



**FINAL ASSESSMENT REPORT**  
**Executive Summary**  
**February 2018**  
**Bachelor of Science in Health Physics and Radiation Science**  
**Dean: Akira Tokuhiro**

Under UOIT's Quality Assurance Framework, all degree programs are subject to a comprehensive review every eight years to ensure that they continue to meet provincial quality assurance requirements and to support their ongoing rigour and coherence.

On the completion of the program review, the self-study brief together with the reviewers' report and the assessment team's response are reviewed by the appropriate standing committee of Academic Council, and are subsequently reported to Academic Council, the Board of Governors and the Quality Council.

In 2014-2015 a program review was scheduled for the Bachelor of Science in Health Physics and Radiation Science program. The internal assessment team is to be commended for undertaking this assignment. The following pages provide a summary of the outcomes and action plans resulting from the review, identifying the strengths of the program as well as the opportunities for program improvement and enhancement. A report from the program outlining the progress that has been made implementing the recommendations is also included.

**External Reviewers:** Ana Pejović-Milić (Ryerson University), Paul Johns (Carleton University)

**Site Visit:** May 11-12, 2015

The Health Physics and Radiation Science degree program started in 2003 and is designed to provide students with the scientific and mathematical tools to operate effectively in the multidisciplinary work environment of health physics and radiation protection. The program provides students with direct experience of measurement techniques and computer codes used in industry, government laboratories and regulation.

**Significant Strengths of the Program**

- The program is well aligned with the UOIT mission and strategic plans
- The program is innovative and unique in Ontario
- The laboratory facilities supporting the program are excellent with up to date equipment and instrumentation available to students.
- Well qualified faculty and staff to support the program.

**Opportunities for Program Improvement and Enhancement**

- The number of students applying to the program is low and would benefit from further investigation.
- Further work needs to be done on the learning outcomes for the program and alignment with the degree level expectations and courses in the program.
- Physics and Mathematics course requirements in the program should be examined.
- The program could benefit from a more formalized administrative structure.

### **The External Review**

Dr. Ana Pejović-Milić and Dr. Paul Johns visited the University of Ontario Institute of Technology (UOIT) North Oshawa location on May 11-12, 2017. Over the two days, the reviewers met with faculty, students, administration and staff from UOIT. The reviewers had the opportunity to ask these individuals questions about the program and their experiences. The reviewers also had the chance to tour classrooms, labs and other facilities.

### **Summary of Reviewer Recommendations and Faculty Responses**

#### **Recommendation 1**

*We highly recommend that the main emphasis should be on the HP&RS Program quality and not on the Program size. Being a sister program to Nuclear Engineering with the majority of courses cross-listed with it and/or with other programs at UOIT, this Program should be further developed as a 'niche' program to enable the Faculty and UOIT to differentiate itself from other institutions in Ontario.*

#### **Response:**

The Faculty agrees with this assessment. It will not pursue increases to student numbers.

#### **Recommendation 2**

*In line with the suggestion above, we highly recommend to further strengthen the science content of HP&RS by adding at least two physics courses, Modern Physics (PHY 2060U) and a course in Nuclear Physics (without reactor Physics/Nuclear Engineering). Beyond this, a list of options including courses such as Quantum Mechanics I (PHY 3020U) and more mathematics is suggested.*

#### **Response:**

The addition of two physics courses would require making space in the program map by the removal of an equivalent number of courses, requiring a significant curriculum review and modification. To work towards this recommendation ENG2500 (introduction to nuclear physics) will be examined to look at splitting it into two courses replacing the reactor nuclear engineering component with nuclear physics content.

#### **Recommendation 3**

*It should be made clear who is responsible for the Program, through titles such as Program Director, Associate Program Director, and by the establishment of a formal HP&RS Curriculum Committee. The Program governance should be apparent to the students and these administrative efforts should be acknowledged in the professors' workload assessment. Perhaps these things are in place, but they were not apparent in the Self Study, were not apparent during our visit, and cannot be found on the website.*

#### **Response:**

The Faculty of Energy Systems and Nuclear Science is a small Faculty as is the program. When the Faculty is able to hire new faculty for the program the appointment of a program director will be considered.

**Recommendation 4**

*We recommend that another physicist with expertise in HP&RS be recruited. The number of faculty whose research is in HP&RS is very small. The Program is interdisciplinary and does have faculty with a wide range of backgrounds and in some instances with extensive industrial expertise. Hiring of a new faculty member would allow the planning of succession of faculty members due to anticipated retirements, administrative teaching releases or sabbatical leaves. It would also allow sharing of the administrative load associated with the running of the Program, in addition to improved consistency and quality control over the Program courses. Furthermore, the reviewers noticed that a rather high fraction of prescribed lecture courses is taught by sessional lecturers, which will be alleviated by enlarging the faculty complement.*

**Response:**

This recommendation will be taken under advisement when the opportunity for new faculty hires arises.

**Recommendation 5**

*We recommend the development of a Health Physics stream offered within programs in Physics and/or Nuclear Engineering, to increase the enrollment in the core program courses (RADI courses) and, therefore, expose more UOIT students to health physics and radiation science. Furthermore, a Minor ought to be offered to students at UOIT.*

**Response:**

The Faculty has created program maps for a minor degree in Health Physics, aimed in particular, but not exclusively, to Nuclear Engineering undergraduates.

**Recommendation 6**

*On the other hand, during the site visit there was some mention of adding a Medical Physics emphasis or stream since the Medical Physics undergraduate program offered by the Faculty of Science was recently stopped. Given the expertise of the faculty, we do not recommend launching an undergraduate emphasis/stream in Medical Physics within HP&RS. It is evident that there is currently only general knowledge of Medical Physics in the tenured faculty. Given the small number of the core faculty, especially with Physics background, it does not seem prudent to hire one or two individuals with the expertise in Medical Physics because they would be far below the critical mass to provide high- quality training. Furthermore, they would potentially dilute the current faculty expertise in health physics and nuclear science.*

**Response:**

Currently there is no push from faculty or Faculty administration to venture into Medical Physics as a program offering to undergraduates.

**Recommendation 7**

*The development of an official tracking system of the graduates' employment is recommended. Since the Program's main goal is to train students to be job-ready for the industry, this tracking system would allow assessment of this Program outcome.*

**Response:**

*This will be examined when resources allow.*

**Plan of Action**

The table below presents a timeline of the actions planned to address the recommendations from the external report.

| <b>Proposed Action</b>                            | <b>Timeline</b> | <b>Person/Area Responsible</b>                                |
|---|-----------------|---|
| 1: no action required                             | N/A             | Dean-FESNS  |
| 2: Review curriculum and content of ENGR 2500     | TBD             | Undergraduate Program Director on instruction from Dean-FESNS |
| 3: Solidify program administrative structure      | 2017-2018       | Dean-FESNS  |
| 4: Consider HP&RS program in future faculty hires | indeterminate   | Dean-FESNS  |
| 5: Develop minor degree option                    | 2017-2018       | Undergraduate Program Director on instruction from Dean-FESNS |
| 6: no action, but to note                         | n/a             | Dean-FESNS  |
| 7: Develop tracking system                        | 2017-2018       | Undergraduate Program Director on instruction from Dean-FESNS |

**Due Date for 18-Month Follow-up on Plan of Action:** February 2017

**Date of Next Cyclical Review:** 2022-2023