Physics

Program Requirements
M.Sc. Physics (5.0 credits)

1. 2.0 credits in: 
   - PHYS 5601 [0.5] Experimental Techniques of Nuclear and Elementary Particle Physics
   - PHYS 5602 [0.5] Physics of Elementary Particles
   - PHYS 5701 [0.5] Intermediate Quantum Mechanics with Applications
   - PHYS 5702 [0.5] Relativistic Quantum Mechanics

2. 0.5 credit in: 
   - PHYS 5002 [0.5] Computational Physics (equivalent course in computing physics)

3. 2.5 credits in: 

4. Participation in the seminar series of the Ottawa-Carleton Institute of Physics

Total Credits 5.0

Notes:
1. Students with academic preparation particularly well suited for their chosen field of study may have their course credit requirements reduced to 2.0 credits. In this case, a 3.0 credit thesis will be required.
2. Students with a medical/health physics background may have the selection of required courses adjusted to reflect their preparation and may receive advanced standing for equivalent courses.
3. A selection from PHYS 5208, PHYS 5209, or, (with approval) other appropriate courses in physics, engineering, computer science, business or law can be used to complete the program.
4. Of the 2.5 credits of course work, no more than 1.5 credits may be fulfilled by Selected Topics such as PHYS 5900 PHYS 5900 PHYS 5900 PHYS 5900. PHYS 5901. In special cases, the requirements may also be met by taking 5.0 credits of course work. 1.0 credit must be the Selected Topics course PHYS 5900 [1.0].

Requirements - Medical Physics stream:
1. 0.5 credit from: 
   - PHYS 5203 [0.5] Medical Radiation Physics
   - PHYJ 5003 [0.5] Computer Simulations in Physics
   - PHYJ 5004 [0.5] Computational Physics I
   - PHYJ 5005 [0.5] Computational Physics II

2. 2.0 additional credits in PHYS

3. 1.0 credit in: 
   - PHYS 5905 [1.0] Physics in Modern Technology Work Term

Total Credits 4.0

Note:
Students enrolled in the physics in modern technology stream are required to complete a work term rather than a research thesis. Students in this stream who wish to pursue a research degree should consult with the graduate supervisor. Although every effort is made to find a work term position for every student enrolled in the physics in modern technology stream, no guarantee of employment can be made. To minimize the likelihood of a work term position not being found, enrollment will be limited to reflect the availability of work term placements. If a work term placement cannot be found, students may fulfill the M.Sc. requirements with 4.0 credits of course work.

Guidelines for Completion of Master's Degree

With the exception of those students in the physics in modern technology stream, full-time master's candidates are expected to complete all requirements in six terms of registered full-time study. Part-time master's candidates are expected to complete their degree requirements within an elapsed period of three to four calendar years after the date of initial registration.

Students in the physics in modern technology stream are normally expected to complete all their requirements in three successive terms of registered full-time study.
Ph.D. Physics (10.0 credits)

Requirements:
1. 2.0 credits course work at the graduate level
2. Comprehensive examination designed to demonstrate overall ability in physics and in the candidate’s research area, normally within the first year of study. This takes the form of a written examination followed, if necessary, by an oral examination
3. Participation in the seminar series of the Ottawa-Carleton Institute for Physics
4. 8.0 credits in:
   - PHYS 6909 [8.0] Ph.D. Thesis (which will be defended at an oral examination. The examining board for all theses will include members of the Ottawa-Carleton Institute for Physics from both Departments of Physics. The external examiner of the thesis will be external to both Departments of Physics.)

Total Credits 10.0

Notes
- Students in experimental or theoretical particle physics who lack any of the relevant courses recommended for the M.Sc. program must complete them (or the equivalents) by the end of their Ph.D. program. In addition they should complete PHYS 6601 and PHYS 6602
- Students in medical physics must have completed, either within this degree (as part of the minimum 2.0 course credits) or in prior graduate studies:
  - PHYS 5203 [0.5] Medical Radiation Physics (or equivalent)
  - PHYS 5204 [0.5] Physics of Medical Imaging (or equivalent)
  - PHYS 5206 [0.5] Medical Radiotherapy Physics (or equivalent)
  - PHYS 5207 [0.5] Radiobiology (or equivalent)
  - PHYS 5209 [0.5] Medical Physics Practical Measurements (or equivalent)
  - PHYS 5210 [0.0] Anatomy and Physiology for Medical Physicists (or equivalent)
- 0.5 credit appropriate physics course from an area of physics outside medical physics
- In addition it is also strongly recommended to have completed 0.5 credit in a computational physics course, such as PHYS 5002, within the minimum 2.0 credits of this degree or in prior graduate studies.
- Irrespective of courses taken previously at another institution, students may be required to complete one or more of PHYS 5204, PHYS 5206, or PHYS 5207 as preparation for their thesis research.

Guidelines for Completion of Doctoral Degree
Full-time Ph.D. candidates admitted on the basis of an M.Sc. are expected to complete all requirements within an elapsed period of four to five years after the date of initial registration. Part-time Ph.D. candidates are expected to complete all requirements within an elapsed period of six years after the date of initial registration.

Residence Requirements
For the Ph.D. degree (from B.Sc.): at least three years of full-time study (or equivalent).
For the Ph.D. degree (from M.Sc.): at least two years of full-time study (or equivalent).

Admission Requirements
An Honours B.Sc. in Physics or a closely related field at a standard acceptable to the two universities is normally required for admission to the M.Sc. program.

The admissions committee may require students to take an orientation examination during the first weeks of residence. The results of this examination may indicate the need for a student to register in undergraduate courses to fill gaps in his/her knowledge.

It is strongly recommended that all students have had at least one course in computing.

Candidates admitted to the M.Sc. program with more than the minimum course requirements may be permitted to credit towards the degree a maximum of 1.0 credit at the senior undergraduate level. This maximum does not apply to qualifying-year students.

Accelerated Pathway
The accelerated pathway in the Department of Physics is a flexible and individualized plan of graduate study. Students in their final year of a Carleton B.Sc. Honours degree in Physics with demonstrated excellent aptitude for research may qualify for this option.

Students in their third-year of study in the B.Sc. Honours degree in Physics should consult with both the Undergraduate Advisor and the Graduate Advisor to determine if the accelerated pathway is appropriate for them and to confirm their selection of courses and Honours project supervisor for their final year of undergraduate studies.

Particle physics accelerated pathway: students must complete PHYS 5002 Computational Physics and PHYS 5602 Physics of Elementary Particles with a grade of B+ or higher in each.

Medical physics accelerated pathway: students must complete PHYS 5002 Computational Physics and PHYS 5313 Physical Applications of Fourier Analysis with a grade of B+ or higher in each.

Students may receive advanced standing with transfer of credit of up to 1.0 credit which will reduce their time to completion.

Admission
An M.Sc. in Physics or a closely related field is normally required for admission into the Ph.D. program.

Students who have been admitted to the M.Sc. program may be permitted to transfer into the Ph.D. program if they demonstrate academic abilities for advanced research in their field.
In exceptional cases, an outstanding student who has completed the honours B.Sc. will be considered.