PHYSICS AND ASTRONOMY, PH.D.

Physics and Astronomy
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Academic Staff: Please refer to the Physics and Astronomy website (https://umanitoba.ca/science/directory/physics-and-astronomy/) for Faculty information.

Physics and Astronomy Program Information

The department offers opportunities for graduate study in several experimental and theoretical fields of contemporary interest, leading to the Master of Science and Doctor of Philosophy degrees.

Admission Information

Admission to the Faculty of Graduate and Postdoctoral Studies

Application and Admission Procedures are found in the Academic Guide (https://catalog.umanitoba.ca/graduate-studies/academic-guide/application-admission-registration-policies/).

Admission requirements for doctoral students are found in the Doctor of Philosophy General Regulations (https://catalog.umanitoba.ca/graduate-studies/academic-guide/doctor-philosophy-general-regulations/) section of the Guide.

Physics and Astronomy Ph.D. Admission Requirements

The normal procedure to be a candidate for a Ph.D. degree is to complete an M.Sc. degree first. However, students with an honours degree from the University of Manitoba or equivalent may be accepted directly into the PhD program.

International students entering the Ph.D. program are strongly encouraged to write and obtain a minimum grade of 650 on the GRE physics subject examination prior to applying for the Ph.D. program.

Application Information

Students should complete and submit their online application with supporting documentation by the date indicated on the Physics and Astronomy Ph.D. program of study (https://umanitoba.ca/explore/programs-of-study/physics-phd/) page.

Degree Requirements

The main program of studies is selected from one of the major fields of research, and is supplemented by an ancillary program which takes into account the student's interests and breadth of experience. Ancillary subjects must be chosen from a field of physics distinct from the major area of study or from other departments (e.g., Mathematics) offering suitable courses.

Students must pass a candidacy exam and submit a thesis which describes their research work and which will be examined according to the general regulations.

Where admission to the Ph.D. is directly from an Honours Bachelor degree or equivalent, a minimum of 24 credit hours plus a thesis is required. The coursework must include a minimum of 18 credit hours at the 7000-level or higher with the balance of the coursework at the 3000-level or higher. A maximum of 48 credit hours of coursework is allowed toward the Ph.D. program.

The Ph.D. Program in Medical and Health Physics is designed to prepare students for a Clinical and Academic career in Medical Physics or Health Physics. The program requires a minimum of 24 credits of didactic course work beyond an Honours. B.Sc. and a minimum of 12 credits beyond a M.Sc., as well as the standard departmental Ph.D. research project in a Medical and Health Physics field.

Expected Time to Graduate: 4 years

Progression Charts

Thesis Program

Course	Title	Hours
Year 1		
GRAD 7300	Research Integrity Tutorial	0
GRAD 7500	Academic Integrity Tutorial	0
Courses at the 7000 level [1]		12
	Hours	**12**
Year 2		
GRAD 8010	Doctoral Candidacy Examination [2]	0
	Hours	**0**
Years 3-4		
GRAD 8000	Doctoral Thesis	0
	Hours	**0**
	Total Hours	**12**

1. A maximum of 24 credit hours of coursework is allowed toward the Ph.D. program.
2. The student must successfully complete the formal candidacy examination within the first year after the completion of the Ph.D. program coursework, but in no case later than one year prior to expected graduation.

COMPREHENSIVE PROGRAM IN MEDICAL PHYSICS

Course	Title	Hours
Year 1		
GRAD 7300	Research Integrity Tutorial	0
	Hours	**0**
Term 1		
PHYS 7390	Radiation Protection	3
PHYS 7360	Medical Radiation Physics	3
GRAD 7500	Academic Integrity Tutorial	0
	Hours	**6**
Term 2		
PHYS 7370	Radiation Therapy Physics	3
PHYS 7470	Methods in Medical and Health Physics 2 - (Radiotherapy and Radiation Biology) [1]	3

BME 7012	Foundation of Physiology [2]	
ANAT 7014	Functional Human Anatomy [2]	
	Hours	**6**
Years 1-2		
Term 2		
Select up to 12 credit hours of additional elective courses [3]		
	Hours	**0**
Year 2		
Term 1		
PHYS 7380	Radiation Biology	3
PHYS 7400	Linear Systems for Imaging	3
PHYS 7422	Physics of X-ray Imaging	3
	Hours	**9**
Term 2		
PHYS 7410	Diagnostic Methods	3
PHYS 7430	Physics of Nuclear Medicine	3
PHYS 7460	Methods in Medical and Health Physics 1 - (Medical Imaging and Radiation Protection) [1]	3
GRAD 8000	Doctoral Thesis	0
GRAD 8010	Doctoral Candidacy Examination	0
	Hours	**9**
	Total Hours	**30**

1 Research-based M.Sc. or Ph.D. Students should NOT take PHYS 7460 and PHYS 7470.

2 Students who have not taken Anatomy or Physiology at an undergraduate level (BIOL 1410, BIOL 1012 or BIOL 2410 or equivalent) are required to take ANAT 7014 Functional Human Anatomy (2) and/or BME 7012 Foundation of Physiology (2) in addition to the courses listed above.

3 Up to 12 credit hours of additional electives may be taken to achieve a minimum of 36 credit hours of coursework and to meet program needs. At least 6 credit hours must be courses at the 7000 level, while 6 credit hours may be 4000 or higher level courses. Approved 4000 level courses include PHYS 4386, PHYS 4250, PHYS 4516, PHYS 4646.

Registration Information

Students should familiarize themselves with the Faculty of Graduate and Postdoctoral Studies 'GRAD' courses applicable to their program (https://catalog.umanitoba.ca/graduate-studies/registration-information/). If you have questions about which GRAD course(s) to register in, please consult your home department/unit.

All students must consult with their advisor prior to registration.

Regulations

Students must meet the requirements as outlined in both Supplementary Regulation and BFAR documents as approved by Senate.

Supplementary Regulations

Individual units may require specific requirements above and beyond those of the Faculty of Graduate and Postdoctoral Studies, and students should consult unit supplementary regulations (https://umanitoba.ca/graduate-studies/supplementary-regulations/) for these specific regulations.

Bona Fide Academic Requirements (BFAR)

Bona Fide Academic Requirements (BFAR) (https://catalog.umanitoba.ca/graduate-studies/academic-guide/academic-performance-general/#BFAR) represent the core academic requirements a graduate student must acquire in order to gain, and demonstrate acquisition of, essential knowledge and skills.

All students must successfully complete:

- GRAD 7300 prior to applying to any ethics boards which are appropriate to the student's research or within the student's first year, whichever comes first; and
- GRAD 7500 within the first term of registration;

unless these courses have been completed previously, as per Mandatory Academic Integrity Course (https://catalog.umanitoba.ca/graduate-studies/academic-guide/academic-performance-general/#GRAD7500) and Mandatory Research Integrity Online Course (https://catalog.umanitoba.ca/graduate-studies/academic-guide/academic-performance-general/#GRAD7300).

Students must also meet additional BFAR requirements (https://umanitoba.ca/graduate-studies/student-experience/core-academic-requirements/#additional-requirements-by-program) that may be specified for their program.

General Regulations

All students must:

- maintain a minimum degree grade point average of 3.0 with no grade below C+,
- meet the minimum and not exceed the maximum course requirements, and
- meet the minimum and not exceed the maximum time requirements (in terms of time in program and lapse or expiration of credit of courses).