTA 708† Revenue Management for Hosp/Tourism HTR 841† Research and Data Analysis LIBERAL STUDIES: One course from Table B PROFESSIONAL: Two courses from Table I PROFESSIONALLY-RELATED: One course from Table II † Students will select one of HTA 708 or HTR 841 in 8th semester.

TABLE I (seven courses)	
HTF 505 Restaurants from Concept to Operations	HTM 604 Hospitality and Tourism Sales
HTF 506 Food and Beverage Operations	HTM 621 Advertising and Promotion
HTF 601 Beverage Management	HTR 900 Director's Special Project
HTH 700 Professional Ethics in Hosp/Tourism	HTT 501 Introduction to the Gaming Industry
HTH 706 Advanced Hospitality Management	HTT 509 Issues/Policies in Hospitality/Tourism
HTI 746 Destination Management Systems	HTT 510 Sustainable Tourism Development
HTL 503 Meeting and Convention Management	HTT 605 Business Aspects of Incentive Travel
HTL 510 Asset Management in Hospitality	HTT 607 Event Management
HTL 701 The Value of Branding in Lodging	HTT 622 Destination Management and Marketing
HTL 801 Strategic Management in Hosp/Tourism	

See the Ryerson Calendar for Table II Professionally Related Electives and Liberal Studies Electives.

b) Minors declared by HTM students in 2013 (67% of graduates)

Accounting 1	Human Resources 47	Marketing 17
Economics 1	Law 1	Organizational Leadership 2
Entrepreneurship 1	Finance 2	Professional Communication 9
		Retail and Services Management 3

c) Mapping to Program Learning Outcomes

i. Operations Management

Overall, of the 27 required courses, 9 courses address this area at an introductory level, 10 courses reinforce it, and 8 courses cover to a proficiency level. These proportions suggest balanced offering levels in the *required courses.*

1. Hospitality and Tourism Management	
LO 1a, 1b, 1c	The learning outcomes are addressed in required courses at the introductory level in two courses for lodging, three courses for food and beverage but only by one course for tourism. The same pattern exists for reinforcement and proficiency in higher years. There is a lack of reinforcement of tourism concepts in the core.
LO 1d	No reinforcement in year 3 and 4 required courses. There is ample coverage of this outcome in elective courses.
*LO 1*e, *1f, 1g*	Appropriate in sequence and coverage at both core and elective levels.
LO 1h	While this goal is introduced in three courses in year one there is no reinforcement of it in the core curriculum. There is no noted coverage in food and beverage courses.
LO 1i	There is no core course that introduces this area.
LO 1j	Viewed as appropriate in sequence and coverage in the core and strongly addressed to the proficiency level in the electives (6 courses).
LO 1k	Little reinforcement in core courses.
2. Role of IT in HTM	
LO 2a	A lack of coverage in year two.
3. Multiculturalism and Diversity	
LO3a	A gap of coverage in years 2 and 3 after multiple introductions (4 courses) in year one. There is just one reinforcement in year 2 and nothing again until year 4. While coverage in electives is high at reinforcement (6 courses) and proficiency levels (5 courses), the nature of this learning outcome necessitates stronger and more strategic coverage in the required courses.
4. Individual Attributes	
LO4a	Reinforced well (5 required; 5 electives) but needs more focus in year 1, where currently only one course is noted.
LO4b	A gap in coverage/reinforcement in year two. In year four, HTH 901 addresses this individual attributes learning outcome to proficiency.
5. Leadership and Group Dynamics	
LO5a, 5b	Appropriate in sequence and coverage in the core and strongly reinforced (8 courses) in the electives.

ii. Research and Analytical Skills

There appears to be a number of required courses that introduce and reinforce research and analytical skills learning outcomes in year two, which needs to be reviewed for logical order of semesters (reinforcement occurs repeatedly before introduction).

6. Critical thinking and problem solving	
LO 6a, 6b.6c	These learning outcomes are mainly addressed by required courses in year two at an introductory level and later reinforced or taught for proficiency. In the elective courses, typically taken in third and fourth years, it is noted that 6 courses do not address any of these learning outcomes at all.
7. Research	
LO 7a, 7b	Covered at all levels, with proficiency occurring in the required curriculum, which has been a hallmark of the HTM program.
8. Ethical Understanding and Reasoning	
LO 8a, 8b	Only dealt with at a proficiency level in the electives.
LO 8c	There is minimal coverage in required courses.

iii. Business and Strategic Management

9. Communication	
LO 9a	Receives extensive and progressive attention in the core curriculum and is reinforced or proficiency in all elective courses.
LO 9b	A gap in reinforcement year 2 required courses.
LO 9c	A gap in year 2 required courses and also year 3.
10. Business Management *	
LO 10a, 10b	Addressed to proficiency in four required courses, in each of years one through four.
LO 10c, 10d	Singularly covered by HTH 601 Organizational Behaviour to proficiency level in year 2. There is no other introduction or reinforcement in the core curriculum. A few elective courses also address these learning outcomes.
LO 10e	Covered a bit more extensively in the core and electives than the previous business management learning outcomes.
LO 10f	Taught at all levels in the required curriculum and reinforced in the electives, plus addressed at proficiency level in HTF 601.
LO 10g	In the core at every year in the program this goal is addressed from introduction through to proficiency by the courses focused on financial management. The elective courses focused on meeting, events, and incentive travel also address this goal at a proficiency level.
LO 10h	Covered at all levels in the core curriculum and reinforced by several electives (5).
LO 10i	Introduced in year one and reinforced throughout the required curriculum (8 courses). It is reinforced in 7 elective courses, and meets proficiency in 6 electives.

d) Equity, Diversity, and Inclusion (EDI)

The very nature and scope of the hospitality and tourism industry demands an understanding of diverse populations in order to be successful. It is an industry founded on service and experience. Traditionally this has focussed primarily on diversity in terms of culture. More recently, issues related to gender, sexual orientation, disability, ethics, and corporate social responsibility are being included in the study and management of hospitality and tourism. From market segmentation of international tourists to sound human resource management, to community based tourism initiatives by Aboriginal peoples, the breadth of knowledge required by hospitality and tourism professionals ranges from global business practices to cross-cultural understandings of people and place. The HTM curriculum addresses issues of diversity, equity, and inclusion in a variety of ways to facilitate understanding of both the phenomenon of tourism and the hospitality management implications. This is based on HTM's curricular content, teaching methods, and major assignments.

e) Curriculum and Structure – Undergraduate Degree Level Expectations (UDLES)

The six Undergraduate Degree Level Expectations were mapped to the HTM program's ten learning outcomes. All HTM learning outcomes address the UDLEs in some capacity and there is good correspondence between the overarching knowledge, skills, and attitudes explicated in the UDLEs and HTM's learning outcomes.

Depth and Breadth of Knowledge. Understanding of key disciplinary concepts for the degree is supported by the two main curriculum components referred to as "operations management in hospitality and tourism management" and "business and strategic management", which encompass learning outcomes 1 and 10, respectively. Hospitality and tourism are inherently interdisciplinary and combined with the business courses, student exposure to major fields of intersection is quite high. For example, several courses also establish a sound understanding of theories and concepts that crosscut those sectors, such as service management, marketing, and information systems.

The following required courses either introduce (I), reinforce (R), or address proficiency (P) of learning outcomes 6a, b, c, d. HTL 507 (R), HTM 302 (I), HTA 402 (P), HTF 201 (R) HTM402 (I), HTR741 (I), HTA602 (P), HTD500 (R), HTA208 (P), HTR841 (R).

It is noted in the program review that 6 elective courses do not address any of these learning outcomes at all. This is troubling for learning outcomes focused on critical thinking and problem solving and will be addressed at the time when courses are reviewed and re-mapped.

In the program review's developmental plan, the School listed a number of emerging subject areas which the curriculum should support (e.g., entrepreneurial thinking, social innovation and community engagement, etc.). It is the intent of the School that these subject areas be incorporated as topics where possible into exiting courses and not to become new courses or standalone subjects.

Critical thinking, information synthesis, and data analysis are central to learning outcomes 6 (critical thinking and problem solving), 7 (research), and 8 (ethical understanding and reasoning) and supported to some extent in most courses and specifically by the required HTA and HTR course series. Learning outcomes 6, 7, and 8 form the "research and analytical" component of the HTM curriculum and support the *Knowledge of Methodologies* and the *Application of Knowledge* for evaluation and problem solving. Additionally, learning outcome 10 is focussed on information interpretation, concepts application, and producing work to show evidence of higher order learning, such as the strategic marketing plans, financial plans, and event plans. Computer simulations for hotel and restaurant operations foster student engagement and understanding of consequences of decision making.

Communication Skills are critical to the people oriented industry of hospitality and tourism. Learning outcome 9 is dedicated to effective written, oral, and media communication. Almost every course attends to some aspect of communication. The HTM program allows for both traditional academic outlets (e.g., reports, essays, presentations) as well as alternative forms (e.g., video, web-based), and different purposes (e.g., strategic, persuasive, informational). Learning outcome 5 (leadership and group dynamics) focuses on practicing effective group leadership skills such as active listening, negotiating, persuasion, and conflict resolution.

Furthermore, learning outcome 5 reinforces the importance of evidence-based knowledge to provide leadership in such a dynamic field and as such addresses the need to have *Awareness of Limits of one's own Knowledge*, and appreciate how uncertainty might influence interpretations and actions. The "operations management", "research and analytical skills", and "business and strategic management" program components all have learning outcomes that reflect the need to recognize external socio-cultural, environmental, and economic influences on hospitality and tourism (learning outcome 1), the ethical and other dilemmas these might present (learning outcome 8), and the need to consider stakeholder perspectives in decision making (learning outcome 10).

Additionally, students are challenged to demonstrate self-awareness, respect for diversity (learning outcome 3), and self-assessment of their strengths and weaknesses (learning outcome 4). HTH 102 Service and Professionalism and HTT 202 Tourism Concepts initiate students to such limitations and influences early in the program. More advanced courses stimulate increased self-reflection and professional reasoning through examination of issues and government policies (HTT 509), ethical decision making (HTH 700), and corporate social responsibility (HTT 510 Sustainable Tourism Development). Consideration of industry issues, professional standards, and policies helps to prepare students for reflective and responsible practice as well as advanced study. The opportunity to work in groups and develop networks with their student cohort is an important strategy employed throughout the HTM curriculum for developing *Autonomy and Professional Capacity***.**

Strategic Management is a very important skill that is incorporated throughout the core curriculum. We have five required courses that have incorporated strategic management skills into the content of the course. Specifically learning outcome 10f (strategic plan) and 10 g (business plan) are covered in each of the

following courses. These two outcomes are most formal in HTD 500 and HTA708. It should be noted that in the next mapping of learning outcomes these goals will be re-mapped in the appropriate courses.

f) Curriculum Development

Curriculum is revised on an ongoing basis. The Curriculum Committee schedules yearly a review of all courses to compare the topics with the most recent industry data as to the changing trends and needs to meet today's business obligations. The HTM Advisory Council is a working group which meets 3 times a year. Time is set aside for the Council to review and present the latest needs of the industry.

g) Enrolment in Program Courses

Over the last 7 years there has been little variation in the loading of HTM professional elective courses. HTL 503 Meetings and Convention Management and HTT607 Event Management have increased enrolments due to their popularity. These two areas provide significant careers for our students. Two relatively new courses, HTH700 Professional Ethics in Hospitality and Tourism Management and HTL 510 Asset Management, seem to be of interest to students. This interest may stem from the changing nature of the Hospitality Industry Ownership model where more hospitality companies are managing a brand as a management company and real estate investors now own the bricks and mortar. Introduction to the Gaming Industry has shown some growth – this is most likely from the inclusion of this course in the Tourism Minor.

h) Relationship to Current Discipline and Profession

Through its close relationship with the industry and associations, the School is able to maintain currency and relevancy. Students, faculty, staff, industry and graduates work together to achieve continuous improvement supported by the industry Advisory Council and the Alumni Association (RHAA).

The most recent trend is the call for Ethical Leadership in industry and such the school has responded to this by adding an Ethics course, currently an elective. The structure of ownership particularly in the hotel industry, required the School to introduce a course in Asset Management which brings together the ownership and management model of today's business structure where the assets are owned by one company and the business is managed by another. The other trend is technology and its use in the hospitality industry precipitating the need to do research in the digital media and social media realm as it applies to hospitality operations.

By its very nature hospitality and tourism is an inter- and multi-disciplinary field. Particular attention is paid to trends and literature in management, leisure, communication, sustainability, and their cross-sections. Several extra-curricular, community service, and industry based activities inform our currency of practice.

The HTM program ensures students are made aware of the role of the practicing professional in society and his/her ethical responsibilities in a number of ways. The HTM undergraduate learning outcomes that relate particularly to responsible and ethical professional practice are noted within and across courses with a varying depth of coverage; however, the number of courses that consider these important components of professionalism is substantial. It is observed; however, that for learning outcome 8c. *describe and apply principles of corporate social responsibility*, it is mainly elective courses that address this goal. Topics and assignments/assessments used to ensure students are made aware of the role of the practicing professional in society and his/her ethical responsibilities. This is an area that has received increased emphasis since the last program review and is also reflected in new textbook chapters and other classroom resources.

The Ted Rogers School of Hospitality and Tourism Management is fully accredited by the *Institute of Hospitality Accreditation for Academic Programs in Hospitality, Leisure and Tourism*. The School accreditation will be up for renewal in 2016.

To assess the market positioning of HTM, comparable programs were reviewed focusing on: degree designation and areas of specialization within the fields of hospitality and tourism, program length, the availability of a co-op and/or internship program, and type of courses offered.

- University of Calgary and University of Guelph offer a Bachelor of Commerce; University of Guelph is most closely aligned with Ryerson
- University of Guelph, Mount Saint Vincent University, University of Calgary, University of New Brunswick, George Brown College and Humber College are in Ryerson's competitive set and are the institutions that were most closely reviewed
- 3 of the universities have a coop program
- All of the 11 universities and 2 colleges reviewed have a broad hospitality focus that includes accommodation and food and beverage management. Mount Saint Vincent, University of Calgary and University of New Brunswick, like Ryerson, has the addition of Tourism as subject area.
- A number of the colleges appear to have been very responsive and innovative in developing programming to compete with the Universities and have introduced 4 year programs offering a Bachelor of Commerce Degree. In this way, they represent a primary source of competition for HTM.
- Universities of Toronto, Alberta, Northern B.C. Prince George, New Brunswick, Waterloo, Lakehead and Wolfville – offer Bachelor of Applied Arts or Management and the focus of these programs is on Tourism, Recreation, and Sport Tourism. Only the University of Toronto and New Brunswick offer management courses as part of their degree.

i) Student Engagement

i. Teaching Methods and Innovative or Creative Content or Delivery

The School of Hospitality and Tourism Management uses a great variety of teaching methods to achieve its learning outcomes. There is a progression of courses and methods in each curricular component from introduction of key concepts to reinforcement to proficiency.

Introductory theory courses typically employ lectures (demonstration and discussion), guest speakers, videos, quizzes, and clickers. HTH 102 incorporates several interactive learning strategies, including small groups in large classes, peer tutoring, role play, problem assignments, and a small research project. All food and beverage courses are practicum based from lower to upper levels. HTM operates a demonstration kitchen and dining room where students learn food concepts, food production and preparation, menu planning, operating, and managing the restaurant. The students experience peer teaching and demonstrations, and critical reflection and evaluation. In addition to lectures, discussion, and guest speakers, lodging courses employs case studies, field experience, and a computer simulation to introduce students to hotel operations.

Second and third year (mid-level) course teaching methods reflect the people and practice-centred nature of hospitality and tourism and reinforce concepts and lectures from introductory courses. Courses engage students with case studies, software specific activities, service learning, and role playing.

Fourth year required courses that are considered of a capstone nature provide advanced level knowledge and skill development opportunities through critical analysis, problem solving, and experiential research and feasibility projects. Senior students are also challenged to work effectively in groups. The use of industry client projects enhances students' motivation and initiative. The formal research courses set the HTM program apart from the general commerce degree and other HTM programs. These higher level courses also incorporate critical thinking and ethical reasoning through case study and debates and field trips.

ii. Partnerships or Collaborative Agreements

HTM has created over the years significant partnerships with the industry as evidenced by past and present partnerships with agencies/businesses such as Tourism Toronto, Fairmont Hotels and Resorts, Colliers International, Ontario Culinary Tourism Alliance, the Canadian Society of Club Managers, to name a few. In 2009 the school signed a MOU with UQAM and its Hospitality and Tourism Department to run a joint research conference annually.

iii. Experiential Learning Opportunities

- The School is certainly well positioned in experiential learning with the food, revenue management, research and service courses all having hands on application or projects directly linked with industry partners.
- Current students and more particularly alumni appreciated the contribution of experiential learning opportunities throughout the program. Group work, the required 1000 (previously 1600) hours of related work experience, industry based projects, and networking opportunities are examples.
- 72% of employers agreed that HTM graduates are "prepared to hit the road running", supporting the practical skills and abilities attained through such learning methods.

j) Student Assessments

The HTM program curriculum endeavors to provide a diversity of student assessment methods. In many instances there is overlap with delivery through the use of case studies, journals, projects, and i-clickers as both teaching and assessment methods. All HTM courses have at least one writing assignment and all but one required courses incorporate an examination as part of the evaluation strategy. Several elective courses have major projects and case studies rather than examinations as an avenue for students to apply their knowledge and creativity. Group assignments are found in all years of the program and are integral to building the skills required for careers in a service and experience based industry such as hospitality and tourism.

Business management learning outcomes are primarily assessed by the production of plans (e.g., strategic, marketing, financial, HR) across business disciplines, and the "cracking of cases" to demonstrate problem solving and understanding of the socio-cultural, political, economic and other contexts in which business operates. The research project in HTR 841 Research and Data Analyses is produced in iterative stages (i.e., proposal, literature review, method, analyses and results) such that the final submission can be improved based on feedback from each prior stage. The third and fourth year courses more often include student presentations as part of the assessment.

Currently the group project from the second year HTM402 course is "rolled over" to become the starting point for HTD500 in the third year. The School is aware that students, for the following reasons, are not able to remain in the same group moving forward from HTM 402 to HTD 500:

- students who may not have had the necessary pre-requites/co-requisite to enroll in HTD 500
- students who would like some new partners (quite common)
- students who may have been on an exchange
- students who may have failed HTM 402
- students who are now accepted into the Co-Op Program

The premise that students gain the experience of undertaking a feasibility study from start to finish for a company with which they partnered was the initial intent of the coupling of these two courses. This premise can no longer be upheld and the School will undertake changes to the assignments to decouple these two courses.

k) Student Success and Achievement

Undergraduate student standings from 2008 - 09 to 2011 - 12 show a consistent pattern across the years with the percentage of clear standing HTM students lower than TRSM and Ryerson in years 1 and 2 but the same or higher percentage of clear standing students in years 3 and 4. Table 3 indicates percentage of students with a Clear standing after one year.

Table 3

Percentage of students with a CLEAR standing after one year (%)

	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
Ryerson	64.2	66.9	66.8	74.7	76.1	74.2	76.1
Ted Rogers School of Management	56.2	57.2	61.2	73.7	73.3	68.8	71.8
Hospitality & Tourism Mgt.	61.1	66.7	55.2	65.4	58	56.4	60.6

GPAs upon graduation were also examined and show consistency of mean GPAs for HTM and TRSM (~2.8), which are below Ryerson's average of 3.0. The most recent year (2012) indicates a dip in HTM average GPA upon graduation to 2.74, while TRSM and Ryerson both increased to 2.88 and 3.03 respectively. In 2012, 49.2% of HTM students had a B- or better upon graduation. This compares to 65% of TRSM students in 2012.

In a review of articulation students from 2006-2012, the school made offers to 573 students from colleges or universities in Canada. Of the 573 offers, 198 students accepted the offer. The low uptake on offers is a result of students not receiving enough credit in the program as students must have a B or better in courses that are equivalent to receive a credit. The uptake has been impacted as well by the addition of four year degree programs in the colleges. The School is working on a blanket articulation strategy moving toward direct entry into the third year of the program. It should be noted that there is no significant difference in the CGPA of articulation students to the CGPA average of all graduating students from HTM.

l) Library Resources

The report by the Ryerson library concerning HTM use/access of the library makes some key points. HTM has traditionally exposed our students to the library (and its resources) in the first semester of the first year. Due to the library not having sufficient room/computer size rooms to accommodate our current class size we now have had to bring the librarians to TRS, which, while effective, does not really help introduce students to the physical library and its use. In addition, our students have been (since the last program review) coming to Ryerson unprepared for University (and research) and one three-hour session clearly has not been sufficient to prepare them for the work they will be doing here. And, while our hospitality courses try to bridge the 'gap' in their background, clearly this has been an ongoing frustration for the faculty and students.

m) Student, Graduate, and Employer Surveys

i. Student Survey

An online student survey was conducted in the winter of 2014 with students in all years of the program (approximately 700). One hundred and sixty-four (N=164) replied for a response rate of ~24%. The distribution of respondents across year in program was Year 1 - 30%, Year 2 - 23%, Year 3 - 30% and Year 4 - 17%.

Perceptions of Workload and Academic Challenge

- 66% of the students agreed the program was academically challenging.
- 65% felt the workload was manageable and 31% thought it was too high
- 61% reported they are currently employed with an average of 18 hours per week; 35% worked between 10 and 15 hours per week.

Program Contribution to Skills, Abilities, Knowledge

- 72% or more noted the greatest contributions to research skills
- 70% noted project management
- 69% noted time management
- 69% noted working in teams
- 67% noted understanding their professional/ethical responsibilities

- 66% noted written communication
- 66% noted developing a broad knowledge of their career field
- 57% noted critical thinking/problem solving

The lowest percentage of responses was evident for:
- entrepreneurship (39%)
- creativity (40%)
- computer proficiency (44%)
- responding to technological innovations (44%)
- oral communication (47%)

Contribution of Learning Methods
The largest percentages (excellent + very good) are found for:
- written assignments (64%)
- group work (58%)
- 1000 hours of work experience (56%)
- classroom instruction (52%)

Contribution of Professors
Students Strongly Agree + Agree:
- the currency and disciplinary knowledge of HTM professors (79%)
- their knowledge about career opportunities in the field (74%)
- their availability outside of class time to help students (72%)
- that teaching is of high quality (65%)
- that teaching is intellectually challenging (64%)
- that professors are well organized (62%)
- that professors provide useful feedback on academic performance (53%)

Academic Advising
54% felt academic advising was *very good/excellent*. The guidance to outside resources showed a similar pattern of ratings with 52% rating it *very good/excellent*.

Satisfaction with Program
The vast majority would recommend the Hospitality and Tourism Management program (88%) and Ryerson (92%) to others. Students' satisfaction with the diversity (82%) and quality (76%) of guest speakers illustrate HTM's links to industry. Students are also satisfied with:
- the business curriculum (72%)
- the average class size (70%)
- industry based projects (67%)
- the variety of core courses (63%)

Students are less satisfied with:
- the variety (55%) and availability (47%) of Table I Professional electives
- the variety (56%) and availability (52%) of Table II Professionally Related electives

ii. Alumni Survey
An online survey of HTM alumni who graduated between 2008 and 2013 was conducted in the winter of 2014 (approximately 500). Seventy-two (N=72) replied for a response rate of ~15%. Alumni overall were very complimentary of their time at Ryerson. 83% stated the School of Hospitality and Tourism Management (HTM) was their first choice to pursue their education.

Employment / First Full-time Position
- 61% were able to find a job in the sector of the industry they most wanted to work in upon graduation
- 68% agreed that their degree provided good preparation for a career
- 43% felt they were able to advance more quickly in their job because of their degree (23% disagreed)

- Most are employed full-time (86%) as an employee (88%)
- Employment is related to their degree either directly (70%) or indirectly (18%)

Satisfaction with HTM Program
- 96% would recommend the School to others; 53% of which said without any hesitation
- 72% agreed the HTM program was academically challenging, of high quality (74%), with well-organized courses (67%)
- 78% found the workload to be manageable

Program Contribution to Skills, Abilities, Knowledge
Alumni responded *a great deal + very much* on how much the HTM program helped to improve their ability in:
- working in teams (88%)
- research skills (85%)
- time management (83%)
- project management (81%)
- written communication (74%)
- interpersonal skills (71%)
- understanding their professional/ethical responsibilities (69%)
- problem solving/critical thinking (65%)
- oral communication (65%)
- entrepreneurship knowledge/skills (29%)

Contribution of Learning Methods
Alumni responded *very effective + effective* on effectiveness for:
- written assignments (90%)
- classroom instruction (89%)
- group work (85%)
- 1600 (now 1000) hours of work experience (78%)

Assessment of Professors
Overall the alumni were very positive about the HTM's professors. They agreed (strongly agreed + agreed) that professors were knowledgeable in their fields (81%), organized (75%), available outside of class (75%), and quality teachers (75%). They felt professors' teaching was intellectually challenging (74%) and useful feedback was provided (71%). 63% felt that the professors were knowledgeable about career opportunities.

iii. Employer Survey
In the winter of 2014, an online employer survey was distributed to employers from the HTM Career Fair list (N=67) and the HTM Advisory Board (N=20). Thirty-two responses were received, which although not a large number, provided fairly broad representation across 8 sectors of the hospitality and tourism industry. The majority of respondents (81%) had employed HTM graduates,

Perceptions of HTM and its Graduates
The strongest perceptions of the School (i.e., described it *very well*) were its industry focus (75%), diversity (59%), relevance (44%), leading edge (42%), and academic rigour (41%). 91% rated the reputation of HTM as very good/excellent and 69% said the reputation influenced their decision to hire HTM graduates.

Graduate Preparedness
The extent to which employers thought HTM prepared its graduates (*to a great extent and quite a bit*) with various skills were:
- teamwork (77%)
- problem solving (65%)
- creative thinking (61%)

- interpersonal skills (60%)
- oral communication (58%)
- critical thinking (58%)
- written communication (48%)

Future Trends and Industry Needs

The top trends or changes employers see their organizations facing in the next five years were:

- labour trends (shortage of competition and for skilled labour and management/leadership, the aging workforce, and characteristics of the millennial workforce)
- market trends (increased competition and new and/or growth markets)
- industry trends (increasing costs of operation and the need for debt/margin management, the phenomenon of consolidations and mergers to promote growth, and the need for diversification of services and experience for clients/guests)
- general trends (innovations in technology, changing demographics, government regulations, and globalizations/ties to international economies)

6. ACADEMIC QUALITY INDICATOR ANALYSIS

a)Scholarly, Research and Creative Activities

The Ted Rogers Institute for Tourism and Hospitality Research (TRITHR) was established in 2009 as the research "arm" of HTM. HTM's current areas of research expertise encompass: sustainable tourism; tourist behaviour; hospitality management; destination and services marketing and management.

Since 2011 HTM faculty members delivered 40 research presentations to local, national, and international audiences at a variety of research symposia and conferences. Thirty refereed articles were published by HTM researchers, which included top tourism journals. Additionally, HTM faculty actively review for journals as well as for scholarly conferences and awards.

b)Admissions Requirements

Ontario Secondary School Diploma (OSSD) or equivalent with a minimum of six Grade 12 U or M courses including the following program specific requirements. Typically, a minimum overall average of 70% establishes eligibility for admission consideration; subject to competition individual programs may require higher pre-requisite grades and/or higher overall averages:

- English/Anglais (ENG4U/EAE4U preferred)
- Mathematics [One of: Advanced Functions (MHF4U), Calculus and Vectors (MCV4U) or Mathematics of Data Management (MDM4U)]
- Grade 12 U Advanced Functions (MHF4U) or Grade 12 U Calculus and Vectors (MCV4U) are the preferred Mathematics courses.
- The minimum grade(s) required in the subject prerequisites (normally in the 65-70% range) will be determined subject to competition**.**

c) Student Qualifications

The entering average (Table 4) for HTM ranges from a low of 78.3 in 2005-06 to a high of 80.4 in 2007-08. Most recently, it is 78.4%. When viewed in conjunction with Table 5, (Percentage with 80 % or above entering average) it can be seen that from 2005-06 to 2008-09 the percentage of students entering HTM with above 80% average increased by 12.4% to just over half of entering students. The School's improvement mirrored that of TRSM and RU. Since that time HTM has decreased each year and is now at a seven year low of 37.4%. With the move to a higher mathematics course being recommended for admission, this may assist in raising the entering averages.

Table 4

Entering Average (%)

	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Ryerson	78.8	79.8	80.2	80.6	81.5	81.4	81.9	82.2
Ted Rogers School of Management	77.9	79.7	79.8	80.3	81.2	80.9	81.3	81.4
Hospitality & Tourism Mgt.	**78.3**	**79.0**	**80.4**	**79.9**	**79.9**	**79.4**	**79.3**	**78.4**

Table 5

Percentage with 80 % or above entering average (%)

	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Ryerson	41.3	48.4	52.2	55.1	61.7	61.6	66.0	66.0
Ted Rogers School of Management	33.6	41	53.1	56.5	62.6	61.3	63.3	63.3
Hospitality & Tourism Mgt.	**38**	**41.1**	**50.5**	**50.4**	**44.0**	**40.0**	**37.4**	**37.4**

Enrolment, Retention, Graduation Data

Table 6 displays the 30% increase in intake numbers from 181 (Fall 2005) to 236 (Fall 2012). The largest drop in enrolment is between Year 1 and Year 2.

Table 6

Fall Headcount Enrolment by Year Level

		F2005	F2006	F2007	F2008	F2009	F2010	F2011	F2012
Hospitality & Tourism Mgt.	Year I	181	167	181	205	202	209	239	236
	Year II	141	153	144	157	163	158	160	175
	Year III	135	113	129	117	141	142	127	135
	Year IV	88	117	121	148	141	177	184	171
	Total	**545**	**550**	**575**	**627**	**647**	**686**	**710**	**717**

After one year HTM retains about three-quarters of its students (Table 7). Student retention within HTM after two and three years in the program (Tables 8 and 9) is approximately 62% for the most recent years available. Since the pattern of retention is higher for high school entry students.

Table 7

Retention after one year of same program (%)

	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009	Fall 2010	Fall 2011
Ryerson	81.0	81.3	82.1	80.0	81.0	82.3	82.1
Ted Rogers School of Management	80.3	81.9	84.2	81.9	81.9	84.6	83.7
Hospitality & Tourism Mgt.	**80.3**	**77.2**	**81.3**	**75.0**	**69.9**	**76.6**	**72.8**

Table 8

Retention after two years of same program (%)

	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009	Fall 2010
Ryerson	70.2	74.8	75.3	72.9	75.9	74.3
Ted Rogers School of Management	71.0	77.3	79.9	78.9	78.2	77.2
Hospitality & Tourism Mgt.	**66.7**	**73.7**	**80.6**	**68.9**	**62.0**	**66.7**

Table 9

Retention after 3 years of same program (%)

	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009	Fall 2010
Ryerson	65.9	71.3	70.3	70.4	69.9	-
Ted Rogers School of Management	64.3	71.2	75.0	74.3	71.5	-
Hospitality & Tourism Mgt.	**59.8**	**66.7**	**73.6**	**61.6**	**57.7**	-

For graduation rates by year Table 10 presents data from 1997 to 2004 because there is an eight year window for students to graduate. Since 2000 HTM rates have increased and for 2004 are at 68%.

Table 10

Graduation Rate

	1997	1998	1999	2000	2001	2002	2003	2004
Ryerson	67.6	70.5	72.9	72.7	74.2	76.3	77.4	73.8
TRSM	68.3	71.9	74.2	76.4	77.1	74.7	76.6	72.4
Hospitality & Tourism Mgt.	**65.6**	**62.5**	**60.8**	**59.8**	**64.5**	**69**	**68.6**	**67.9**

From the Program Review it is clear that the program has some retention problems especially in year 1. Firstly, the School has recognized for some time that ACC100 is very challenging for students. The School, recognizing this fact, purposely moved Accounting 100 from 1st semester to 2nd semester to allow students the time to adjust to university and the work load difference between university and high school. While this did seem to improve student success it still contributes to a problem in clear standing and retention. The School of Hospitality and Tourism Management was the first School in TRSM to go to mandatory testing for math proficiency looking to help students improve their math skills to help in improving their success in quantitative courses. Going forward, all TRSM School's other than Accounting and Finance have changed their entrance requirements to Calculus as the preferred math. As well, the School has raised its cut-off grade for Math and English from 60% to 65%.

The School believes that while having 5 and 6 courses in the first and second semester is a heavier work load than the norm in TRSM and has some impact on retention, the two most significant factors in determining student success are the entering GPA and ACC100.

Beyond reducing the number of courses as a strategy to improve retention the School will pursue the possibility of reducing the number of first year seats from 220 to 165. *(Note that TRSM as a whole is looking at strategies to improve the quality of first year student intake and the School will follow these strategies as they are developed).* The School will also work with the registrar's office to target those students who have taken calculus as the preferred math.

7. RESOURCES

Faculty

The Ted Rogers School of Hospitality and Tourism Management has 13 full-time RFA faculty members and 3 Sessional CUPE instructors in the 2014-2015 academic year. Each of the RFA faculty has industry experience in the subjects they are teaching. Their educational background, research and industry experience bring a wealth of knowledge to meet all of the school's current program objectives. In the next 5 years there will be some attrition in the faculty due to retirement.

Support Staff

The Ted Rogers School of Hospitality and Tourism Management has 3 full time office staff (Program Coordinator, Program Assistant, Departmental Assistant) and 2 full time lab staff (Executive Chef/Manager of Catering, Assistant Manager of Catering). On average the school employs 24 teaching assistants and 1 to 2 research assistants a year. The research assistants are funded most often by research grants and are hired by faculty members.

Curriculum Counselling/Advising

Students are able to meet with the Program Coordinator to receive curriculum counselling and advising. The Program Coordinator guides them through the courses they need to be taking in order to graduate, offers assistance if they encounter problems throughout the semester and refers them to Student Services if a student is in need of personal counselling beyond curriculum matters.

The Ted Rogers School of Management also provides support to our students by offering learning consultations with a full-time Learning Strategist to help students to create a learning plan tailored to their learning style and lifestyle. They will discuss their current approaches to studying and talk about strategies to improve their ability to learn in a university environment.

The Program Advisory Council (PAC)

The HTM Advisory Council is an active group of industry representatives who provide expert advice to the School on program-related matters such as curriculum, program review, technology and trends in the industry, discipline or profession. The PAC promotes the Program in the broader community and advises and assists the school in respect to external liaison.

Physical Resources

Class room space is controlled centrally by the University and the scheduling department. The school makes every effort to ensure that the space allocated for teaching is appropriate for the courses being taught. The school does have its own Teaching and Demo lab which is controlled by the school for teaching. Computing facilities are provided by the Ted Rogers School of Management for all students in TRSM. Software that is required to be uploaded into the computing facilities is purchased by the school.

8. STRENGTHS, WEAKNESSES AND OPPORTUNITIES

Strengths

- Teaching and research combining the theoretical and the practical/applied
- Strong industry links and high job placement
- Currency of faculty through consulting, research, and/or employment
- Business management focus aimed at preparing future leaders
- Strength of HTM's reputation based on history, alumni, and connection to industry
- Location in downtown Toronto

Weaknesses

- Student intake qualifications; some weak students
- Quality of some courses is inconsistent
- 45 courses in the curriculum
- 1st year support around time management skills and the transition from high school

- Language and numeracy skills
- Focus on local, not global perspective
- Research output, publications, grants
- Lack of graduate programs

Opportunities

- Executive development programs/life-long learning/degree completion
- Increased use of technology inside and outside the classroom
- Online/blended education
- Master's level programs
- Need for research by both government, industry and the university
- Increased demand for sustainable practice, management
- Depth and breadth of management career opportunities
- Knowledge transfer/mobilization to industry/networking
- Executive in residence

9. DEVELOPMENTAL PLAN

i. Student Engagement and Retention

1. Review Admissions Requirements
2. Enhance Academic Advising
3. Enhance Student Engagement
4. Reduce the number of required courses for degree completion to 40-42 courses from 45

ii. Curriculum and Experiential Learning for the 21st Century

1. Review the content of all courses and curriculum flow to ensure that learning outcomes are introduced, reinforced and where possible students become proficient and to ensure the reinforcement of equity, diversity, and inclusion**.**
3. Review all courses to incorporate emerging areas of entrepreneurial thinking, social innovation and community engagement, experiential learning, data analysis skills, and critical reasoning skills. Review courses for quantitative and qualitative analysis, problem solving, and decision making techniques to identify issues, trends, and solve business problems in our courses.
4. Employ more innovative teaching methods.
5. Address the gaps in years 2 and 3 in reinforcing the learning goals to express ideas and convey information effectively, accurately, and appropriately through verbal presentation and express ideas and convey information effectively, accurately, and appropriately through use of media commonly used in business settings.
6. Expand the Co-op program which was introduced in 2014-2015.

iii. Graduate Programming and Research

1. Participate in and contribute to the thesis-based master's program by supervising and teaching students with a research interest in Hospitality and Tourism Management.
2. Create a research culture where mentoring takes on both formal and informal roles; integrate research into our teaching to enhance the student learning experience at all levels.
3. Develop our research narrative, around the metrics defined by the Ted Rogers School of Management that will align our research plans to those of TRSM and Ryerson University
4. Continue to improve and build the School' research institute.

iv. International Relations, Industry Partnerships and Local Community Engagement

1. Continue to strengthen our industry partnerships through a review of our advisory board membership to include new global industry partners.
2. Continue to engage with the local community; be a key partner to help the Ted Rogers School of Management expand community engagement and city building.
3. Through the research institute build strategic global research partners including visiting professors.

v. Supplemental Developmental Plan for Retention and Clear Standing (April 2015)

1. To reduce the number of courses to 40 or 41 from the current number of 45 to more closely align with the other Schools in TRSM. In reducing the number of courses the following points will serve as guidelines:
   - Maintain the integrity of the program breadth in the core required SHTM courses that reflect the School's history and focus on hospitality and tourism
   - Reflect the 10 SHTM undergraduate learning outcomes, Undergraduate Degree Level Expectations (UDLES), and the School's Developmental/ Academic Plan
   - Reflect future industry needs
   - Give students flexibility and choice to undertake concentrations within the curriculum that enables students to enhance their knowledge and skills of the specific areas of accommodation, food and beverage and tourism or specific course topics
   - Ensure that Equity, Diversity and Inclusion principles are included in the course curricula
   - Reflect AACSB accreditation goals (Communication Skills, Ethics, Critical Thinking, Group Work, Business Functions Integration , Technology and Financial Theories and Analysis)
   - In reviewing courses rectify issues identified in the Program Review through the mapping process where there is inconsistency of Introductory, Reinforcement and Proficiency levels where noted
2. To reduce student intake and increase entering GPA average
   - Improve the quality of intake by reducing the numbers to the point that the GPA will be 80% or better and the cut off set to 76-77%. This will be based on historical information of previous years.
   - Work with the Registrar to ensure that more preference is given to students that have Calculus as the preferred math.
3. To improve retention
   - Work with the TRSM Associate Dean to look at the possibility of having a required Math course for those students that do not pass the mandatory math test.
   - Continue to improve the SHTM mentoring program for first year students.

10. PEER REVIEW TEAM (PRT) REPORT

Reviewers: Dr. Candace Blayney, Associate Professor, Tourism & Hospitality Management Mount St. Vincent University; Dr. Brian White, Acting Dean, Faculty of Management Professor, Tourism and Hospitality Royal Roads University

a) OUTLINE OF THE VISIT

On January 14 & 15, 2015 the groups interviewed by the PRT included staff, faculty, current students, alumni of the program, Director, Associate Dean Research, Associate Dean of the Faculty, Dean of the Faculty, industry advisory representatives, the Vice Provost Academic, and the Provost. The following facilities were toured: classrooms, lecture halls, computer labs, staff offices, restaurant/kitchen, meeting rooms, event rooms, career center, and campus walk.

b) GENERAL OVERVIEW

The program's notably strong and creative attributes:

- The Hospitality and Tourism Management Program (HTM) has a long and excellent history in the Greater Toronto Area.
- There is a continued great interest in the program with a high number of applications
- The new building in 2006 provides excellent infrastructure and space
- The new demonstration kitchen in 2007 provides the latest in technology for teaching students cutting edge practices and promotional space
- HTM is one of six schools under the umbrella of the Ted Roger's School of Management and this arrangement allows cross pollination of ideas and knowledge
- HTM has a good reputation for high academic quality and quality of graduates
- All faculty have noted industry experience and they bring this into the classroom through examples, case studies and projects

- The strong curriculum covers three main areas of the industry: accommodation, food and beverage and tourism
- Introduction of the co-op option will enhance the program

The program's respective strengths, areas for improvement, and opportunities for enhancement:
Strengths:

- High job placement in field upon graduation
- High satisfaction rate from graduates
- Alumni indicated in interviews that they have a preference to hire Ryerson grads
- Students indicated they have easy access to staff and professors and build good relationships with them
- High level of networking with industry both for faculty and students.
- MOU with UQAM and the case study competitions from this partnership adds depth to the program
- Critical thinking is required in the computer simulation courses as students must design strategies for input decisions
- Mandatory testing of math skills introduced in 2008 identifies students that require additional assistance. This is highly recommendable as 75% of students enter the program directly from high school.
- Scholarships in the amount of $62,000 each year enable the program to recognize high calibre students.
- The number of tourism and hospitality electives and liberal arts electives appears to be consistent with other hospitality and tourism degree programs.
- Four courses: HTH 503 Human Resources Administration, HTH 601 Organizational Behaviour, HTM Marketing Principles and HTM 401 Strategic Market Planning are separate from the general management population of courses and speaks to the uniqueness of the tourism and hospitality industry. This has been recognized by the program and they should be kept separate from the common business management core to allow students to work with industry specific cases.

Areas for improvement:

- Introduce a method to streamline admissions to decrease high attrition rate in first year.
- Decrease the number of courses in the curriculum.
- Review the weighting on final exams as it appears to be high. Not sure if there is a university policy for the weighting of final exams.
- There is a need to look at methods of reducing the high attrition. Possibilities include introducing earlier feedback in course work, identifying high risk students earlier in the courses, and use appropriate methods to give students support such as directing them to the Learning Strategist.
- There appears to be a need for greater capacity for classrooms so classes can be in the same building.
- Create themes from the elective list of courses that falls under a specialization.
- Career strategies are currently offered in depth in a fourth year course. It was suggested from alumni that career information would be beneficial earlier in the program.
- No master's level education offered at this time.
- Program projects and cases are very local in nature. Need to add more international flavour to the program's perspectives.

Other Recommended Steps

- Review the possibility of introducing a mandatory "Special Topics" or "Current Issues" course into the final year to direct students to conduct in-depth research into a topic of their choice. There is a course currently available HTR 900 Director's Special Project but it is an elective.
- Implement a system to identify high risk students earlier in the program with feedback to occur before course withdrawal date
- Develop partnerships with the tourism sector to highlight career opportunities in the tourism area. Students mentioned that too much focus was on the hotel industry but we acknowledge that this is where the majority of jobs are available as compared to the tourism sector.
- Pursue Ontario Pathways Articulation Program to backfill the spaces left for leaving students after first year.
- Pursue the AACSB accreditation which is to occur in 2015

- The Minor in Tourism, initiated in Fall of 2013, may need to be promoted
- Explore the expansion of the program capacity by reviewing options for on- line delivery of appropriate courses that do not have hands-on components

c) FEEDBACK ON EVALUATION CRITERIA

i. Objectives (alignment with institution's plans)

The reviewers feel that the Hospitality and Tourism Management degree is currently consistent with the University priorities. There is a large component of student engagement with industry in the form of events, projects and cases; the faculty are very active in research initiatives; innovation is fostered through the curriculum as well as the many projects with industry. Community engagement and city building is very prominent in the degree as the community industries are very well connected to the program through employment, consulting and projects.

The curriculum appears to generally match the program learning outcomes. However there are four areas to be reviewed:

1. Event management. Some of the course content should be incorporated into the general curriculum.
2. It was noted that 6 of the elective courses typically taken in third and fourth year do not address learning outcomes 6a to 6d.
3. The self-study indicates that there is a lack of reinforcement of tourism concepts in the core. This may be the reason that the majority of students that were interviewed stated that the program tended to concentrate on hotels and not the tourism industry. This could be addressed by bringing more tourism concepts into the program more frequently.
4. The self study indicates there is a gap in sustainability in the food and beverage courses. There appears to be only one course on sustainability. This is a very important area in tourism currently and should be a key component of the curriculum.

ii. Admission requirements

The school has had a high ratio of applicants to registrants of 9.9 in 2006-2007 and the ratio for 2011-2012 has declined to 6:1. The entering GPA has decreased slightly from a high of 80.4 in 2007-08 to 78.4 in 2012-13. The admissions requirements are appropriately aligned with the learning outcomes established. I t should be noted that the hospitality and tourism program does have in place mandatory testing for math and written skills to ensure a smoother transition into university.

iii. Curriculum

The curriculum appears to reflect the current state of the hospitality and tourism industry. The number of tourism and hospitality electives and liberal arts electives appears to be consistent with other hospitality and tourism degree programs. The minor options are also very beneficial for students. It was noted that more HTM students are graduating with a minor (67% in 2013). Innovation and creativity are indicated by the use of technology and simulations in the courses.

The reviewers would like to make one comment about the flow of the program and courses. In the first to fourth semesters the students are in five common courses or more and this starts to create a cohort and a sense of cohesiveness among the students. In the fifth and sixth semester the students are in two common courses. In the seventh and eighth semester there are three common courses. The final semester include four electives which may scatter the cohort. In any program this is a balancing act of trying to offer choice and keep a cohort.

iv. Teaching and Assessment – Methods and Means

- There is a good combination of individual and group assessments such as group projects and presentations.
- Students interviewed indicated a high use of multiple choice which is appropriate for introductory courses but may need to be used less in the third and fourth year courses.
- The course outlines are very thorough and detailed and descriptions of assessment indicate a broad range of evaluation techniques being used.

- A review of the course outlines indicate detailed evaluation sheets and rubrics for projects and presentations and peer evaluations for group work.
- In reviewing the assessments used in the final year courses, it is noted that writing and presentations are well incorporated into the courses. In interviews with alumni, the writing components were very important to them and increased their confidence in their writing skills.

The only comment or question these reviewers have is "How many writing assignments are individually assessed as compared to the percentage in group work?"

v. Resources

It was noted that physical resources are strained with more classroom space required. Currently students are moving to different buildings for classes and the scheduling times are sometimes very early or late in the day due to demand on space. In order to create cohorts and streamline scheduling, it is suggested that the scheduling in the School be reviewed. The academic services of library, co-op, computer labs, etc. appear appropriate to support for the program.

vi. Quality Indicators

Graduating student quality of work is recognized to be high, and overall industry recognition of the program is strong. Approximately one in ten applicants to the school is accepted, but faculty and administrators indicated that they were concerned about the level of student work and attitude in the first year of the program- a not unusual complaint from most tourism and hospitality schools, particularly those bringing in students straight out of high school. However, addressing this issue is important in terms of brand recognition of the School and its overall reputation for quality. With social media providing unmediated feedback to prospective students and their parents as well as industry, the overall profile of the school should include a strong reputation for teaching excellence across all four years.

The high attrition rate at the end of first year appears to address the issue in part by failing, and by drop outs, and redirecting the weaker students. Also, the School is committed to maintain their accreditation, which requires a substantial output of research publications. The stringent requirements of the accreditation body might mitigate against flexibility in terms of the balance between teaching and research. Teaching assistants and markers supplement teaching and help deal with the large classes in first and second year in particular, but given the fairly substantial size of the school, it seems that there is room for an increase in junior faculty to concentrate on the first two years of the program.

Additionally, there does not seem to be any focus on increasing the level of specialization. The reputation for the school has focussed mostly on hotels, which is the largest job market. However, to maintain comprehensiveness, some additional specializations might be considered.

It is noted that the percentage of courses taught by full time faculty is 68% for 2015/16. This appears to be a good ratio for this large a school. The class size in first year seems to be very large and may intimidate the first year students and may be a factor in the high attrition rate.

The reviewers noted that the graduations rates in are only up to 2004 which makes it difficult to judge the current graduation rates. Upon reviewing the retention rates it was noted that in the year 2008 a drastic drop in retention occurred.

vii. Quality Enhancement

- The student outcomes evidence indicates a strong record of acceptance by industry
- Placement rates are excellent and feedback from alumni indicates that the large number of Ryerson graduates in the GTA are committed to continuing to hire from Ryerson.
- The reputation of Ryerson has been enhanced by its graduates, many of whom occupy very senior positions in the industry.
- The scholarly record is developing but some faculty members do not provide high levels of research output.
- Class sizes are smaller at the third and fourth year levels, and in the larger first and second years, TAs and markers provide supplemental support.

- Associate faculty with strong professional experience are an essential element in an applied program, and except for the need for more junior core faculty, the balance seems quite strong.
- The introduction of a co-op program and overall more focus on experiential education is an important quality enhancer, with the opportunity to provide more experiential education across the curriculum.
- It was noted that issues related to gender, sexual orientation, disability, ethics and CSR are now included in the HTM program. Also a quality indicator is the last three of four tenure track hires were women to bring the total of four out of the thirteen.
- The external review team were able to look at some creative and user-friendly simulations developed by the faculty.
- Networking with industry, particularly hotel chains is strength of the school, and the strong industry background of faculty provides several current projects and consulting opportunities for faculty. Regular guest lectures from industry professionals and opportunities for project work with industry also maintains student to industry exposure.
- So far as we could see, the rate of curriculum change has been moderate, and it might be appropriate to accelerate the examination and revision of courses.
- The mix of courses and the choice of electives also need to be systematized so that students can get some assistance based on their choice of specialization.

d) OTHER OBSERVATIONS

There is a need to develop a succession plan, as several faculty are close to retirement; a mentoring and professional development program for succession planning will become more important to maintain the School's reputation. Supporting industry professionals undertaking a Doctoral degree while they transition to full time teaching could be an emerging strategy, which might help in acquiring faculty who have a longer time window as professors and also maintain the research capability of the School.

e) SUMMARY AND RECOMMENDATIONS

The HTM program is a very strong degree with a high application rate. There is some concern about the lower GPA of the students entering into the program and possibly creating a higher attrition rate between first and second year. Two strategies may mitigate the high attrition rates. One is to put into place a screening method to include more criteria than just the GPA, which is not practical due to university and Ontario policy. The other is to implement a method of identifying high risk students early in the program to offer outreach and support to them.

The program is highly respected in the local industry and there is a high calibre of networking between faculty and industry. This keeps the program current with industry trends.
The program is considering accreditation from the AACSB which the Ted Rogers School of Management currently holds. This is a positive step to gain recognition for the program.

11. PROGRAM RESPONSE TO PEER REVIEW TEAM REPORT

a) AREAS FOR IMPROVEMENT

Student Retention:

Three areas that need to be discussed and researched by HTM are:

1) the requirements for admission (math requirements and the GPA cut off for admission to the program)
2) the reduction of the number of courses in the program from 45 to 40 or 41 courses
3) improved mentoring and advising procedures to identify the bottom 30% of our intake to ensure they are receiving timely and adequate help in succeeding academically

Weighting of final exams and teaching assessments:

In reviewing the grading scheme of all courses taught by HTM faculty we are in compliance with University Policies 2.1. The School recognizes that many of the upper level courses have multiple choice exams. When the review of the curriculum is undertaken the use of multiple choice questions in the upper level courses will be examined. However, most of the upper level courses have more than two independent assessments so one or more assessment(s) is not multiple choice.

Capacity and Course Scheduling:
The School has no control over classroom scheduling. Many faculty members have started to use 3 hour delivery blocks to try to alleviate the situation of not having classes in TRSM. Most course conflicts are due to the liberal arts bands running through the middle of the day.

Offering of Electives:
Students are provided well in advance an elective list of those courses offered in each of the semesters. These courses are on the course intentions form which the students must select. In the majority of cases if a student has completed the course intentions they receive the courses they requested. Students have plenty of time to adjust their courses once their schedule comes out. It has been noticed that with the liberal arts band in the middle of the day which take priority the Schools elective courses are often offered on only two days this creates a conflict for some students reducing the choice of electives that are available to them. Students' work schedules also create a problem for the students with courses often being offered later in the day conflicting with the starting time of their work schedules.

Career Strategies Course:
The PRT report suggests that the School's career strategies course be offered earlier in the program. The School has identified this as an opportunity as well to better prepare students regarding their career path earlier in the program and prepare them for part time work as well while they are in the program.

Masters Level Programming:
This has been addressed in the self-study report as a priority to develop a thesis-based master's program.

International Program Perspectives:
The program has many international components to it to introduce the students to the global nature of Hospitality and Tourism. The School is very much aware that we need to keep an international viewpoint where relevant. That said the majority of our students work and remain in Toronto and the province of Ontario so many of the cases and projects are locally focused. In the review of the curriculum the School will make sure that this point is considered when developing content and projects for the courses. There are 35 international partners for our student exchange program.

b) OPPORTUNITIES FOR ENHANCEMENT

- The School is continually looking for partnerships in the tourism sector. This sector is more of a global all-encompassing term and includes lodging, food and beverage, attractions, tourism operators, destination marketing/management organizations and government. We feel we are doing well in this area but there is always room for improvement to add more industry partnerships to the program.
- The School is looking at improved articulation agreements as mandated by the Governments Pathways Program. The School has prepared and will be putting forth a blanket agreement to provide students with a better value proposition to consider transferring to Ryerson.
- The School will be pursuing AACSB accreditation in 2015.

Program Requirements and Learning Outcomes Alignment with Degree Level Expectations:
The PRT report has highlighted four areas for review (event management, third and fourth year electives not addressing learning outcomes 6a to 6d, reinforcement of tourism concepts in the core, and an introductory course on sustainability and its concepts). The four areas were discussed in the Self-study Report and will be incorporated into the Academic Plan moving forward.

Curriculum Cohesiveness:
To date the School has not noticed a lack of cohesiveness amongst the students in the final year and although the students are taking different electives there are 3 required capstone courses in semesters seven and eight. These courses give some continuity to the cohort.

Resources:
The reviewers felt that this lack of classroom space and study space is a deterrent to creating cohorts and streamline of scheduling. The School is aware of this problem but it is beyond the control of the School.

Quality Indicators:
The PRT report indicates that the quality of work of students is recognized as being high and that overall industry recognition of the program is strong. In the review the PRT team supports faculty's and students' concern for the level of work and the need to review the number of courses in the program linking it to the high attrition rate of first year students. This is well documented in the program review and is a priority of the School going forward.

The PRT report also noted the School moving forward with AACSB accreditation and the need to balance research and teaching might mitigate against the focus on teaching. Currently all of our faculty are managing the balance between teaching and research and they have been provided with sufficient teaching support to maintain this balance.

The report also focused on 2008 as a year that there was a significant drop in retention. There was no change made in the program and the School can find no reason for this and has treated this year as an anomaly.

The PRT report suggests that the School look more to increasing the level of specialization. The School's curriculum offers a balanced approach with equal balance between courses in accommodation, food and beverage and tourism sectors. The School in the 1990s did try a specialization approach to the program in accommodation, food and beverage and tourism, however; it served to divide the students rather than to support a cohort.

12. DEAN'S RESPONSE (Dr. Steven Murphy)
The peer review team did a thorough job, and the School of Hospitality and Tourism has taken their report seriously and strives for continuous improvement. I will use this opportunity to highlight areas where I believe our response needs to be structured and precise. The issue of quality and intake is of pressing concern. In order to meet university set targets, HTM has to admit students with high school GPA's that we know will result in learning and retention problems. In addition, dipping well below the larger SBM cut-offs does little to strengthen TRSM's reputation overall. We have embarked on important consultations in order to make quality our number one goal. Options being considered include one intake point for all of TRSM, and this would represent one important step in helping the quality, intake and retention issues.

The peer review team makes a number of curricular recommendations that have to be assessed. From an overuse of multiple-choice tests in upper year courses to a career strategies course, we must commit ourselves to the best student experience possible. We pride ourselves on being a university with a practical edge. An early career strategies course and closer industry alignment make sense. Pedagogically, we must look at creative solutions including enhanced use of technologies in the classroom. An LMS never solves problems, but the change away from Blackboard can be seen as an opportunity to build technology platforms further into HTM courses (e.g. through enhanced use of 'flipped classrooms').

The peer review team also stressed the international focus of the program (or lack thereof) and substantive international partners. I see this area as a major shift for HTM moving forward. We must produce graduates that are internationally savvy and competitive. The hospitality and tourism industries are nothing if not international. Even local restaurant operators can benefit from an understanding of how establishments are run, and supply chains are managed, in other parts of the world. Linked to this recommendation is the need to create more meaningful international partners. We must go beyond exchange agreements and partner with top hospitality schools and regions around the world. Internationalization is a key strategy for TRSM in our academic plan.

We must also be moving faster to keep up with our competitors – in HTM, principally with the colleges. One way of doing so is establishing a much more robust value proposition for students transferring from

college programs. We must do a better job at differentiating what makes a TRSM Hospitality and Tourism BComm different from what can be obtained at an Ontario college.

Our graduate level programming must also be bolstered across our Faculty. I am expecting to see a number of HTM faculty members avail themselves of MScM students. Thesis-based students can provide support to SRC as well as foster an ecosystem of research within a School and Faculty. TRSM has offered to fund scholarships for up to three faculty members in every School and Department to kick-start our revamped thesis based Masters.

Broadening the scope or perception of HTM from a 'hotel school' to a school with a serious emphasis on tourism and sustainability in all activities is also a key change that must be operationalized. Today's students are savvy regarding sustainability issues and are looking for ways to shift the thinking in traditional industries. We must afford these students great opportunities to pursue their passions for tourism and sustainability throughout our HTM curriculum. Even in hotels where many of our students find employment we must be challenging current business models and contemporary thinking.
Finally, the reviewers and the HTM School both mention the lack of Space. TRSM is the busiest business school in Canada. There is no denying that our building is the most heavily utilized on campus. We must continue to put pressure on the central administration to fund an additional two floors for TRSM. In the meantime, we need support in locating and paying for contiguous space options. As was made clear in the report, the status quo around space is not an option if we're serious about the student experience.

13. ASC EVALUATION
The Academic Standards Committee assessment of the Periodic Program Review for Hospitality and Tourism Management (Bachelor of Commerce) indicated that the review provided a well-organized, timely, and informative evaluation of the program. The ASC also noted the recent addition of a Tourism Minor and a co-op option in the program.

The Academic Standards Committee recommends that the program provide a follow-up report on the status of the initiatives outlined in the Developmental Plan. The follow-up should also include an update on (1) the reduction of the number of the courses in the curriculum, (2) the blanket articulation strategy with colleges, (3) the decoupling of HTM402 and HTD500, (4) retention issues, and (5) ACC100 concerns.

Follow-up Report
In keeping with usual practice, the follow-up report which addresses the recommendation stated in the ASC Evaluation Section is to be submitted to the Dean of the Ted Rogers School of Management, the Provost and Vice President Academic, and the Vice Provost Academic by the end of June, 2016.

Date of next Periodic Program Review
2022 - 2023

Recommendation
- Having satisfied itself of the merit of this proposal, ASC recommends: *That Senate approve the Periodic Program Review for Hospitality and Tourism Management – Bachelor of Commerce (BComm)*

D. PERIODIC PROGRAM REVIEW FOR CHEMISTRY – BACHELOR OF SCIENCE (BSC)

1. BASIC INFORMATION
a) Program Description
The Bachelor of Science in Chemistry, which started in 2005, is a full time, four year degree program. Students are able to complete the regular program or opt to take the Chemistry – Applied Physics option.

The regular program and the options can all be taken with or without a co-op option (which adds another year to the program). Students also have access to an Optional Specialization in Management Sciences.

b) Program History

- When the Ryerson Institute of Technology was established in 1948, one of the three-year diploma programs was Chemical Technology.
- By the mid 1960's, this program had options in Industrial Chemistry, Applied Chemistry and Polymer Chemistry. Laboratory Science was added in 1967. The program combined some elements of the Applied Chemistry option with newly designed courses in biology, microbiology, and biochemistry.
- In 1971 a fourth year was added to both the Chemical Technology and Laboratory Science programs and the first Bachelor of Technology (Laboratory Science) degree was awarded in 1973.
- During the 1970's and 1980's, Chemical Technology gradually changed to Chemical Engineering Technology, and the name was changed to Chemical Engineering in 1984. The program was accredited by the Canadian Society for Chemistry (CSC) in 1985 (and reaccredited in 1992 and 2003).
- In 1989, the Laboratory Science program was renamed Applied Chemistry and Biology.
- Growth in faculty research activities prompted the development of new science programs in Biology, Chemistry, Contemporary Science, Mathematics and its Applications, and Medical Physics, all with a common first year platform. The Chemistry and Biology programs were launched in 2005, at which time the Applied Chemistry and Biology program was phased out.
- In order to meet CSC guidelines, some changes were made to the Chemistry program in 2007; the Chemistry and Chemistry Co-Operative Education programs were accredited in 2009.
- The Chemistry Applied Physics option did not meet CSC accreditation requirements, in part due to the lack of a biochemistry component. Due to lack of student interest in Computational Chemistry, this option and its Co-Operative Education version were eliminated effective September 2010.
- A Master of Science in Molecular Science was launched in 2006, followed by a PhD in Molecular Science in 2010.

2. DEVELOPMENTS SINCE PREVIOUS PROGRAM REVIEW

a) Previous Developmental Plan

This is the first periodic program review for the Bachelor of Science in Chemistry. The program was implemented with the first cohort of students entering their first year of study at Ryerson in the Fall of 2005.

b) Annual Academic Plan

One of the goals (Objective 2) of the academic plan is to improve undergraduate programs in pedagogy, delivery and technology; to review and remove options not well used by students; and to renew undergraduate laboratory infrastructure. The Chemistry program underwent accreditation review by the Canadian Society for Chemistry in 2009 and was fully accredited. The Computational Chemistry stream of the Chemistry program was not popular; no students had ever enrolled in this option, therefore the option was eliminated.

Two undergraduate chemistry teaching laboratories had been identified as in urgent need for renovation: KHN 205 and KHN 207. Funding was approved for the KHN 205 renovation, but almost the entire budget was consumed by major expansion of the HVAC, installation of air make-up capacity, and the fume hoods themselves. Construction was completed in Fall 2011. With a new science building as a rising priority in University capital projects, approval of further major laboratory renovations in Kerr Hall is unlikely. Chemistry teaching labs continue to suffer from infrastructure deficiencies.

An additional goal of Objective 2 is to increase the student satisfaction with their experience in the Chemistry program at Ryerson. The goal for graduate satisfaction is 85%; in 2008 the combined score for both chemistry and biology was 74%; by 2011, the combined score for overall satisfaction for both chemistry and biology was 81% (67.5% satisfied and 18.8% very satisfied). It should be noted that the sample size is very small; 15 biology students and 3 chemistry students responded.

The NatSome results from the National Survey of Student Engagement (NSSE) 2011 follow:

Table 1 NSSE 2011 *Entire educational experience* (% good + excellent)			
Program Year	**Chemistry**	FEAS	Ryerson
1st year	**74 (n=15)**	72 (n=373)	81 (n=1612)
4th Year	**82 (n=17)**	77 (n=384)	77 (n=2170)

Table 2 NSSE 2011 *Would you choose to attend the same school if you were to start all over again* (% probably yes + definitely yes)			
Program Year	**Chemistry**	FEAS	Ryerson
1st year	**69 (n=16)**	78 (n=373)	86 (n=1612)
4th Year	**94 (n=17)**	76 (n=384)	78 (n=2170)

Table 3 NSSE 2011 *Worked harder than they thought they could to meet instructors standards or expectations* (% often and very often)			
Program Year	**Chemistry**	FEAS	Ryerson
1st year	**40 (n=15)**	50 (n=407)	54 (n=1739)
4th Year	**67 (n=18)**	60 (n=400)	60 (n=2261)

Table 4 NSSE 2011 *Put together ideas or concepts from different courses to complete assignments or during class discussion* (% often and very often)			
Program Year	**Chemistry**	FEAS	Ryerson
1st year	**38 (n=16)**	48 (n=410)	61 (n=1755)
4th Year	**50 (n=18)**	70 (n=404)	74 (n=2286)

Table 5 NSSE 2011 *How often do you worked on papers or projects requiring that you integrate ideas or information from a variety of sources* (% often and very often)			
Program Year	**Chemistry**	FEAS	Ryerson
1st year	**71 (n=17)**	60 (n=433)	79 (n=1837)
4th Year	**74 (n=17)**	84 (n=413)	91 (n=2341)

c) Response to Issues Arising from Previous Accreditation Assessment

The Chemistry program was reviewed by the Canadian Society for Chemistry in 2009 for accreditation. At the time of the site accreditation review, the Department of Chemistry and Biology was part of the Faculty of Engineering, Architecture and Science. As of July 2012, the Department is now one of the founding departments of the Faculty of Science.

For the purposes of the accreditation review, the PCS 400 Quantum Physics course was considered equivalent to a Quantum Chemistry course. While students gave the site visit team compliments about PCS 400, chemistry faculty and students have expressed reservations about the course since then. The course has become a required component of the Medical Physics undergraduate program, with PCS prerequisites not normally obtained by Chemistry students. With this change, Chemistry students are no longer adequately prepared to succeed in the course as taught.

The Chemistry – Applied Physics program (including co-op) was also reviewed in 2009 and was deemed not accreditable due to the lack of a biochemistry course and insufficient hours of instruction in both chemistry laboratories and chemistry courses as a whole.

Other comments about the main Chemistry program:

- The reviewers noted that "the age of the building, its physical state, and the overall space associated with the Department of Chemistry and Biology has implications for the quality of the Chemistry education taking place, and for the growth of the department's research profile."
- The Chemistry program exceeds the required number of mathematics and computer science courses with two required calculus-based mathematics and one computer science course required in the first year, a calculus course in the second year, and a course in statistics in the third year.

- The reviewers thought that the CHY 261 Biochemistry course should be re-labelled as a BCH course. This change was put into effect with the 2011-2012 course calendar and included renaming CHY 361 Intermediary Metabolism I and CHY 362 Intermediary Metabolism II as BCH 361 Advanced Biochemistry I and BCH 362 Advanced Biochemistry II, respectively. The content and descriptions of these courses have not changed.
- Students were generally very positive about the chemistry course offerings and the quality of instruction. They particularly liked their smaller class sizes and interactions with faculty and staff.
- Students attempting to complete the minor in biology reported that despite the large selection of courses, scheduling limits their actual selection of courses and in many cases makes obtaining the minor within a four year program of study impossible. Since the 2009 accreditation site visit, scheduling concerns have only increased. Recently, Scheduling has been working collaboratively with the Department to try to minimize conflicts between elective courses, with some success.
- The site visit team recommended that we hire an additional chemist in the area of organic/environmental chemistry. A synthetic organic chemist interested in the design of new materials for sustainable energy production was hired in 2011.
- The site visit team was impressed with the Ryerson library holdings, in particular the paper and electronic journals. At the time of the accreditation review, we had just one seat available on SciFinder Scholar. This is the standard tool for searching the chemical literature and therefore is used extensively by faculty and students for both teaching and research activities. The number of seats has since been increased to an unlimited number.
- The accreditation report recommends that the number of Chemical Technologists be increased to 3; this was done in Fall 2011.
- The site visit team strongly recommended that Ryerson renovate KHN 205 and KHN 207 to modern standards.

A new Science Building remains at the top of the wish list for the Chemistry program, the Department of Chemistry and Biology, and the Faculty of Science. The need for such a facility is even more pressing with the establishment of the new Faculty of Science, and growth in undergraduate programs, undergraduate admissions in all science programs, growth in graduate programs, and increases in the number of faculty who need not only office space, but adequate research space and infrastructure.

3. SOCIETAL NEED

a) Current and Anticipated Societal Need

Chemists find employment in a wide variety of industrial sectors, including chemical, petrochemical, agrochemical, pharmaceutical and other scientific companies, mineral, metal, pulp and paper, food, and other manufacturing industries, education, health/medical, and government, as well as in analytical laboratories. In Ontario, most chemists are employed in the GTA, Ottawa, Hamilton-Niagara Peninsula and Kitchener-Waterloo-Barrie. Therefore, the chemistry program at Ryerson is ideally situated to provide chemistry graduates for employment locally. Chemists generally have fairly high employment rates.

Overall, our alumni are quite successful at pursuing opportunities and finding employment in areas directly related to their degree. In our sample set, 60% have pursued graduate training and approximately 80% are directly using their chemistry/science knowledge in some way.

b) Existing and Anticipated Student Demand

The Chemistry program has met its target admissions each year with approximately 11 to 12 applicants per position (average from 2005 to 2009). The interest in these science programs compares very favourably with programs in the Faculty of Engineering, Architecture and Science (average 8 applicants per registrant, average from 2005 to 2009) and Ryerson as a whole (10 applicants per registrant, average from 2005 to 2009).

The Chemistry program has seen a steady increase in first year enrolment from 43 (Fall 2005) to 56 (Fall 2010), further supporting a growing interest in the chemistry program (Table 6). The admission target is

currently 56-60 students. The overall headcount in the Chemistry program is approximately 160 to 170 students.

Table 6 ENROLMENT	**F2005**	**F2006**	**F2007**	**F2008**	**F2009**	**F2010**	**F2011**
Engineering, Architecture & Science	1271	1296	1373	1508	1497	1592	1731
Science	371	390	452	488	447	534	626
Chemistry	**43**	**52**	**54**	**50**	**49**	**56**	**63**

The ratio of male to female students in chemistry programs has traditionally been higher than in some other disciplines. Our chemistry program is no exception; in most years since 2005, the percentage of male students (53% weighted average from 2005 to 2011) in the program has been higher than in the Biology (43%) and Contemporary Science (44%) programs and higher than at Ryerson as a whole (45%).

Full-time enrolment dropped down from an average of about 80% from 2005 through 2009 to 70% in 2010 and 53% in 2011. Some students have restricted course loads because of their academic standing, some cannot access the courses they want to take because of scheduling issues, some students are part-time because they have only a few courses remaining to complete their degrees, while others choose to work part-time for financial reasons.

4. PROGRAM OUTCOMES

a) Program Outcomes

The chemistry faculty in the Department of Chemistry and Biology value a Chemistry program which is accredited and produces graduates capable of entering the work force as professional chemists or pursuing further study as graduate students. The learning outcomes developed for this program support these values and are modelled on the scientific process.

	Graduates of the Chemistry program should be able to:
Knowledge	1. Demonstrate the integrated nature of the essential facts, concepts, principles and theories in each of the five core areas of chemistry: a) Analytical Chemistry b) Biochemistry c) Inorganic Chemistry d) Organic Chemistry e) Physical and Theoretical Chemistry
Scientific Inquiry	2. Identify problems, formulate questions, select and interpret relevant and appropriate resources and data.
Experimental Design	3. Devise methods to test original hypotheses with attention to detail.
Experimentation & Safety	4. Conduct standard laboratory procedures using appropriate synthetic methods and instrumentation; 5. Demonstrate understanding of safe chemical handling and disposal; assess and manage risks of chemicals and procedures.
Analysis & Problem Solving	6. Manipulate and critically evaluate data and experimental evidence in order to arrive at appropriate and defendable conclusions.
Communication and Collaboration	7. Decipher and communicate technical information clearly and concisely orally, in writing, and in visual form, for a range of audiences; 8. Collaborate effectively and reliably with faculty and peers (listen, provide constructive feedback, contribute equitably and in a timely manner).
Autonomy and Awareness	9. Understand the limits of their own knowledge and recognize uncertainty and ambiguity; confidently exercise responsibility in

	decision making and the consequences of their decisions; 10. Demonstrate curiosity and actively pursue a higher level of understanding. Interpret the societal impact of chemistry in everyday life, technology, and the environment.
Professional Conduct	11. Demonstrate ethical behaviour, accountability as well as personal and academic integrity; 12. Demonstrate time and resource management.

Students reach a level of proficiency towards *learning outcome 1a* analytical chemistry by the end of their third year, which is reinforced with the environmental science course. With only one required biochemistry course in the program, it is not possible for students to reach a level of proficiency in this sub-discipline (*learning outcome 1b*) without a major restructuring of the program. Proficiency in biochemistry is neither expected nor required for accreditation of the program. We are not satisfied with the level of proficiency reached by our graduates in *1c*) inorganic chemistry or *1d*) organic chemistry, areas that are our strengths in terms of number of faculty focus. Students are not able to reach proficiency in these areas because there are not enough courses in these areas. We plan to address these deficiencies through the development of several new chemistry elective courses. Proficiency in *learning outcome 1e*) physical and theoretical chemistry is also difficult for students to achieve. We offer only two physical chemistry courses and have only two faculty capable of teaching these courses, both of whom have administrative roles and reduced teaching loads.

Students are able to reach a suitable level of proficiency in *learning outcome 2* (scientific inquiry) through the chemistry elective courses. Student achievement towards proficiency in program *learning outcome* 3 (experimental design) and 4A (experimentation) are hampered by the use of cook-book style labs and not enough labs in sub-disciplines other than analytical chemistry. We plan to address this shortcoming in the program by developing an integrated synthesis laboratory course. L*earning outcome 4B* (safety) would also be strengthened with this course.

Proficiency in *learning outcome* 5 (analysis and problem solving) is attained through the chemistry elective courses. A level of proficiency in *learning outcomes* 6A (communication) and 6B (collaboration) should be achieved fairly early in the program, but is only reached in the chemistry electives. Student achievement of these *learning outcomes* should be examined and built into existing courses wherever possible.

Learning outcomes 7A (uncertainty & limits of knowledge, decision-making) and 7B (curiosity, higher understanding & societal impact) are reached in the chemistry elective courses, but have little reinforcement or introduction. In particular, issues relating to societal impact of chemistry could be introduced in courses as part of the examples that are used and could be assessed on tests and assignments.
Learning outcomes 8A (integrity & accountability) and 8B (time and resource management) reach a level of proficiency by the end of third year through the core required courses.

b) Program Consistency with other Academic Plans
Because the learning outcomes are intended to support a high-quality accredited program and to produce graduates with the appropriate knowledge and skills to solve problems, design and perform experiments safely and effectively, communicate clearly, work well with others, use resources effectively and demonstrate sound ethical conduct, the program learning outcomes are in alignment with the ultimate goal of the University: to offer high quality societally relevant programs. The Chemistry Program and the learning outcomes of the Chemistry Program are consistent with the University's Mission Statement in that the students in the Chemistry Program learn knowledge and theory and apply these to chemical problems.

The Chemistry program, and in particular the learning outcomes of the program, are in alignment with the Academic Plan's priorities:

- The main purpose of the program learning outcomes is to train students to become independent thinkers capable of meeting the need for chemists in a variety of sectors. Conformation to the requirements for

CIC accreditation as well as the program learning outcomes combine to create a high quality program and ensures that the program meets the expectations of the Chemical profession in terms of content and quality.

- The program supports students to develop the study, learning, laboratory, communication and collaboration skills that will make them successful in the program and beyond.
- The existing Chemistry Program offers students some choice in programming; however, student choice is frequently limited by the availability of elective courses and by scheduling issues.
- Students engage in the SRC activity when they opt to take the Chemistry Thesis project in their fourth year of study. Additional opportunities to participate in SRC activities exist through summer employment in research labs on and off campus, opting for the Cooperative education option in the Chemistry program, or through volunteer work.
- The experimentation that forms the basis of teaching laboratory curricula is intrinsically experiential. Chemistry students have many experiential learning opportunities in the laboratories that form a core part of the curriculum, the writing assignments associated with these labs and other course components, as well as through Co-Operative education and these research projects.
- The newly established Faculty of Science enhances the University's reputation and makes the existing science programs at Ryerson much more visible. Full accreditation of the Chemistry and Chemistry Co-Op programs further enhances the reputation of Ryerson. Formally, only learning outcomes1 (Knowledge) and 4/5 (Experimentation) are considered as part of the accreditation process. However, the combination of all the learning outcomes makes the program very solid.

5. ACADEMIC QUALITY

a) Description of the Program Curriculum and Structure

The first year of the program is shared with other science programs, namely, Biology, Contemporary Science, and Medical Physics. The courses in this first year include Biology, Chemistry, Mathematics, and Physics, Computer Science and Liberal Studies.

The concepts and skills introduced in the first year courses are further developed in the core chemistry courses of second year (analytical chemistry, biochemistry, organic chemistry, physical chemistry) and third year (inorganic chemistry). In addition, students take two additional mathematics courses: calculus in their second year, and statistics in their third year of the program.

The main subdivisions of chemistry are further developed by the core courses of third year. In particular, students strengthen their knowledge of analytical methods with additional courses in Analytical Chemistry (CHY 330 and CHY 331); additional courses (CHY 339 and PCS 400) strengthen and extend their core knowledge in chemistry and the communication course (CMN 600) is meant to provide students with solid writing skills so that they can communicate professionally with other scientists via posters, oral presentations and written documents such as reviews and research articles.

In the fourth year of the program, students are required to take an Environmental Science course (CHY 423). Students choose eight professionally related courses in which they can further specialize in chemistry, or can broaden their scientific knowledge base with courses in the other sciences (biology and physics) and mathematics. Two of these electives must be chemistry courses to ensure that students have met the laboratory hour requirements of accreditation. The chemistry courses in their selection mostly bring students to a level of proficiency in chemistry concepts and skills at the undergraduate level, while introducing students to more specialized niche areas in chemical disciplines. Students may also choose to take either the Chemistry Thesis Project or an Independent Study course in which they perform laboratory and/or literature research and present the findings of their research in professionally appropriate formats, including an oral presentation and a written thesis.

Aside from the chemistry courses required in the Chemistry program and allied sciences, the Department also offers core chemistry courses to students in Engineering programs, especially Chemical Engineering, as well as to students in Nutrition, and Public and Occupational Health. Students in the Arts have access to first

year General Chemistry courses. The Department also offers some Liberal Studies chemistry courses to students outside of the Faculties of Science and Engineering and Architectural Science.

On average, 31% of the students in the Chemistry regular and Co-Operative education programs complete minors as part of their undergraduate degree program – typically in Biology and Mathematics. The graduates from the Chemistry – Applied Physics program have not obtained minors.

CURRICULUM - CHEMISTRY	
1st SEMESTER REQUIRED: BLG 143 Biology I CHY 103 General Chemistry I CPS 118 Introductory Programming for Scientists MTH 131 Modern Mathematics I PCS 120 Physics I SCI 180 *Orientation * pass/fail	**2nd SEMESTER** REQUIRED: BLG 144 Biology II CHY 113 General Chemistry II MTH 231 Modern Mathematics II PCS 130 Physics II LIBERAL STUDIES: One course from Table A
3rd SEMESTER REQUIRED: CHY 142 Organic Chemistry I CHY 213 Analytical Chemistry I CHY 381 Physical Chemistry I MTH 330 Calculus and Geometry LIBERAL STUDIES: One course from Table A	**4th SEMESTER** REQUIRED: BCH 261 Biochemistry CHY 223 Analytical Chemistry II CHY 242 Organic Chemistry II CHY 382 Physical Chemistry II LIBERAL STUDIES: One course from Table A
5th SEMESTER REQUIRED: CHY 330 Atomic and Molecular Spectroscopy CHY 331 Basic Chromatography CHY 344 Inorganic Chemistry MTH 380 Probability and Statistics I LIBERAL STUDIES: One course from Table B	**6th SEMESTER** REQUIRED: CHY 339 Characterization of Organic Compounds CHY 449 Inorganic Chemistry II CMN 600 Science, Communication and Society PCS 400 Quantum Physics I PROFESSIONAL AND PROFESSIONALLY-RELATED: One course from Table I
7th SEMESTER LIBERAL STUDIES: One course from Table B. PROFESSIONAL AND PROFESSIONALLY-RELATED: Four courses from Table I	**8th SEMESTER** REQUIRED: CHY 423 Environmental Science LIBERAL STUDIES: One course from Table B. PROFESSIONAL AND PROFESSIONALLY-RELATED: Three courses from Table I

Notes:

i. First two semesters are common to Biology, Chemistry, Contemporary Science, Mathematics and its Applications, and Medical Physics - Both Co-operative and Regular Programs

ii. Students in the Applied Physics Option follow a separate curriculum from 3rd to 8th semester

iii. Students in Co-operative Program follow a separate curriculum from 5th to 8th semester

PROFESSIONAL AND PROFESSIONALLY-RELATED - TABLE I Regular and Co-operative Programs (excluding Applied Physics Option)	
A minimum of **two** from the following:	
BCH 361 Advanced Biochemistry I CHY 40A/B† Research Project-Thesis CHY 431 Applied Analytical Chemistry	CHY 434 Analytical Chemistry of Complex Samples CHY 600 Organic Reaction Mechanisms † A multi-term course (equivalent to two single-term courses)
A maximum of **six** from the following:	
BCH 362 Advanced Biochemistry II BLG 151 Microbiology I BLG 251 Microbiology II BLG 307 Molecular Biology BLG 311 Cell Biology BLG 351 Applied Microbiology BLG 400 Genetics BLG 401 Ecotoxicology BLG 402 Limnology BLG 567 Ecology BLG 578 Pharmacology BLG 600 Physiology BLG 678 Current Topics in Biology	MTH 210 Discrete Mathematics II MTH 330 Calculus and Geometry MTH 430 Dynamical Systems and Differential Equations MTH 480 Probability and Statistics II MTH 500 Introduction to Stochastic Processes MTH 501 Numerical Analysis I MTH 503 Operations Research I MTH 540 Geometry MTH 601 Numerical Analysis II MTH 603 Operations Research II MTH 607 Graph Theory MTH 609 Number Theory MTH 640 Complex Analysis

BLG 700 Anatomy BLG 785 Developmental Biology BLG 788 Current Topics in Biotechnology BLG 800 Genomics and Proteomics BLG 856 Immunology BLG 888 Molecular Biology Laboratory CHY 435 Advanced Chemical Instrumentation CHY 436 Pharmaceutical Chemistry CHY 437 Organic Chemistry CHY 445 Materials Chemistry CHY 482 Selected Topics in Chemistry CHY 500 Directed Studies CHY 501 Polymer Chemistry CHY 502 Organometallic Chemistry CHY 706 Computational Chemistry CPS 314 Graphical Modeling MTH 110 Discrete Mathematics I MTH 210 Discrete Mathematics II	MTH 710 Fourier Analysis MTH 712 Differential Equations II MTH 714 Logic and Computability MTH 718 Design and Codes MTH 814 Computational Complexity MTH 817 Combinatorics MTH 820 Image Analysis PCS 227 Biophysics PCS 228 Electricity and Magnetism PCS 229 Introduction to Medical Physics PCS 230 Photonics and Optical Devices PCS 300 Modern Physics PCS 335 Thermodynamics and Statistical Physics PCS 352 Nuclear Physics/Radiation Protection PCS 354 Radiation Biology PCS 700 Quantum Physics II

b) Diversity and Inclusion

Throughout the program, students are exposed to many different laboratory skills through the courses that have laboratory components. Along with these hands-on skills, students also learn to communicate their findings in professionally appropriate ways through written laboratory reports. They also learn appropriate conduct in a laboratory environment, and how to work with their colleagues and instructors.

c) Curriculum and Structure

Each of the UDLEs is addressed by one or more of the program learning outcomes. In turn, each of the program learning outcomes is addressed by a number of required courses at different levels of the program, beginning in the first year and continuing through the third and fourth year courses. Professionally related chemistry electives further reinforce the program learning outcomes and therefore the UDLEs.

We noted during our curriculum mapping to our program learning outcomes, that there was some uncertainty amongst faculty regarding the meaning of the levels I, R and P; a number of faculty reserved P (proficiency) for the level of a working chemical professional. This is not the level at which undergraduates would perform upon graduation. The teaching and assessment methods all appeared to support the acquisition of knowledge related to, and specific to, chemistry.

Depth, breadth, and application of knowledge are addressed by four of the UDLEs (1, 2, 3, and 5). The general trend in the required courses in the program is that the first year courses introduce the required knowledge in chemistry and related fields. Some further introduction occurs in second year with courses in major areas of chemistry not addressed in first year, namely organic and biochemistry. Reinforcement of concepts occurs in both second year and third year required courses. Proficiency is reached in the third year analytical courses, but is not reached in any of the other major areas of chemistry unless the appropriate chemistry elective courses are taken.

Ideally, a graduate would have reached proficiency in at least two of the major areas of chemistry through their selection of chemistry electives, which could include a laboratory research thesis (CHY 40A/B). We see the potential lack of proficiency in our graduates related to these UDLEs as a weakness of the current program and plan to address this through the development of new courses to fill in gaps in fundamental knowledge early in the so that this knowledge and the associated skills can be better developed in later courses. At the same time, we are considering repositioning some of the topics between courses to promote better retention of knowledge and to assist the development of knowledge and skills.

UDLE 4 deals with communication skills. These are introduced in first year courses and to some extent in the first half of the second year. Communication skills are reinforced throughout the second half of the second year and the third year courses. Proficiency is reached in fourth year chemistry elective courses. This means that the bulk of the required courses in the program only bring students to a reinforced level of

communication skill. Some communication skills could be expected at a higher level beginning in the second year and brought to proficiency in third and fourth year. The biggest hurdle towards developing good communication skills in lower level courses is the large class sizes. In these courses, it is overly difficulty to develop oral communication skills, but written communication skills in the form of laboratory and other written work can be developed.

UDLE 6 deals with autonomy and professional capacity. This is generally well covered, with most courses addressing these expectations. There is a steady progression from introductory through reinforced to proficient using the chemistry elective courses that students take in their fourth year in the program. We could put more emphasis on these skills earlier in the program.

d) Curriculum Development

Curricular changes and development in the chemistry program occur on a number of levels: within a course, between courses in the same discipline, and in the program as a whole. Curricular changes within a course are often small changes made in response to new discoveries and developments in the field.

e) Enrolment in Program Courses

The science programs at Ryerson have had a steady growth in admissions since 1995. The first year courses have been the ones most impacted by this growth because the Biology program has grown faster than the other programs. Other courses taken by Biology program students after first year have also experienced substantial growth, in particular CHY 142 Organic Chemistry I and BCH 261 Biochemistry.

Beginning in the second year courses, class sizes drop quite significantly (aside from CHY 142 Organic Chemistry I and BCH 261 Biochemistry) and represent the number of students in the Chemistry program as well as some students from other programs such as Biology who are taking Chemistry courses in order to obtain a Chemistry minor, to fulfill prerequisites for professional programs, or for interest.

The Chemistry program has seen an increase in the number of small (<30) size chemistry courses as more upper year professionally related chemistry electives have been offered. These courses are typically small because of some self-selection by students into the courses, and because there is a relatively small number of students in the upper years of the chemistry program. The class capacities are generally higher than the course enrolments, suggesting that there is room for expansion in the chemistry program.

f) Relationship to Current Discipline and Profession

CHY 482 Special Topics in Chemistry and CHY 40A/B Research Thesis provide students with the most exposure to new developments in chemistry; in the case of the research project, this is because the students are involved in the discovery process. Small changes to course content are made to incorporate newer reactions and techniques.

Our Chemistry program is not significantly different from comparator Chemistry programs at Brock University, Lakehead University and Windsor University in terms of course content in required courses. However, the chemistry program at Ryerson has at least three fewer total chemistry courses. This has a significant impact on the amount of exposure students have to chemistry and to the opportunities available for students to learn to be chemists. The total number of chemistry courses can only be increased at the expense of core courses in supporting disciplines such as those in mathematics and computer science; the chemistry program includes three more foundational science and related courses than the comparator programs. Another limiting factor is the number of humanities and social science courses required in the Chemistry program, which has three more of this category of course than any of the comparator programs.

g) Professional Practice

Program *learning outcomes 8A and 8B* relate to professional and ethical practice in the field of chemistry. Most of the professional practice is dealt with through lab instruction and grading of Good Lab Practice. Additional discussion regarding professional practice and ethics takes place in lectures and on a case-by-case

basis with individual students who need further instruction on ethics. Students who have participated in the thesis course will have had exceptional training in professional practice and ethics.

h) Accreditation

The Chemistry Program at Ryerson is accredited by the Chemical Institute of Canada and is similar to other chemistry programs in Canada. The Chemistry and Chemistry Co-Operative Education program are accredited through 2014.

i) Student Engagement

a) Teaching Methods & Innovative or Creative Content or Delivery

The Chemistry Program is delivered in a traditional manner of lectures and laboratory sessions. However, within the lecture, a variety of different activities occur that allow for student engagement including demonstrations, problem assignments, interactive activities, discussions, in-class activities and exercises, problem-based learning and case studies. Laboratories are an effective means of providing students with experiential learning opportunities and skills that will be useful after graduation. Laboratories are an essential component of the program for accreditation by the Canadian Society for of Chemistry (CSC). In-class delivery of course material allows students in relatively small classes to be engaged in interactive real-time discussions and to demonstrate good oral communication skills.

While all of these activities are related to learning outcome 1 (knowledge of Chemistry), they also support achievement of other learning outcomes in the program, depending on the course and how the activity is used. Each of the learning outcomes is supported by the activities in at least one of the required program courses. Each of the UDLEs is also supported by the teaching methods used in the program (Table 7).

Table 7 Support of Program Learning Outcome and UDLEs by TEACHING METHODS

Teaching Method	Program Learning Outcomes	UDLEs
Lecture	1, 2, 3, 4A, 4B, 5, 6A, 6B, 7A, 7B, 8A, 8B	1-6 (all)
Lab work	1, 2, 4A, 4B, 5, 6A, 6B, 7A, 8A, 8B	1-6 (all)
Demonstrations	1, 2, 5	1, 2a, 3, 6a
Discussion	1, 2, 3, 4, 5, 6A, 6B, 7A, 7B, 8A, 8B	1-6 (all)
Problem Assignments	1, 2, 4B, 5, 6A, 6B, 7A, 7B, 8A, 8B	1-6 (all)
Interactive Activities	1, 5, 6A, 6B, 8A, 8B	1, 2, 3a, 3b, 4, 6
In-class activities	1, 2, 3, 4B, 5, 6A, 6B, 7A, 7B, 8A, 8B	1-6 (all)
Group Work	1, 5, 6A, 6B, 7A, 7B, 8A, 8B	1, 2, 3a, 3b, 4, 5, 6
Case Studies	1, 2, 4A, 4B, 5, 6A, 6B, 8A, 8B	1, 2, 3, 4, 6

j) Experiential Learning Outcomes

The nature of the chemistry profession requires that courses contain experiential learning opportunities throughout the program. Beginning in the first year of studies, students are exposed to hands-on laboratory experiments in chemistry, biology and physics. By the end of the second year of study, chemistry program students have completed at least one course with laboratory component in 4 out of 5 of the major chemistry sub-disciplines. Laboratory skills are further reinforced in core courses with laboratory components throughout the third year of study. By the end of their sixth term, students are asked to use skills learned in previous courses to help them develop their own experiment procedures in both core and elective courses with laboratory components.

Experiential learning laboratory components in required courses of the program allow students to reach proficiency in only a single sub-discipline (Analytical Chemistry). Students that are enrolled in the Thesis Project course (CHY40, taken in the final year of study) will reach proficiency in one (or more) of the 5 sub-disciplines by having completed a research project that requires the student to design and carry out their own experiments in a research laboratory environment under the supervision of a faculty member. These projects build upon the skills learned in core and professional elective courses taken by the students in previous years. It would be beneficial to increase the number of professional electives courses with laboratory components and/or stand-alone laboratory courses from each of the sub-disciplines to provide an opportunity for students

not enrolled the Thesis Course (CHY40) to reach proficiency in laboratory skills in sub-disciplines other than analytical chemistry.

Many of the laboratory components require students to work in groups and to share access to instrumentation with other groups in order to complete their assigned tasks (learning outcome 6). These skills are further reinforced in upper level courses through in-class exercises and presentations that require students to explain and defend their solutions to problems, compose term papers and/or give oral presentations on current topics from scientific literature.

Co-op students who are able to complete all 5 work terms prior to the beginning of their final year of study are able to reach proficiency in program learning outcomes 2-8.

Students with an interest in Inorganic Chemistry can apply to participate in the Inorganic Chemistry Exchange (ICE) program, which offers summer employment opportunities.

k) Student Assessment

All of the program learning outcomes and all of the UDLEs are assessed by at least one form of evaluation in each of the required chemistry courses. While the first year chemistry courses rely quite heavily on multiple choice examinations for assessment, by third and fourth year, students are normally assessed through short answer tests, problem sets and assignments. Lab reports are *de rigueur* in courses with a laboratory component. The most common forms of assessment and the program learning outcomes and UDLES that they support are shown in Table 8. Other forms of assessment are used in some courses, such as oral presentations, term papers and case study.

Table 8 Support of Program Learning Outcomes and UDLEs by STUDENT ASSESSMENTS in Required Chemistry Courses

Assessment Method	Program Learning Outcome (s)	UDLE(s)
Midterm exams	1, 2, 3, 4A, 4B, 5, 6A, 6B, 7A, 7B, 8A, 8B	1-6 (all)
Final exams	1, 2, 3, 4A, 4B, 5, 6A, 6B, 7A, 7B, 8A, 8B	1-6 (all)
Problem Sets	1, 2, 3, 5, 6A, 6B, 7A, 7B, 8A	1-6 (all)
Assignments	1, 2, 5, 6A, 6B, 7A, 7B, 8A, 8B	1-6 (all)
Lab report(s)	1, 2, 3, 4A, 4B, 5, 6A, 6B, 7A, 7B, 8A, 8B	1-6 (all)

l) Student Success and Achievement

About 76% of the students who entered the Chemistry program have been retained in the second year of the program. The number of students entering second year in the Chemistry program with clear standing has varied from 37% to 61%, with an average of about 53%. These values are similar to the overall figures for the Faculty of Engineering, Architecture and Science, the program's home faculty from 2005-1012, but lower than for Ryerson as a whole.

The retention data indicate that of entering students, 65% have entered third year of the program and 60% have entered fourth year. These figures indicate that while students have the most difficulty adjusting to the first year of the program, they are likely to continue in the program. Only a handful of students do not make it from second year to third year; these are most likely to be students who experienced academic difficulties in their first year of the program. The retention figures for students after two and three years in the program are comparable to those for students in the Faculty of Engineering, Architecture and Science, but somewhat lower than those for Ryerson as a whole. This is a reflection of differences between science and engineering programs and other programs at Ryerson.

Since the Chemistry program was launched in 2005, there is insufficient data available to comment on the graduation rates of newly-admitted secondary school students within six years.

Academic Standing Distributions are similar to those for the science programs within the Faculty of Engineering, Architecture and Science for all four years of study. Science students typically have the most

difficulty in the first year of study, which is reflected in the lower proportion of clear students after first year in science compared to Ryerson as a whole. The academic standing distributions for third and fourth year chemistry and science students are in line with the distributions for Ryerson. Graduating students have a mean GPA of approximately 3.0, which is consistent with both the sciences and Ryerson.

m) Library Resources

The Ryerson library chemistry collection currently includes content and resources from SciFinder Scholar, Scholars Portal Journals, Scopus, Science Direct, the Royal Society of Chemistry, and Compendex. The library is well poised to support Chemistry students.

Maintaining access to the ACS journals is of utmost importance for continued research and teaching in chemistry. CRKN (Canadian Research Knowledge Network) recently negotiated a new contract with ACS that extends the terms and pricing of the existing contract for two years, with an annual increase applied. Chemistry students use and access not only the chemistry collections, but collections in other areas as well. Besides electronic and print materials, the library also has other resources available for students, in particular, the Math Assistance Centre and the Writing Centre, both of which are used by Chemistry students. The library also offers some technology and reference support.

n) Student Surveys, Focus Groups, and Graduate Surveys

Students of the Chemistry program indicate a general level of satisfaction with the quality of the program. Current students agreed and strongly agreed that:

- the program is academically challenging (95%; N = 82)
- the program is of high quality (84%; N = 83)
- most professors are current and knowledgeable in their field (82%; N = 83)
- most professor's teaching is intellectually challenging (78%; N = 82)
- the content in the program courses is well organized (77%, N=83)
- the teaching experienced is generally of high quality (72%; N = 69)
- the program provides good preparation for a career (61%, N=83)

In the NSEE 2011 results, 82% of third year chemistry program NSSE respondents (N=17) indicated that their entire educational experience at Ryerson was good or excellent.

Overall, students reported that the program helped them to improve at least somewhat in a variety of skills.

- 66% of current students reported that the program improved their ability in problem-solving and critical thinking very much or greatly
- 60% of the students believe that the program has improved their research skills very much or greatly
- 66% improved their ability to work in teams very much or greatly by being in the program
- Students also reported improvement in their oral and written communication skills, leadership skills, computer proficiency, understanding their professional or ethical responsibilities, employment related skills and knowledge, and knowledge of their career field.

Students indicated the contribution of different aspects of the program to their learning. In particular, students found the following to be effective:

- computer-based library resources (78%, N=83)
- written assignments (77%, N=83)
- laboratory experiences (77%, N=83)
- group work (72%, N=83)
- textbooks and other learning materials (71%, N=83)
- tests and examinations (69%, N=83)
- classroom instruction (68%, N=83)

NSEE 2011 responses suggest that in the first year of study, much of the emphasis is on memorization and analyzing basic ideas, but not so much on synthesizing information or ideas, or on making judgements, or applying knowledge. By the time Chemistry program students reach their fourth year, the emphasis on

memorization has dropped and is replaced by synthesizing and organizing ideas, information and experiences. The emphasis on evaluating information, arguments or methods, or on applying theories or concepts to practical problems or new situations does not increase from the levels reported by first year students, and in both cases are well below the values reported by students in the Faculty of Engineering, Architecture and Science.

Further evidence comes from the NSSE scores for the institutional contribution to solving complex real-world problems. These score suggest that instructors should make an effort to link classroom activities more closely with real-world problems, and to provide upper year students with more complex problems.

From 2009-2012 there were 72 BSc Chemistry graduates. With only four respondents to the *alumni survey*, the errors are likely to be very high. All four respondents reported that they would recommend Ryerson. In addition, the respondents indicated that they were either very satisfied (33%) or satisfied (67%) with the overall quality of education they received at Ryerson.

Using a variety of sources (Facebook™, LinkedIn™, alumni emails, and personal knowledge), we have managed to obtain incomplete data regarding pursuit of additional education and current employment from 51 alumni. The results are summarized below:

- 30 of the 51 alumni pursued some form of additional education after graduating from Ryerson.
- Of the 30 alumni who pursued additional education, 20 pursued an MSc or PhD, with 12 of the 20 alumni doing their graduate studies at Ryerson. The second most common form of additional education was a BEd degree (5 students). Other forms included training at colleges and professional schools such as medicine.
- Of the 51 alumni we collected data from, 12 are currently employed in industries directly related to chemistry and/or science. There are also several alumni who could be considered 'in transition' and are employed as Research Assistants or working with science outreach programs such as Visions of Science while they consider their future career paths.
- Approximately 12 alumni are currently employed in other areas. Examples include the financial sector (3), communications, law related areas, and the service industry.

Results from the *employer survey* (N=4) indicated that employers of graduates of the Chemistry program are satisfied or very satisfied with our graduates skills and abilities in technical skills, written and oral communication, ability to plan and run projects, organization, initiative, creativity, leadership potential and overall quality of work. For these categories, the employers indicated that Ryerson graduates are better or comparable to graduates of similar programs at other universities. The respondents indicated that they would prefer graduates with a degree in chemistry, and were evenly split between wanting graduates who had specialized in-depth knowledge of chemistry, and graduates who had a breadth of knowledge in many disciplines. Mathematics and Computer Science are the two areas of science of most interest as secondary areas of knowledge in chemistry graduates.

While the employers indicated some dissatisfaction with graduates' skills at data analysis and problem solving, they also indicated that our graduates were ranked as better or comparable to graduates from other universities at data analysis and problem solving.

6. ACADEMIC QUALITY INDICATOR ANALYSIS

a) Faculty Qualifications

The core chemistry faculty includes all the chemists in the Department of Chemistry and Biology. Faculty members from other disciplines and departments are also involved in teaching the required courses in biology, communication, computer science, mathematics, and physics. Almost all the chemistry faculty have PhDs in chemistry, and most also had postdoctoral experience prior to joining the faculty at Ryerson. Several of the faculty members also have professional experience outside of academia.

b) Scholarly, Research and Creative Activities
Chemistry research within the Department of Chemistry and Biology has a number of foci: synthesis, materials, chemical education, and environment.

Undergraduate students have the opportunity to participate with SRC activity within the department in a number of ways. Students in their fourth year of the program can pursue a research project in one of the research laboratories or a chemical education research project under the supervision of a faculty member. Between 2009 and 2012, 54 chemistry undergraduates have taken the chemistry research project course (CHY 40A/B), 21 of whom are known to have entered graduate school, and five to have entered teacher's college. Some of the research laboratories are able to hire students to work as research associates during the summer or as Co-operative education work terms. In addition, some students volunteer to work in the research laboratories. Research activities and the results of research studies are discussed in classes when this work is relevant to the topics under discussion.

The Ryerson University Analytical Centre (RUAC), a department-run facility, supports some of the analytical work related to SRC activities in the department. The Department also houses a Tissue Culture facility within a clean room, and an Advanced Microscopy Facility.

c) Admission Requirements
Eligibility for admission to the Chemistry program is on the basis of an Ontario Secondary School Diploma with a minimum overall average of 70% in six Grade 12U/M courses including Grade 12U English (ENG4U/EAE4U preferred), Advanced Functions (MHF4U), and two of Biology (SBI4U), Chemistry (SCH4U) or Physics (SPH4U). Students applying for admission to the Chemistry program are strongly recommended to have SCH4U; SBI4U and SPH4U are also recommended. These admissions requirements are similar to those of many chemistry programs in the province.

d) Student Qualifications
Students entering into the Chemistry program between 2005 and 2011 had mean entering averages between 77 and 78% based on their best six Grade 12U courses (Table 9).

Table 9: Entering Averages	**Year**						
	2005-06	**2006-07**	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**
Ryerson	78.8	79.8	80.2	80.6	81.5	81.4	81.9
Engineering Architecture & Science	77.7	78.5	78.4	79.3	79.8	80.1	-
Engineering and Architectural Science	-	-	-	-	-	-	82.4
Science[1]	75.0	76.6	76.6	76.6	77.8	77.3	77.9
Chemistry	**74.8**	**79.9**	**76.5**	**76.2**	**79.7**	**76.6**	**77.7**

The percentage of students with entering averages over 80% in the chemistry program tends to be lower than for the Faculty of Engineering, Architecture & Science or the University, but this value is on average similar to the value for the science programs (Table 10).

Table 10: Entering Averages Over 80% (percentage)	**Year**						
	2005-06	**2006-07**	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**
Ryerson	41.3	48.4	52.2	55.1	61.7	61.6	66.0
Engineering Architecture & Science	32.3	38.5	36.6	42.8	48.1	48.8	-
Engineering and Architectural Science	-	-	-	-	-	-	68.5
Science[1]	12.5	26.9	21.5	27.3	30.7	25.1	30.9
Chemistry	**4.0**	**40.0**	**22.6**	**3.0**	**48.4**	**24.4**	**27.0**

e) Enrolment, Retention and Graduation Data

The chemistry program has met its enrolment targets each year since the first admissions into the program (Fall 2005). This is due in part to the ratio of applicants for each spot in the program which has never dropped below than 10:1.

Retention data for the Chemistry program (Table 11) indicate that retention of newly admitted chemistry students in the chemistry program is comparable to retention in other science and engineering programs, although lower than in other programs at the university. Other years show mixed results.

Table 11			**% Retained in same program after 1 year**				
	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009	Fall 2010	Fall 2011
Ryerson	81.0	81.3	82.1	80.0	81.0	82.3	82.1
FEAS	75.6	77.4	74.7	73.4	74.2	-	-
Science	-	-	-	-	-	73.5	72.0
Chemistry	**85.3**	**82.4**	**69.1**	**75.8**	**73.0**	**71.7**	**66.7**

Table 12			**% Retained in same program after 2 years**				
	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009	Fall 2010	Fall 2011
Ryerson	70.2	74.8	75.3	72.9	75.9	74.3	-
FEAS	62.6	69.2	65.5	60.3	-	-	-
Science	-	-	-	-	66.9	66.3	-
Chemistry	**67.6**	**73.5**	**54.8**	**69.7**	**59.5**	**69.6**	-

Table 13			**% Retained in same program after 3 years**				
	Fall 2005	Fall 2006	Fall 2007	Fall 2008	Fall 2009	Fall 2010	Fall 2011
Ryerson	65.9	71.3	70.3	70.4	69.9	-	-
FEAS	59.1	64.8	59.5	-	-	-	-
Science	-	-	-	56.6	58.3	-	-
Chemistry	**58.8**	**58.8**	**52.4**	**69.7**	**45.9**	-	-

Of the newly admitted secondary students who entered the Chemistry program in Fall 2005, 59% had graduated within six years. This is better than the average for 2005 cohort in the science programs (48%), although slightly lower than for engineering and architecture programs (66%) or the university average (66%). On average, students in the Chemistry program are registered for 9.7 academic terms. This is equivalent to 4-5 years of study for most students.

f) Additional Program Feedback

The Chemistry Advisory Committee provided input regarding the strengths and opportunities of our program in light of the current and projected job opportunities for chemists in Canada. They suggested that 40-50% of the jobs will be in analytical chemistry (QA, QC, support), 15-20% in synthesis and process development, and the remaining 30-45% in product development. Overall, the advisory committee likes the direction of our current program.

- The focus in analytical chemistry is a strength and an important differentiator. The advisory committee thought that we should not sacrifice our strengths in analytical chemistry instruction in order to build strength in other areas.
- The chromatography course (CHY 331) is one that is not usually found in chemistry curricula. However, the advisory committee thought that this course is key for our students for entry into the industrial workplace, and would be even more important for this if more real-world connections and relevance were included in the course.
- If any changes are to be made to the analytical chemistry component of the curriculum, the committee suggested that the curriculum should be modernized and that the emphasis on titrimetric and gravimetric techniques in Analytical Chemistry I (CHY 213) be reduced in both the lecture and laboratory components and that a wider variety of techniques be taught here instead.
- To make students market-ready, they should be introduced to, and taught, industrial lingo, process control and organizational structure and roles.

- Students should have many opportunities to develop written and oral communication skills appropriate to the discipline, including the use of graphics to illustrate ideas and concepts clearly.
- The use of statistical tools, such as SPSS, to determine the relevance of data is a numeracy skill that is also of importance and should be well developed by the time students graduate.
- Although there is value in being able to work with others, it is important that all employees are able to work independently and be accountable for their contributions to their team. In most cases, teams are comprised of members from different disciplines, so it is vital that team members are able to collaborate with others across disciplines. Some knowledge of these other disciplines is useful.
- Students should have an understanding of copyright and trademarks. They should know how to use and research ChemAbstracts as is already done with the thesis students. Teaching aspects of regulatory science would increase the market-readiness of our students upon graduation.

7. RESOURCES

a) Faculty and Staff

The Department of Chemistry and Biology administers the Chemistry program, the Biology program and the Biomedical Science program (F2013). The Department has a Departmental Chair, a Program Director, and Co-Operative Education Coordinator, all of whom are chemists. The Associate Chair is the Biology Program Director.

The Department of Chemistry and Biology is supported by an Administrative Coordinator, and two Departmental Assistants. Another staff member provides additional administrative research support and program coordination for the graduate programs in Molecular Science. The Chemistry program has three technologists to support the running of teaching laboratories and equipment, as well as the Ryerson University Analytical Centre (RUAC), and overseeing safety.
The Advisory Council consists of six individuals who have an interest in undergraduate chemistry education. In selecting members for the advisory committee, representation from both industry and academia, and from different sub-disciplinary foci was sought.

Full-time faculty (RFA) teach 72-92% of the chemistry courses offered by the Department of Chemistry and Biology. The faculty strength is in synthetic and materials chemistry (inorganic and organic). Therefore, we are well equipped to teach inorganic chemistry, organic chemistry, and general chemistry with our current faculty complement. However, we are currently weak in physical chemistry and analytical chemistry due to administrative positions. A bioorganic or biological chemist would help to expand our offerings into the well-established cross-disciplinary area of chemical biology.

We currently have 29-35 TA/GA chemistry positions and 3-4 marking assistants. Teaching assistants for chemistry courses are normally selected from among the graduate students in the Molecular Science and Environmental Applied Science and Management programs pursuing work under the direction of members of the department.

b) Curriculum Counseling/Advising

Students with questions or who want advising regarding their course selections are directed to the Program Director, who provides advice based on the student's advisement report, transcript, program requirements, and the student's strengths, current and post-graduation interests. Those wishing assistance with career choice and development normally seek advice from the Program Director or any of the other faculty members. Additional resources are available from the Centre for Student Development & Counselling and from the Career Development and Employment Centre.

The First Year and Common Science Office (FYCSO) plays an active academic advising role to all first year students register in programs within the Faculty of Science, including those registered in the Chemistry program. The FYCSO collaborates with student groups in the organization of Orientation Activities prior to the start of the Fall semester and is the official academic home department of the online SCI180 Orientation course designed to help familiarize incoming students with the academic policies and

support structures provided by Ryerson University. The FYCSO coordinates with Student Learning Support to ensure that appropriate services are available for first year science students.

c) Physical Resources

Chemistry and Biology largely resides in the north-east corner of Kerr Hall on the second and third floors. The Department has a total of 8895 ft2 of chemistry teaching lab space, with an additional 955 ft2 of preparatory space. The research labs total 4499 ft2. While some of the laboratory space has been completely renovated since 2000 and is in relatively good shape, most of this space is antiquated and in need of renovation.

The Department has no dedicated computing facilities. Students have access to academic computing laboratories distributed across Ryerson University and wireless access to Ryerson's central portal is possible throughout most of the Department's space.

8. STRENGTHS, WEAKNESSES AND OPPORTUNITIES

a) Strengths

- The Chemistry program has managed to keep the feeling of a fairly small program, despite the high student to faculty ratio.
- Although the first year classes are relatively large at 300+ students, these are still smaller than corresponding courses at nearby universities.
- Faculty are relatively accessible to students, are approachable and friendly.
- The chemistry program gives students many opportunities for experiential learning.
- Most chemistry courses are taught by full-time faculty.
- Most faculty pursue funded research activities in their areas of expertise.
- The department has a relatively high proportion of faculty (3 of 12) who are actively involved in chemical education research activities, as well as others who are interested and dabble in this field.
- Most of the program learning outcomes are met through the required courses and emphasized through the professional and professionally-related courses that students choose in their upper years.
- Students and alumni value the chemistry program and would recommend it to others. Employers are satisfied with the quality of our graduates.

b) Weaknesses

- Analytical chemistry is emphasized compared to other areas of chemistry in the current chemistry program. This emphasis is a product of the history of the Chemistry program and the Department, but is not consistent with current faculty strengths in inorganic, organic, synthetic, polymer, and materials chemistry. In addition, this emphasis is not consistent with the learning outcomes and interests of many of the chemistry students.
- The learning outcome of knowledge in chemistry is not well met through the current courses. In order to address this, several new courses will be developed, and some existing courses will be redeveloped.
- While the Chemistry program currently meets the chemistry course instructional requirements for CSC accreditation, the program would be stronger if students were required to take additional chemistry courses beyond the number they currently take (17). Comparison with our comparator programs suggests that three additional courses would be needed.
- The Chemistry – Applied Physics Option program is not accredited by the CSC, and has relatively low student enrolment. Students enrolled in this program complain that there is too much overlap between some of the required courses. In addition, they find that many of the physics courses that are part of the program are too focused on medical physics; they would prefer courses in classical physics, quantum physics and chemical physics.
- Many of the undergraduate laboratories are out-dated and/or lack the equipment for modern analysis techniques. Some of the equipment has come to the end of its functional life and can no longer be repaired. Funds to replace needed equipment and to maintain this equipment are not readily available. Some of the laboratories have been renovated while others have not and are in need of renewal. The Chemistry laboratories are used to maximal capacity within the capabilities of the Chemistry department, the equipment available, and scheduling (timetabling).

- While the quality of TA/GAs is a concern, we are confident that the overall quality of TAs is increasing. We provide TAs with more training now through the Learning and Teaching Office than we used to, and also provide them with feedback and resources. As the need for additional sections of chemistry laboratories increases, we expect to have increasing difficulty filling these positions.

c) Opportunities

- Faculty research interests in synthetic, inorganic, organic, materials and polymer chemistry could be capitalized upon to develop new professional courses and the possibility of allowing students to pursue areas of concentration within chemistry.
- Opening up the program structure would provide students with more choice of courses and also more opportunities to take the professional courses (chemistry electives) that are of most interest to them and that will provide them with the best preparation for future endeavours, including employment and graduate studies.
- There is no BSc in Environmental Science, although the Biology program does have an Environmental stream. We would be interested in contributing towards the development of a BSc in Environmental Sustainability.
- Growth in the Faculty of Science has seen increasing numbers of faculty who pursue biochemical research. The expected new hires for the Biomedical Science program are expected to strengthen this area even further. Some of this work contributes well toward the field of Biological Chemistry, which could be expanded beyond a proposed area of concentration under the BSc Chemistry into a program of its own.
- The possibility of having a new building to house the Faculty of Science is very exciting. This new building will not only allow the faculty to rectify a serious space deficit, it will also provide an opportunity to design flexible multi-purpose chemistry teaching laboratories and new research laboratories with adequate space for equipment and research activities.
- An interesting curricular opportunity is to programmatically address deficiencies in the training provided by college programs and local competitor universities by meeting a middle ground between these types of training, balancing communication skills and rigorous academic preparation and communication skills with practical hands-on knowledge.

9. DEVELOPMENTAL PLAN

a) Curriculum

Curricular development in the Chemistry Program is needed to provide students more choices in their third and fourth years, and to strengthen the core chemistry program while maintaining current strength in analytical chemistry.

Year 1 Development (2014-2015)

The core concepts and skills should be identified and mapped throughout the program. This will address the deficiencies in program learning outcome 1 (knowledge) that we noted in our program mapping. This mapping should provide indications of areas of redundancy and weakness. Redundancies should be removed, and weaknesses addressed by including instruction in those areas. The mapping would also track and programmatically address differentiation from other university Chemistry Programs. Renewal of the Chemistry Program accreditation will be sought.

Year 2 Development (2015-2016)

Course content, outlines and descriptions should be adjusted according to the results of the concept and skill mapping. New courses may be created and existing courses could be repositioned in the program. Student advising documents will be created to help students choose their professional elective courses and navigate through a series of program concentrations (e.g. Analytical, Industrial, Synthetic, Biochemical, Physical, etc.). As part of a process of opening up the program to allow students to specialize in concentrations or to broaden their horizons with minors, we would like to create room for six open electives.

Year 3 Development (2016-2017)
Program changes will begin to be rolled out, the success of the program will be monitored and adjustments made as required. In addition, we anticipate the formation of a formal mentoring system for Chemistry Program students.

Renewal of the Chemistry - Applied Physics Program
- Discuss alternative physics courses; students would prefer traditional and quantum chemistry courses rather than medical physics courses.
- Determine how to make the program acceptable for accreditation.
- Determine if the program should be cancelled due to low student enrolment and the results of our discussions with the Department of Physics, and how easy or difficult bringing the program in line with accreditation guidelines proves to be. This program could in effect be replaced by a "Physical Chemistry" concentration.

b) Personnel
One faculty hire in 2014-2015 has been agreed upon at the Faculty level and is linked to the staffing needs associated with the newly launched Biomedical Science program. Teaching needs related to this program call for hiring an organic chemist, although the needs of the Chemistry program call for hiring an analytical chemist. The major challenge with hiring a new faculty member is that space will be required for an office for the faculty member, and the faculty member will need his/her own laboratory research space. We currently need additional laboratory space in our existing organic laboratories.

c) Equipment
Adopting a systematic approach to equipment inventory and maintenance remains a Faculty of Science priority and a work in progress.

10. SUPPLEMENTAL DEVELOPMENTAL PLAN (May 2015)

Year 1 Development (2015-2016)

a) Mapping of core concepts and skills.

b) Analysis of entrance requirements.

c) The first year experience:
- perform data analytics to identify the risk factors which may lead to students experiencing academic difficulties during the first year of their program (including high school performance in science and math courses in addition to the overall average, and the number and combination of math and science courses taken in highs school).
- identify curricular bottlenecks in each of the Science programs to ensure that the content of such courses is relevant to the program and that appropriate support services are put in places for students taking these courses to provide the greatest opportunity for student success.
- establish a pilot project in cohort registration which will see the incoming class of Fall 2015 chemistry students assigned to common lecture and laboratory sections of required first year courses.

d) Co-operative education option – the Department will work with the Office of Co-Operative Education to determine if the number of required work terms should be decreased to bring it into alignment with newer Co-Op programs offered at the University.

Year 2 and 3 Development (2016-2018)

a) Concept map flow chart – following mapping of the core concepts and skills through the program, this information will be compiled into a flow chart or concept map that shows how the concepts are threaded through the program.

b) Communication skills rubric –the descriptors in this rubric could be extended to cover the first and second year student level as well as graduate student writing.

c) Admissions requirements will be re-evaluated based on the information provided by the study carried out by FYCSO. Changes to consider will be the required courses and minimum grades. We will begin to monitor the impact of changes to the admissions process and requirements.

d) Analytical Chemistry – the lecture and laboratory content of the analytical chemistry stream (CHY 213, CHY 223, and CHY 330) will be analyzed and re-worked to modernize this stream and to remove redundancies. We will submit new analytical chemistry courses for approval by ASC and inclusion in the course calendar.

e) Quantum physics – the required quantum physics course will be revised and combined with computational chemistry to make a course that is more relevant to chemistry students than the existing course. Computational and Quantum Chemistry will replace PCS 400 as a required course in the curriculum. We will monitor the impact this has on students.

Ongoing

a) Renewal of laboratory experiments – new experiments for all laboratories will be developed to provide students with more input into the direction of the work they undertake in the laboratories, and also to provide more real-world types of experiences within our operational constraints.

11. PEER REVIEW TEAM REPORT

1. Outline of the Visit

The Program Review Team (PRT) was composed of Dr. Robert Burk, Department of Chemistry, Carleton University; Dr. John Honek, Department of Chemistry, University of Waterloo; and Dr. Mehrab Mehrvar, Department of Chemical Engineering, Ryerson University.

The PRT visited the Department of Chemistry at Ryerson University on October 27th and 28th, 2014. The PRT had the opportunity to meet with the Chemistry Program Director, the Department of Biology and Chemistry Chair, the Vice Provost Academic, the Associate Dean, Research & Graduate Studies, the Chemistry Academic Coordinator, three faculty members, a Technical Specialist, the Departmental administrative staff, (6) undergraduate students (all years); and graduate students (3), (4-5) recent graduates (alumni) of the BSc program, an Advisory Council Member, the Faculty of Science Dean, and the Provost & Vice President Academic. The PRT also observed a high school outreach experimental lab being performed while on their visit.

A range of laboratories (undergraduate as well as research) was seen by the PRT. In addition, several centralized analysis facilities were also visited. Several undergraduate classrooms were also briefly seen by the PRT. One of the external reviewers (JH) took a self-guided tour of the Ryerson University library. The committee also had several opportunities to walk through the Ryerson campus to capture a sense of the spirit of Ryerson.

2. General Overview

Based on these documents and the site visit, the following areas of the undergraduate Chemistry program are considered strong:

- A strong curriculum which has evolved over the years to accommodate new areas of modern Chemistry such as Materials Science and advanced qualitative and quantitative instrumental analyses, while continuing the strong tradition of Ryerson's involvement in training technologists
- A desire by faculty and staff to provide students with outstanding "real world" opportunities and to provide an intimate atmosphere for learning. This was clearly evident in the PRT's discussions with faculty, staff and students (current undergraduate, graduate and alumni).
- Creative use of external business expertise by developing an advisory committee to the department. This type of committee is rarely seen at universities, so this was a very positive aspect to the Chemistry program different from other Chemistry programs in Canada.
- Creative sharing of undergraduate and research equipment and facilities to the benefit of both the undergraduate program and the graduate/research programs of members of the Chemistry Department.
- High school student outreach in the form of research experience provided to high schools was viewed as positive and creative, especially since that type of interaction would likely provide community support for the Faculty of Science and the University.

- The presence of new faculty members as well as established faculty members that provide for a very positive student environment. Interviewed students were highly complementary to the faculty and staff in the department and repeatedly confirmed the positive learning environment that was present in the department.
- The Department of Chemistry and Biology has self-identified eight key strengths in research capacity. It is expected that the expertise available in these areas would benefit undergraduate students by providing them summer research opportunities and/or 4th year research project opportunities.

3. Feedback on Evaluation Criteria

a) Objectives (alignment with institution's plans)

Consistency with the institution's mission and academic plans and with the program's academic plan

The PRT believes that the Chemistry Program is consistent with the institution's mission and academic plans and with the Faculty's academic plan. During the interviews, current program students as well as alumni clearly stated that the Chemistry program is rewarding, the program is applied based with hands-on experience in laboratories, and also the faculty members are very approachable. In addition, students have the opportunities to conduct a research project by taking CHY 40A/B (Research Project-Thesis) in order to enhance their research and scholarly skills. Also, students have the option of taking co-op to gain industrial experience. This clearly aligns with the training of highly skilled professionals for the societal needs.

Program requirements and learning outcomes clear, appropriate and in alignment with the institution's statement of undergraduate and/or graduate Degree Level Expectations

The Undergraduate Degree-level expectations (DLEs) specify six areas of ability required at the undergraduate level. These areas include: Depths and Breadth of Knowledge, Knowledge of Methodologies, Application of Knowledge, Communication Skills, Awareness of Limits of Knowledge, and Autonomy and Professional Capacity. The learning objectives (goals) are very well implemented in the program. However, through the interview with the students and alumni it was discovered that the students need more attention in communication skills.

The PRT strongly believes that the learning outcomes of the Chemistry program are well addressed through different levels of courses. However, the PRT recommends to offer more professionally related chemistry courses from Table 1. If these professionally related chemistry courses are more frequently offered, students will be prepared more to enter the professionally related job markets. Due to the need for statistical analysis of data in laboratory experiments, the PRT suggests to move MTH 380 (Probability and Statistics I) to earlier semesters or to blend most of the important contents of this course to Analytical Chemistry I in case of its elimination.

b) Admission Requirements

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

The PRT understands there are legacy issues in the Department that partly dictate the admission requirements. In particular, the original desire to have a common set of courses for all first year students in Science is one reason for demanding only two of the three 4U-level science courses in high school. Regardless of the reason, this practice is common at other Ontario universities. However, three items are worth considering:

1. The high school Calculus and Vectors course is not an admission requirement. It may be worthwhile to at least "strongly recommend" that they take it.
2. Chemistry SCH4U is "strongly recommended" but not an admissions requirement. This is a curious point - the course is required by most Ontario university chemistry programs, either as a program requirement or as a prerequisite for first year chemistry courses. Ryerson may want to consider making the course mandatory, or possibly creating a remedial high school-level course prior to students entering CHY 103.
3. A grade requirement of 65-70% is rather low and may be contributing to low retention rates in the chemistry program. In the 2010-11 year (the latest year for which data were made available to the PRT), only 19 of 51 first year students were "clear". A further 16 were placed on probation and 16 more were required to

withdraw. This is a very low success rate in first year. Not having a solid grounding in high school chemistry and calculus, or having low high school grades cannot be a good thing for students entering an undergraduate chemistry program. The chemistry program itself is of good quality and Ryerson therefore ought to be competing with other institutions for the best students in the province.

c) Curriculum

The curriculum reflects the current state of the discipline or area of study

The required courses in Ryerson's Chemistry program are typical in Canadian universities. Areas covered include organic, analytical, physical, inorganic and biochemistry, as demanded by the accreditation process of the Canadian Society for Chemistry. Optional courses, although not numerous, also cover a range of modern topics such as environmental chemistry, food science, pharmaceutical chemistry, as well as materials, solid state, polymer and organometallic chemistry. If these optional courses are offered frequently enough, an undergraduate student will graduate with an appreciation of the current state of chemistry. There were concerns raised by students however, that such courses are not offered frequently enough that they did not have much real choice of which courses to take.

Evidence of any significant innovation or creativity in the content and/or delivery of the program relative to other programs

The content of the program, including mandatory and optional courses, covers the main areas of chemistry, as described above. The number of faculty members and their areas of expertise largely dictate the breadth of content, so it seems unlikely that this will increase significantly in the near future.

In the words of the self-study, "The Chemistry program is delivered in a traditional manner." This means that the lectures and tutorials are delivered live, in classrooms, to the students. Laboratories are regularly scheduled in most courses and again are delivered in a traditional manner, i.e. in a real laboratory. As such, the PRT was not made aware of any particular innovative teaching methods. However, there is nothing wrong with traditional methods. Especially for the relatively small class sizes in this program, the face to face Socratic method works very well.

The modes of delivery are appropriate and effective to meet with the program's identified learning outcomes

The modes of delivery used in this program vary from traditional lectures to lectures including demonstrations, as well as discussions, tutorials and other in-class activities and exercises. Many of these activities include some group work and collaborative or cooperative learning. In each case, teaching via these methods is introduced in the lower level courses, reinforced in mid-year courses, and students become proficient learners using these techniques in senior year courses. All of the program goals are appropriately mapped to these modes of delivery, in both the core chemistry courses and the other courses such as physics, computer science, etc.

Particularly noteworthy is the large number of courses, even in the senior years, that include a laboratory component. This is a feature of Ryerson's chemistry program that should be protected and nurtured in the face of cost-cutting measures that are surely biting at its heels. Ryerson's history of teaching applied chemistry should be emphasized and used to advantage while recruiting, especially since the focus in Ryerson's labs these days is much more modern than decades ago. Delivering chemistry via laboratory work is chemists' version of experiential learning and is tied deeply to the learning outcomes.

d) Teaching and Assessment

The methods used to assess student achievement of the program learning outcomes and degree level expectations are appropriate and effective

It should be noted that Ryerson Chemistry Program is currently accredited by the Chemical Institute of Canada and the program is similar to other chemistry programs in Canada. For lecture-based courses, the standard approach is to require a combination of assignments, midterms and final examinations based on the course material, with questions that allow students to make use of learned materials and apply them to new problems. These are also goals that are present in the current Chemistry curriculum and are assessment criteria utilized throughout Canada as well. As stated in the Self Study Report, "the goals are intended to

support a high-quality accredited program and to produce graduates with the appropriate knowledge and skills to solve problems, design and perform experiments safely and effectively, communicate clearly, work well with others, use resources effectively and demonstrate sound ethical conduct".

Analysis of the documentation on individual courses provided to the PRT, which included listings of the assessment methods, indicated that various forms of student learning were present and took the form of the usual assignments (both in-class and take home), spot quizzes which could vary from short essays, short answer, to multiple choice formats. Learning objectives were clearly indicated for courses (based on the course outlines provided) and many outlines went into great detail to provide the important areas of understanding that a student was required to develop in that particular course. In addition, some courses indicated that students may be required to use spreadsheet programs to handle some course material. Experimental skills and learning, as exemplified through laboratory-based courses, were assessed in the standard fashion (experimental results reporting in short form and longer and more detailed "lab reports").

Interestingly, students that were interviewed by the PRT during the site visit indicated that the students would like to see more information on how to write proper lab reports provided to them early in the term, and that example lab reports be available, so that they did not have to learn proper lab report writing by so much trial-and-error. The students requested that feedback on their lab reports were provided in a more timely fashion.

The PRT did notice that many courses have Experimental Design as an important learning objective. This is important. However it appeared to the committee that students would require the 4th year research project (CHY 40A/B) to become proficient with this aspect. Perhaps the departmental curriculum committee could identify courses that could provide more formal training in this in some way.

The means of assessment (particularly in the students' final year of the program) are appropriate and effective to demonstrate achievement of the program learning outcomes and the degree level expectations
In addition to the standard approaches to student assessment mentioned above, which continue in many final year courses, the 4th year research project (CHY 40A/B) provides additional training at a high level. This laboratory course is a research project spread over two terms and is supervised by a faculty member, usually involving research in the faculty member's laboratory. The course assessment is based on a combination of laboratory skills and effort, an oral presentation of the results obtained by the student and a thesis.

One worrisome aspect is that the enrolment in this course may be restricted by the number of available projects, and this is dependent upon availability of a) the faculty member and b) laboratory space and project for the student. It seemed that students that were unable to obtain a project to work on, would have to take other formal laboratory courses and miss out on the research experience. This course is a key course offering to students and provides an opportunity for graduating students to bring all their prior learning to focus on a chemical problem.

e) Resources
The appropriateness and effectiveness of the academic unit's use of existing human, physical and financial resources in delivering its program. Also the appropriateness and effectiveness of academic services (e.g. library, co-op, technology, etc.) to support the program.
Although the resources in general have been aligned so far to offer two programs in Chemistry and Biology in the Department, there is an urgent need to increase most resources due to the growth of the Chemistry Program and the addition of the new Biomedical Science Program.

Currently, the faculty strength is in synthetic and materials chemistry (inorganic and organic). However, the program is currently low in the number of faculty in physical and analytical chemistry. The PRT suggests consideration to be given to the hiring of two more faculty members in physical and organic chemistry areas. The addition of a third faculty member in bioorganic or biological chemistry would help to expand the offerings into the well-established cross-disciplinary area of chemical biology.

With the addition of the Biomedical Science program in 2013, apparently the overall loads of the staff have been significantly increased. This will be more noticeable once there are biomedical science students from the first to the last year in the department. The PRT suggests to add at least one more office support staff to compensate the loads due to the growth of the department.

Although the current level of support is appropriate in delivering two programs of Chemistry and Biology, the addition of the Biomedical Science Program indicates the need of one more technologist. The addition of a Laboratory Coordinator would enhance the efficiency of the program in terms of delivery of the laboratory experiments, training teaching assistants, evaluation of students, etc..

There is a sufficient number of Teaching Assistants available to help in courses and laboratories. The PRT is impressed with the level of support coming from graduate students in terms of Teaching Assistantships. However, due to the current budget limitation of the department, the growth of the program, and the birth of the new Biomedical Science Program, a budget increase is necessary to make sure there is sufficient Teaching Assistantship support.

During the site visit, it was noticed that there is no space available in case of new faculty and or administrative hires. Students during the site visit indicated that they need a computer room along with common software and dedicated printers. However, the PRT is pleased to hear from both the Dean of Science and the Provost and Vice President-Academic that the new Faculty of Science Building is the university's first priority upon the availability of the budget for expansion.

During the site visit, it was noticed that recently some of the laboratories have been either completely or partially renovated. Although most of research laboratories are new and modern, most of undergraduate chemistry teaching laboratories are antiquated and in need of full renovation, both in terms of infrastructure such as walls, ceilings, fume hoods, etc. and in terms of benches and even some equipment. There are some serious safety issues related to the number and positioning of fume hoods, i.e. air quality.

The PRT is very pleased to hear about the construction of the new science building, the University's first priority, by which the laboratory space issues will be eventually resolved. In the meantime, however, undergraduate students are working in outdated and less than optimal space. These laboratories do not show well, and so are likely having a negative impact on recruiting the numbers and quality of students that the program deserves to have.

The library resources are well poised to support students in the Chemistry Program and courses. This is mainly due to the well-equipped services offered by the Ryerson library in terms of chemistry collections, both electronic and print materials. Titles not available at the Ryerson library either electronically or in print are accessible through the Interlibrary Loan Service, which is free to the Ryerson community. The PRT is pleased with the services offered by Ryerson Library to students. However, based on the self-study report, the book budget has been reduced to maintain some subscriptions. The PRT strongly suggests to Ryerson Library to add new titles related to chemistry continuously and also to increase the library budget to make sure all related chemistry titles are available in print or in electronic form.

f) Quality Indicators

The outcome measures of student performance and achievement for the program

The program outcomes are clearly articulated in the self-study, and are appropriate for an undergraduate chemistry program. Measurements of student performance in each of these areas are made according to assessment methods that are also laid out in detail, and are mapped to the learning outcomes in each course. The grades attained by students are therefore reflective of their performance and achievement for the program.

The qualifications, research and scholarly record, class sizes, % of classes taught by permanent or non-permanent (contract) faculty; the number of part-time/temporary faculty and their qualifications and assignments

All faculty members in the chemistry department hold PhD degrees. There is a distribution of positions from assistant/associate professor to full professor. Two faculty members are currently in administrative positions outside of the department, which surely impacts both teaching and research productivity.
The CVs indicate a diversity of research interests, which cover the main areas of chemistry. The number of currently funded researchers is low however, and severely limits the amount of research taking place in the department.

Class sizes are predictably larger in first year, but only 6 chemistry courses have more than 250 students and only 15 have between 101 and 250 students. These are small introductory courses, compared to those in most other undergraduate chemistry programs in the province.

In the current year, the department is employing only 5 sessionals lecturers in the fall and 6 in the winter. This is quite a low number, especially considering there are several faculty on leave of some sort, and two in administrative positions outside the department. This translates into approximately 80% of courses being taught by FTF, which is quite acceptable.

Students: applications and registrations, attrition rates, times-to-completion, final year academic achievement, graduation rates, academic awards
The data tables provide many insights into applications, registrations, attrition rates, and so on. Some interesting facts, possible interpretations and unanswered questions are as follows:

- There are from 10-12 applicants per registrant in the chemistry program, which is somewhat higher than the average at Ryerson. Undoubtedly many students are repelled by the museum-like undergraduate laboratories in Kerr Hall, or at least attracted to the state of the art undergraduate laboratories at other nearby institutions.
- The average entrance grades are from 75-77%, somewhat lower than the Ryerson average, and there are far fewer entrants with average grades over 80% than in the rest of Ryerson. Increasing the average entrance grades is a slow process, but one that needs to be pursued. Entrance requirements may be a factor.
- There are essentially flat numbers of first year registrants (50-60) over the last few years, but significant growth in the total program numbers, i.e. transfers in after first year are significant.
- The planning projections indicate essentially flat projections. The reasons for these projections are not clear, considering steady growth (at least up to 2011).
- Almost 50% of the chemistry students at Ryerson are part time students. This may be a major factor explaining high attrition rates. If the part-time students are also more prone to being placed on probation or having to withdraw, again the entrance requirements may play a role in reducing these problems.
- The mean GPA upon graduation of chemistry students is approximately 3.0, which seems quite reasonable. In other words, those students who complete the program have good grades, which is important if they plan on doing graduate studies, for instance.
- Data for progress percentage of newly admitted secondary students who graduated within six years were only available for the year 2005, so no useful conclusions can be drawn. The self-study however indicates that students in the chemistry program are registered for approximately 5 academic years. This is reasonable, especially considering the large number of part-time students.
- No data were provided regarding academic awards.

Graduates: rates of graduation, employment after six months and two years after graduation, post graduate study, skills match alumni reports on program quality (if available and permitted by FIPPA)
No other data concerning these issues were available.

g) Quality Enhancement
Initiatives taken to enhance the quality of the program and the associated learning and teaching environment
The opportunity for students to take the 4th year research project is an important contribution to program enhancement. However, the availability of research space (and space in general) in the Chemistry

Department for student projects does limit this initiative. As well, the number of faculty able to take on project students can be limiting.

The co-op stream could be an important initiative in enhancing the quality of the chemistry program at Ryerson. The co-op option for chemistry students does not seem to be as popular as in other universities. Perhaps the department and the university may wish to advertise this program more.

Initiatives to build a new Science building is an extremely important way to enhance the program. The availability of new laboratories and classrooms with data projectors would be most welcomed by faculty, staff and students and provide a better quality learning environment. The addition of a computer laboratory with printing facilities for chemistry/science students would also enhance the program.

The external advisory council is a very interesting and important strategic forum to enhance the chemistry program. Input from the advisory members could enhance the program by supplying an industrial view of needed training backgrounds and supply some real-world problems that could be shared with students.

4. Other Observations

- Students and alumni stated the faculty members are very approachable and they are quick in email communications.
- Students and alumni stated that the Chemistry Program is very rewarding.
- Students would like the department to invite one or two students who have done co-op to present their experience. This might serve in identifying future careers for students, networking connections and possible co-op opportunities.

5. Summary and Recommendations

Specific steps to be taken to improve the program, distinguishing between those the program can itself take and those that require external action

Several areas were identified by the PRT based on the documentation provided and the site visit meetings:

- It is highly recommend that additional course choices be available to 4th year undergraduate students that are relevant to their profession.
- Review of the content of some of the courses would be recommended. For example, the PRT found that some course materials and topics were repeated in various courses.
- An additional faculty hire would be recommended. The area that this hire could be in might be in the area of Biological Chemistry or Biomaterials, or in Physical Chemistry such as in Theoretical/Computational Chemistry.
- A new Science building should be given the topmost consideration by the University, and sufficient modern lab and lecture space for teaching and possibly research.
- Renovations of several of the current laboratories (research and undergraduate laboratories) that require them should also be actively pursued when possible.
- Additional space should be provided to undergraduate students in the form of lounge/study space for their use in the current building.
- Computer/printing facilities should be created in the department.
- Entrance requirements and hence entrance grades are rather low. This is a self-perpetuating problem unless steps are taken to raise both. Raising the entrance requirements and encouraging students with higher grades to attend (perhaps by offering more or better scholarships) may be a first step.
- Rates of attrition from the program are very high and need to be addressed, perhaps by recruiting better students as described above.
- The funded research done in the department is of excellent quality, but low quantity. This has the effect of limiting the number of students that can do summer research work, or take CHY 40 A/B. Future hirings must be done with the objective of raising the research profile of the department.
- With the addition of the Biomedical Science Program, it is recommended to have one additional office support staff.
- It is recommended to hire a laboratory coordinator for undergraduate chemistry laboratories.

- Improvement in soft skills for students. Although there currently is a communications course in the curriculum, a more science-centric communications course might be a better strategy for science students. A problems-based course that has students working on chemically-focused industrial problems could be another improvement.

12. RESPONSE OF THE DEPARTMENT OF CHEMISTRY AND BIOLOGY TO THE PEER REVIEW TEAM (PRT) REPORT

Overall, the PPR Report is highly supportive of the Chemistry Program. The PRT found that Chemistry has a strong, current curriculum that retains Ryerson's traditional values of applied, career-relevant education. Providing outstanding "real world" opportunities is a core aspiration of the program, ably supported by an advisory council with industry expertise. Newer and established faculty members collaborate to provide an intimate and very positive learning environment for students. The Department has been both creative and effective in maximizing the use of resources for delivery of undergraduate and graduate education and research. The Faculty of Science's high school student outreach activities in Chemistry was viewed as positive in raising Ryerson's community profile and strategic in supporting improved student quality.

The PRT found that the Chemistry program is consistent with Ryerson's mission and academic plans and the Faculty of Science's academic plan. Undergraduate Degree-level expectations are well implemented in the program and appropriately addressed at different levels of courses. The program is of good quality with typical coverage of the discipline, as would be expected from a program accredited by the Canadian Society for Chemistry. Although the program is traditional in its approach to curriculum delivery methods, and thus not particularly innovative, the PRT did not see this as problematic. They commended the program for the large number of courses that include a laboratory component, recognizing that laboratory work in teaching labs is student experiential learning integral to course learning outcomes.

1. While it is difficult to hear our department facilities described so negatively, we know that the PRT members are very familiar with chemistry teaching infrastructure across the province. Our faculty and staff consistently rise above the manifest limitations of our facilities, and this accounts for the many positive features of our program and the strong endorsement of current students. Nevertheless, it is clear that we could do so much more with better teaching facilities. We are fully convinced of Ryerson's commitment to achieve better facilities for Science education and are aware of the very substantial resources allocated for "bridging" research space in MaRS.

We expect to hear the provincial response to Ryerson's application for new infrastructure funding in the first quarter of 2015. If the Science building does not receive funding and/or construction within a 5 – 7 year window seems implausible, the question of renovating current space should again be actively considered.

We agree that our students (both undergraduate and graduate) would benefit from nearby additional lounge/study space. Science students have access to dedicated study/meeting space in KHE 233 with their Ryerson OneCard; this room seats approximately 30 students and currently appears to be underused. We will observe the impact of the opening of the Ryerson Student Learning Centre and its new meeting/lounge space on our students, to see if this partially or fully alleviates this student concern.

2. An additional chemistry faculty is anticipated to be the next faculty hire as part of the BMS program implementation. We see recruitment of expertise in the area of biological chemistry or biomaterials to be strategic, especially in terms of eventual growth in chemistry enrolments. Such a hire would support the development of a biological chemistry program, making efficient use of current course offerings and the multidisciplinary nature of the Department. This could set the stage for a strategy to raise entrance requirements, by providing an attractive new program that would tap into a different market segment than Chemistry currently does, without raising overall enrolments.

We agree that at least one further hire, in the area of physical or analytical chemistry, would incrementally address low numbers of current faculty in either discipline and support program improvement and research growth. It is clear that the high rates of student attrition must be addressed as part of a larger strategy for

obtaining more faculty hires. However, providing adequate research and office space for new faculty hires in chemistry will remain difficult for the foreseeable future.

We agree with the PRT that more technical support is required, specifically to address the BMS program expansion. We are currently considering various staffing models (full time, part time) to meet this need and will be requesting base funding for additional technical support in the next fiscal year.

3. We agree that providing students access to chemistry-specific, career relevant software would enhance the quality of the Chemistry program. Offering molecular modeling software such as Spartan or Gaussian would be a valuable addition to the instruction currently provided in the program.

We will investigate options for improving access to computer/printing facilities for our students and faculty. It is possible that students are not well informed of the printing and computer facilities available through the Library and it might be possible to provide access to chemistry-specific software via site licenses accessible on laptop computers on loan at the Library. Given current space constraints, we do not see the merits in establishing a dedicated computing laboratory – such facilities exist in other parts of the university and there are established procedures available to students for gaining access. As desk-top computers become outdated and with ready access to wireless, another alternative would be to have a set of laptop computers loaded with chemistry software that could be available for class use or be deployed to students as needed. This strategy would require some storage space and administrative oversight, as well as a modest capital investment.

4. We agree that the average entrance grades into the Chemistry program are low and that these should be increased. Raising entrance grades without improved retention exposes the Faculty of Science to financial risk. We are exploring strategies to mitigate that risk.

The current admissions requirements for the Chemistry Program may not be serving students in the program well and could be a contributing factor to the relatively low retention rates. The PRT has suggested several modifications that are worthwhile investigating. Requiring Chemistry SCH4U for admission to Chemistry, rather than merely "strongly recommending" it is an eminently practical suggestion. Furthermore, the PRT suggests that the Grade 12U Calculus and Vectors course be "strongly recommended" if not "required" in order to assist students with their math courses (MTH 131, MTH 231, MTH 330), physical chemistry courses (CHY 381,CHY 382) and quantum physics (PCS 400) course. This is a sensible suggestion that needs to be carefully explored. We will consider options for recruiting students with higher entering averages. Since Ryerson currently offers attractive entrance scholarships for Science students, we are not sure what additional incentives might induce highly qualified high school graduates to choose Ryerson.

5. The high rates of student attrition is arguably the crucial problem that the Department must solve in the next five years, a problem shared with other science programs at Ryerson. Our Department Academic Plan will seek to balance undergraduate program enrolment with improved outcomes for students. We will seek to stabilize enrolments in all our programs so that we can reach a steady state condition by September 2016. We will raise the high school entering average for Chemistry by at least 5% over the five year period of the Academic Plan, working cooperatively with Admissions to ensure a more targeted approach to review and assessment of high school grades from applicants.

We will develop and implement a strategy for improving retention in core 2nd year courses, including initiatives such as cohort scheduling, in which laboratory sections are dedicated to particular programs rather than random arrangements of science students. Other factors that could help to improve retention would be to invest in significant resources for first and second year students, for example, improving students' math and problem-solving skills through tutorials, on-line videos, and drop-in help sessions. Additionally, the scheduling of final examinations should be such that students do not have three or more core course examinations scheduled on consecutive days; this practice almost guarantees a lack of student success.

Another strategy could be to establish a new Chemistry Program (e.g. Biological Chemistry) that would share the admission target with the current Chemistry program, making both programs more competitive,

effectively raising the intake average of all chemistry students. Biological Chemistry would make effective use of the interdisciplinary nature of the Department and would be cost effective to implement, but require a lot of work to develop.

6. We agree that future hirings must be done with the objective of raising the research profile of the Department. Like many Chemistry departments in smaller universities across Canada, as a group our chemists have not fared well in NSERC Discovery funding competitions and we have seen the steady erosion of long term external funding in this area. Shoring up and advancing our institutional competitiveness for research funding is always a key goal of our faculty hiring. There is every probability that we can attract talented faculty in chemistry who will raise the research profile of the Department, although the specific research area and fit within the current faculty complement will have to be carefully considered.

While the PRT noted restricted enrolments in the fourth year undergraduate thesis course CHY 40A/B, we believe that most students who want to take the 4th year thesis course and are academically qualified have been able to do so – perhaps 1-2 students a year cannot be accommodated. Students can also gain proficiency in experimental design through Co-op placements, the integrated laboratory course (CHY 399), and summer research projects (CHY 307). The latter courses are new and were specifically designed to provide proficiency in experimental design and techniques to students who did not qualify for or who could not access the thesis course.

7. We are in agreement with the recommendation to hire another office support staff person, even though the office will need either significant renovation or additional space to house this person. We expect this to be approved in the next fiscal year, by which time BMS will be in the third year.

8. We see many benefits to hiring a laboratory coordinator for undergraduate chemistry laboratories, as is standard practice at many Ontario chemistry departments, but there are implementation challenges, particularly due to limitations imposed by our various collective agreements. Although we do not have the option of hiring a non-research faculty member – as is done at most universities with laboratory coordinators – we are developing a proposal for the creation of a laboratory coordination RFA appointment that would be structured analogously to a program directorship or associate chair position.

Conclusion:
We commend the PRT for the thoroughness of their report and their attention to detail; we are pleased that in general our program was well received and we thank them for their suggestions, which are helpful. Overall, the PRT calls for continued investment by Ryerson in the Chemistry program. We believe that past investments have been repaid many times over and played a key role in the development of the Faculty of Science and science research at Ryerson. We encourage the university to seriously consider the informed perspectives of the PRT and to provide the enhanced support that Chemistry needs to achieve its potential.

13. RESPONSE OF THE DEAN (Dr. I. Coe)

1. *Overall state of the program based on the data and analysis contained in the self-study*

The time frame of the current PPR (2005-2012) covers a time of enormous change and growth in the sciences at Ryerson, including (but not limited to the Chemistry program) and culminates in the formation of the new Faculty of Science in 2012. The Chemistry Program at Ryerson is perhaps the program with the longest history in the Faculty of Science, dating back to the establishment of Ryerson Institute of Technology. The program has evolved and changed many times since 1948, culminating in the launch of the current Chemistry program in 2005 with the core values of the program remaining true to its foundational principles of providing hands-on and applied instruction in chemistry, broadly defined. This is the first PPR for the BSc in Chemistry. The faculty and staff involved in the program are clearly deeply committed to continued growth and development of the program with improved outcomes at all levels. Overall, the program is rigorous and has a solid curricular structure. As is typical of many chemistry programs across the country, applications and enrolments tend to oscillate more extensively than for other programs (such as the life science) and outcomes/retention are well known to be challenges.

2. *Plans and recommendations proposed in the self-study report*

The self-study is an extremely comprehensive and thorough document that clearly describes the program and highlights a number of strengths, weaknesses, opportunities and threats. The Department is well aware of areas that need attention while continuing to build on established strengths. For the most part, the plans and recommendations proposed in the self-study are echoed by the reviewers, and the departmental response is appropriate.

3. *Recommendations of the PRT and response to the site visit report by Department*

3.1 Space issues need to be addressed.

The site review team did not "hold back" in their opinions regarding the quality and quantity of the current space supporting both teaching and research in Chemistry at Ryerson. Their descriptions about the space being "atrocious" and "Dickensian" are well taken and not particularly surprising to me. As I outlined in my response to the recent Biology PPR, space in support of laboratory science teaching and research at Ryerson is woefully inadequate, and since joining Ryerson in 2012, I have made "space" a top priority for the new Faculty.

There are a number of initiatives under way, to address the seriousness of the situation but none will address the fundamental lack of space nor the age and state of the current space that support Chemistry. I believe that it is a reasonable assessment that only a new Science building will truly address the team's concerns and as such, there is no easy or fast solution to resolving their concerns. However, I do not concur with the Department's response that "Ryerson has worst chemistry teaching laboratories in Ontario" -although I have no doubt that the PRT made them feel that way. Indeed, at a recent Council of Deans of Arts and Science meeting in early 2015, in conversation with a Dean of Science at another Ontario University, he confessed that they were also dealing with outdated and inadequate teaching laboratories containing wooden fume hoods (perhaps the most egregious example of outdated science labs). While hardly comforting, this does shows that the Department is not the only program in the province dealing with this challenge. As such, I was disappointed that the review team did not credit the department (faculty and staff) to the extent that I think they deserve in terms of managing to deliver programming that they are doing very effectively.

In terms of the comments about student space, the review team seemed to be unaware of the newly renovated space available for science students in KHE233 in addition to the fact that net new space to support all students has just come on-line in the form of the new Student Leaming Centre. These oversights are noted by the Departmental response and I concur.

3.2 New hires of Chemistry faculty (research) and staff (both technical and administrative) are needed, which will allow for more 4th yr advanced courses and additional research strengths.

I agree that the Chemistry faculty complement that is currently delivering the programming is spread very thin and the strain of this on the program is particularly evident when the perfect storm of multiple sabbaticals in a single year hits the department. A new hire in Chemistry is a top priority in the Faculty and will be pursued during for the 15-16 academic year, as part of the hiring plan that is currently in place. In addition, there are two industrial chairs in development, in areas that are directly relevant to chemistry and which we anticipate will add capacity and breadth to the department if successful.

Additional faculty hires will obviously support more offerings in the 4th year as well as additional research capacity (which will also provide undergraduate opportunities). Currently, the program offers a research project honours thesis course, which provides students with high quality opportunities in research labs under the guidance of engaged and supportive faculty members. In addition, undergraduate students are involved in volunteer activities within research labs. These types of more advanced laboratory experiential opportunities do not replace formal, traditional laboratory courses, but rather, provide upper level students with high quality laboratory experiences and perhaps could have been highlighted more positively by the review team. I am very well aware that many of the faculty members in chemistry have been hit particularly hard by the very intentional (and, in my opinion, short- sighted and brutal) approach of the chemistry panel at NSERC to focus research funding to the 'high- end' of the research demographic, disadvantaging, proportionally, smaller institutions, new faculty, and those with more modest (but possibly highly impactful) research endeavours.

This research strategy has been the source of much dialogue across the country and within the chemistry community but appears to be leading to no change in the reviewing strategy of the Evaluation Group at NSERC (which is made up of chemistry researchers from across the country - so our peers).

In light of this, the Associate Dean, Research and Graduate Studies, has initiated a number of approaches to try and assist researchers in increasing their success with both the traditional and the non-traditional sources of funding. Grant- writing workshops and various incentives have been introduced (with a mixed response by the community). Graduate student support to those with highly rated but unfunded proposals has been provided and active promotion of alternate sources of funding, such as industry partnerships or non-Discovery Grant tri-council competitions. Changing research cultures and outcomes is a slow process and it will take some time until we see whether these strategies can help to raise overall research capacity.

In terms of technical staff replacement, strategies outlined in my response for the Biology PPR (such as more flexibility around work schedules of technical staff) are also relevant here - particularly in a climate of limited resources. However, should student retention improve, we may be able to use sensible and targeted enrolment management and subsequent revenue distributions to justify additional technical staff, ideally in support of laboratory sciences in general. This remains to be determined but will part of strategic planning going forward.

3.3 Computer/printing facilities should be created.
The review team suggests that more computer/printing facilities be created in the department for students. The Departmental response addresses this concern clearly and also notes that in the era of wireless, 24/7 connectivity, the creation of a dedicated computing laboratory for one program does not make sense (particularly with our current space crisis). I support the Department in initiatives to make students more aware of what is currently available in terms of software and hardware support, as well as in expanding the offerings of software available to students (by whatever means the program feels appropriate). These costs can be either shared (Dean + Department) immediately or we can request specific support in the annual Faculty budget depending on the amount involved.

3.4 Entrance requirements need to be raised.
The Department responds appropriately to these concerns and I concur. It is worth noting that the Faculty, as a whole, is aiming for the recruitment of more qualified and better-prepared students (not necessarily more students). The low quality of preparedness of incoming students into the sciences is a common lament, widely heard among many (but not all) science programs in Ontario and Ryerson is no exception in this regard. It is worth noting that the entering averages for students accepted into the science programs at Ryerson have been slowly climbing over the last few years (finally breaking an 80% average in 2014) and will continue to increase as we see increasing enrolment pressures. Applications to programs in science have increased by 20% since the Faculty was created in 2012.

Obviously this enrolment pressure is not equally distributed across the faculty and Chemistry in particular appears to experience fluctuations in applications of greater magnitude and unpredictability than other programs. This is not unique to Ryerson - it appears to be a characteristic of Chemistry undergraduate programs in many places. Chemistry also suffers from some worryingly low entering grades in Chemistry from some accepted students (with their other grades making up for their overall entry average). Since recruitment of better qualified and prepared students is a Faculty priority in our academic plan, the Dr. Marcus Santos, (Associate Dean, Undergraduate Science Programs and Student Affairs), in conjunction with Dr. Andrew McWilliams, (Chemistry Co-op Faculty Advisor; Academic Coordinator First Year and Common Science Office) have been looking in detail at the demographics of our incoming students, with the assistance of the Admissions and Recruitment Office. These analyses are on-going and the ultimate aim to refine the incoming requirements for all programs (e.g. establish a minimum cut-off for the science/math requirements and then take the average for the best 6 12U courses) as well as identify markers or profiles that might put students at risk during their first year. Other recommendations including requiring (rather than "recommending") specific 12U courses will have to be considered and the feasibility and consequences of

making changes to the current requirements will have to be modelled. The Department is well aware of these issues and is best positioned to make recommendations about any changes in incoming requirements.

3.5 Additional course choices at the upper level should be made available.
Net new faculty in Chemistry will help with the development of additional courses (see 3.2). Another option that was recently raised by the Chair of the Department was the possibility of coordinated teaching with chemistry faculty at other institutions. I encourage creative solutions of this sort, which use technology to overcome both distances, possibly small class sizes at each location and which promote interactions beyond the bounds of the immediate program/department. The feasibility of this is not clear but it something that is worth further discussion and I am willing to assist the program as requested.

3.6 Retention needs to be improved.
This has been a major issue and a serious problem for the program and continues to be a priority area where we seek improvement as a Faculty. The Departmental response is substantive and well-reasoned and does not need to be duplicated here beyond my endorsement of much that is proposed. I will add that there a number of other initiatives that are in development, that I believe will significant improve retention that are not mentioned, these include new programming and initiatives to optimize and promote faculty:student interactions and broaden opportunities for students to engage in a variety of activities related to their current and future goals. These initiatives include (but are not limited to) the mentoring and professional skills program known as RySciMatch, led by Chemistry professor, Dr. Bryan Koivisto, the formation of a Ryerson Science Students society - which is bringing the various course unions together and which is supported by and well connected to the Dean's office, the Women in Science @Ryerson (WISR) initiative which is aimed at providing a community for students, faculty, staff and others interested in the promotion, retention, recruitment and advancement of women in science. In addition, there is a rapidly developing Science Innovation Zone that will provide zone- learning activities, specifically in an experimental science hub under Dr. Koivisto's guidance. We have also noted a significant up-tick in enrolment in co-op programming, which we believe is a consequence of the presence of an "embedded" career counselor, Rebecca Dirnfeld, within the Faculty who has been providing targeted guidance and advice to science students at the local (and much more accessible) level.

One proposal by the department that may be less feasible is the suggestion for a new undergraduate program in Biological Chemistry. Not only is this is huge amount of work, it seems unlikely to be feasible at this time, given that it was not included in the Strategic Mandate Agreement signed with the Province and thus would not receive approval at Quality Council. The possibility of a specialization or stream could be investigated although whether this would constitute a "major change" (and thus be subject to extensive review and possible rejection) or not, would need to be clarified. Either way, it is clear that there is little appetite at this time for universities to bring forward new programming that has not been agreed to as part of the SMA process therefore focusing on other creative and impactful routes to improving retention, as we are doing and planning, appears to be the most likely solution to raising retention (and attracting better qualified students).

3.7 Research capacity needs to be increased.
See 3.2

3.8 Hire a Laboratory Coordinator for undergraduate chemistry laboratories.
This is an excellent idea that correlates with the approach at many other institutions where there are experts, sometimes with advanced degrees in laboratory sciences or specific expertise and passion for innovation in pedagogy, whose primary role is to support, guide and advance the students experiences in the laboratory sections of undergraduate programming. At other institutions, these individuals may be staff members (possibly the equivalent of MAC at Ryerson) or they can be teaching stream (also known as Alternate Stream) faculty members. The Department recognizes the value of this approach and also highlights the constraints. It is deeply unfortunate that innovation and advancement of pedagogy in the sciences, which is rapidly being embraced as a valid field of research and engagement globally, and among some of our comparator and neighbouring institutions, cannot be readily or easily adopted because of these constraints. I will work with the Department and the program to find creative solutions that address this issue.

Curricular innovation and development continues to be discussed institutionally and, no doubt, new and different approaches may be proposed and adopted. The Faculty of Science is committed to producing well-rounded global citizens who possess a solid and rigorous foundational knowledge in science with an understanding of the way that science permeates every aspect of life and the recognition of the natural and power synergies between the sciences and the arts and humanities.

14. ASC EVALUATION

The Academic Standards Committee assessment of the Periodic Program Review for Chemistry (Bachelor of Science) indicated that the review provided a well-written, candid evaluation of the program. The ASC also noted the program's commitment to quality student intake and quality graduates.

The Academic Standards Committee recommends that the program provide a follow-up report on the status of the initiatives outlined in the Developmental Plan. The follow-up should also include an update on (1) the mapping of core concepts and skills, (2) the analysis of entrance requirements, (3) the registration by cohort pilot project, (4) the co-operative education option revised model and (5) the renewal of laboratory experiments.

Follow-up Report

In keeping with usual practice, the follow-up report which addresses the recommendation stated in the ASC Evaluation Section is to be submitted to the Dean of Science, the Provost and Vice President Academic, and the Vice Provost Academic by the end of June, 2016.

Date of next Periodic Program Review

2022 - 2023

Recommendation

- Having satisfied itself of the merit of this proposal, ASC recommends: *That Senate approve the Periodic Program Review for Chemistry – Bachelor of Science (BSc)*

Respectfully Submitted,

Chris Evans, Chair for the Committee

ASC Members:
Charmaine Hack, Registrar
John Turtle, Secretary of Senate
Chris Evans, Chair and Vice Provost Academic
Denise O'Neil Green, Assistant Vice President/Vice Provost, Equity, Diversity and Inclusion
Anne Marie Singh, Faculty of Arts, Criminology
Kathleen Kellett-Bestos, Faculty of Arts, Languages, Literatures and Cultures
Ian Baitz, Faculty of Communication and Design, Graphic Communications Management
Jean Bruce, Faculty of Communication & Design, Image Arts
Mary Sharpe, Faculty of Community Services, Midwifery
Nick Bellissimo, Faculty of Community Services, Nutrition
Medhat Shehata, Faculty of Engineering and Architectural Science, Civil Engineering
Vadim Bostan, Faculty of Science, Chemistry & Biology
Tina West, Ted Rogers School of Management, Business Management
Jim Tiessen, Ted Rogers School of Management, Health Services Management
Naomi Eichenlaub, Library
Nenita Elphick, Chang School of Continuing Education
Des Glynn, Chang School of Continuing Education
Jona Zyfi, Student, Faculty of Arts, Criminology