

4585 Feminist Philosophy [WMST 4585]

3 credit hours

This course examines the contributions of feminist philosophers to historical and contemporary philosophical thought in diverse areas of inquiry, such as ethics, political theory, metaphysics, epistemology, philosophy of science, and philosophy of mind.

4599 Honours Thesis

6 credit hours

Prerequisite: Honours standing in philosophy.

Honours students have the option of completing a thesis on an approved topic. The permission of the Chairperson of the Department and the availability of a thesis supervisor are required.

Physics (PHYS)

Physics courses are offered by the Department of Astronomy and Physics (<http://www.ap.smu.ca>).

Chairperson	I. Short
Observatory Director	D. Turner
ICA Director	R. Deupree
Undergraduate Co-ordinator	A. Sarty
Graduate Co-ordinator	D. Guenther
Professors	D. Clarke, R. Deupree, D. Guenther, A. Sarty, D. Turner
Associate Professors	R. Austin, M. Sawicki, I. Short, R. Thacker
Assistant Professors	L. Gallo, R. Kanungo,
Adjunct Professor	P. Bennett
Professors Emeriti	W. Lonc, G. Mitchell, G. Welch

Note: This segment lists undergraduate courses and programs in physics only. Course and program descriptions for astronomy and astrophysics may be found in the Astronomy (ASTR) segment of Section 5 in this *Calendar* while graduate course descriptions and programs in astronomy may be found in the *Graduate Academic Calendar*.

History

Physics, the most fundamental of the natural sciences, forms the foundation for all other sciences. Physics deals with motion, the structure of matter, and the underlying forces responsible for that motion and structure. It deals with phenomena at all length and time scales, from the subatomic to the cosmological, from the Planck time to the age of the Universe. With their ability to understand complex phenomena at the most fundamental level, physicists are uniquely qualified to pursue careers and postgraduate studies in a wide variety of fields, including engineering, computer science and modelling, visualisation, aerospace and aeronautics, financial forecasting, communications, meteorology, the energy and health sectors, astronomy, mathematics, and the list goes on. In short, physicists are trained and hired to think.

Physics has been taught at Saint Mary's at least as far back as 1907, and was first offered as a three-year undergraduate

major in 1963 under the watch of the Jesuits, who controlled the University between 1940 and 1970. It was also during the Jesuit period when the Faculty of Science was formally organized (1951, with Father M. J. Burke-Gaffney S.J. as its first designated Dean), and when the Department of Physics was first established as a separate academic unit (1963, under its first and only chair for thirty years, Dangety Murty). The four-year honours program in physics was introduced in 1970. In 1993 the Department of Physics was joined with the Department of Astronomy, and the combined department of eight faculty members expanded its physics offerings to include joint programs with Mathematics and Chemistry. In 1995, Father William Lonc S.J., one of only two Jesuit priests still on the University faculty at the time, retired from the Department of Astronomy and Physics heralding an end of an era. He remains with the Department as Professor Emeritus.

Degree Programs in Physics

The Department offers three different levels of undergraduate study in physics. These include a physics concentration suitable for general science students who want a basic understanding of the fundamentals of physics, a physics major suitable for students who want a solid physics education but who do not necessarily intend to practice physics professionally or go on to graduate school, and a physics honours program for those who require a rigorous training in classical and quantum physics who intend to pursue physics professionally or in postgraduate studies. The major and honours programs are virtually identical through the third year, and students don't need to commit to the honours program until the fourth year if they so choose. Among other differences in the final year, the honours program requires the student to complete an honours thesis (PHYS 4790) under the supervision of a faculty advisor.

In addition to the physics concentration, major, and honours programs, there are double major physics programs with mathematics, chemistry, and philosophy at both the major and honours levels consistent with the regulations governing double major and double honours programs in science and in arts and sciences as outlined in Section 3. These suggested programs of study are suitable for students who want a broader academic background than the pure physics degrees

provide while minimising the compromise to the physics content or the content of the other subjects of concentration.

a. Physics Concentration/Major/Honours

Year 1

1. PHYS 1100 and 1101
2. three (3) credit hours in science electives [CSCI 1226 recommended]; and PHYS 1500
3. MATH 1210 and 1211
4. six (6) credit hours in science electives [CHEM 1210/1211 recommended]
5. ENGL 1205 and three (3) credit hours in humanities electives

Year 2

1. PHYS 2300 and 2301
2. MATH 2311 [three (3) credit hours in science electives] and PHYS 2400
3. MATH 2301 and 2303 [six (6) credit hours in science electives]
4. twelve (12) credit hours in Arts or ECON electives

Year 3 (Concentration)

1. twelve(12) credit hours from PHYS at the 3000 level
2. eighteen (18) credit hours in electives

Year 3 (Major and Honours)

1. PHYS 3200 and 3201
2. PHYS 3300 and 3210
3. PHYS 3500; and either PHYS 3350 or 3400
4. PHYS 3600; and three (3) credit hours in electives
5. six (6) credit hours in electives

Year 4 (Major)

1. PHYS 4500; and either PHYS 3350 or 3400
2. Twenty-four (24) credit hours in electives

Year 4 (Honours)

1. PHYS 4500; and either PHYS 3350 or 3400
2. six (6) credit hours drawn from PHYS 4380, 4390, 4501, and 4510
3. PHYS 4600 and three (3) credit hours in electives
4. PHYS 4790.0
5. six (6) credit hours in electives

b. Double Major/Honours in Physics and Mathematics

Year 1

1. PHYS 1100 and 1101
2. ENGL 1205 and PHYS 1500
3. CSCI 1226 and 1227
4. MATH 1210 and 1211
5. six (6) credit hours in science electives [CHEM 1210/1211 recommended]

Year 2

1. PHYS 2300 and 2301
2. three (3) credit hours in humanities electives and PHYS 2400
3. MATH 2311 and 3405
4. MATH 2320 and 2321
5. six (6) credit hours in Arts or ECON electives

Year 3 (Major)

1. PHYS 3300 and 3210
2. PHYS 3500; and either PHYS 3350 or 3400
3. either MATH 4436 or 3456; and MATH 3406
4. six (6) credit hours in science electives
5. six (6) credit hours in Arts or ECON electives

Year 3 (Honours)

1. PHYS 3300 and 3210
2. PHYS 3500; and either PHYS 3350 or 3400
3. three (3) credit hours from MATH courses numbered 4404 or above; and MATH 3406
4. either MATH 4436 and 4437; or MATH 3456; and 3457
5. six (6) credit hours in Arts or ECON electives

Year 4 (Major)

1. PHYS 4500; and either PHYS 3350 or 3400
2. six (6) credit hours from MATH courses numbered 4404 or above
3. six (6) credit hours from MATH courses numbered 4404 or above
4. twelve (12) credit hours in electives

Year 4 (Honours)

1. PHYS 4500; and either PHYS 3350 or 3400
2. six (6) credit hours drawn from PHYS 4380, 4390, 4501, and 4510
3. six (6) credit hours drawn from MATH 4420, 4421, 4441, and 4442
4. six (6) credit hours from MATH courses numbered 4404 or above
5. PHYS 4790 or MATH 4500

c. Double Major/Honours in Physics and Chemistry

Students should be aware of the specific requirements for double majors in chemistry noted in the Chemistry segment in Section 4 of the Calendar.

Year 1 (major)

1. PHYS 1100 and 1101
2. three (3) credit hours in science electives [CSCI 1226 recommended] and PHYS 1500
3. CHEM 1210 and 1211
4. MATH 1210 and 1211
5. ENGL 1205 and three (3) credit hours in humanities electives

234 Physics

Year 1 (honours)

1. PHYS 1100 and 1101
2. three (3) credit hours in arts/ECON electives and PHYS 1500
3. CHEM 1210 and 1211
4. MATH 1210 and 1211
5. ENGL 1205 and three (3) credit hours in humanities electives

Year 2

1. PHYS 2300 and 2301
2. MATH 2311 [three (3) credit hours in science electives] and PHYS 2400
3. MATH 2301 and 2303 [six (6) credit hours in science electives]
4. CHEM 2312 or 2313; and three (3) credit hours in arts/ECON electives
5. CHEM 3322 and 3324; or CHEM 2332 and 2333; or CHEM 2344 and 2345;

Year 3

1. PHYS 3200 and 3201
2. PHYS 3300 and 3400
3. PHYS 3500 and three (3) credit hours in Arts or ECON electives
4. CHEM 2312 or 2313; and three (3) credit hours in Arts or ECON electives
5. CHEM 3322 and 3324; or CHEM 2332 and 2333; or CHEM 2344 and 2345

Year 4 (Major)

1. PHYS 4500; and three (3) credit hours in Arts or ECON electives
2. twelve (12) credit hours from CHEM numbered 4400 or above
3. twelve (12) credit hours in electives

Year 4 (Honours)

1. PHYS 4500; and three (3) credit hours drawn from PHYS 4380, 4390, 4501, and 4510
2. CHEM 4498
3. twelve (12) credit hours from CHEM numbered 4400 or above
4. PHYS 4790 or CHEM 4500

Note: MATH 2303 is counted as three (3) credit hours in PHYS for the PHYS/CHEM double honours programme only.

d. Double Major/Honours in Physics and Philosophy (B.Sc)

Year 1

1. PHYS 1100 and 1101
2. PHYS 1370/PHIL 1255 and PHYS 1500
3. PHIL 1200 or 1201.0

4. MATH 1210 and 1211
5. ENGL 1205; and three (3) credit hours in humanities electives other than PHIL

Year 2

1. PHYS 2300 and 2301
2. MATH 2311 [three (3) credit hours in science electives] and PHYS 2400
3. MATH 2301 and 2303 [six (6) credit hours in science electives]
4. PHIL 2318 and three (3) credit hours in Arts or ECON electives
5. three (3) credit hours drawn from courses in the history of philosophy[†] and three (3) credit hours drawn from courses in contemporary philosophy[‡]

Year 3

1. PHYS 3200 and 3201
2. PHYS 3300 and three (3) credit hours in arts/ECON electives
3. PHYS 3500 and PHIL 3448
4. six (6) credit hours drawn from courses in the history of philosophy[†].
5. six (6) credit hours drawn from courses in contemporary philosophy[‡]

Year 4 (Major)

1. three (3) credit hours drawn from PHYS numbered 4000 or greater and three (3) credit hours in science electives
2. PHIL 4515/PHYS 4370 and three (3) credit hours drawn from PHIL.
3. six (6) credit hours in Arts or ECON electives
4. twelve (12) credit hours in electives.

Year 4 (Honours)

1. PHYS 4500; and three (3) credit hours drawn from PHYS numbered 3000 or greater
2. PHIL 4515/PHYS 4370 and three (3) credit hours drawn from PHIL.
3. three (3) credit hours drawn from courses in the history of philosophy¹ and three (3) credit hours drawn from courses in contemporary philosophy²
4. six (6) credit hours in arts/ECON electives
5. PHYS 4790.0

¹Courses in the history of philosophy include PHIL 2345, PHIL 2346, PHIL 3442, PHIL 3443, PHIL 3444, PHIL 4565.0

²Courses in contemporary philosophy include PHIL 2301, PHIL 3000, PHIL 3404, PHIL 3413, PHIL 4565.0

e. Double Major/Honours in Philosophy and Physics (B.A.)

A B.A. (major or honours) in Philosophy and Physics is identical to the corresponding B.Sc. degree in Physics and Philosophy with the following modifications:

1. All Arts or ECON electives become social science electives.
2. Science electives become free electives, although MATH 2301/2303/2311 should still be taken in the second year.
3. PHYS 4790 (Honours Thesis) becomes PHIL 4599 (Honours Thesis) and, with the permission of the Undergraduate Advisor of the Department of Philosophy, may be replaced with six (6) credit hours of PHIL courses not already taken and numbered 4000 or above.

Note: MATH 2303 is counted as three (3) credit hours in PHYS for the PHYS/PHIL double honours programmes only.

In addition to physics courses offered to support the degree programs, the Department offers two courses (PHYS 1000 and 1001) for non-majors, suitable for students wishing a non-calculus based introduction to physics for a science elective.

IMPORTANT NOTE ON COURSE NUMBERING

In the 2008-09 academic year course numbers were revised. The first digit represents the year, the second digit indicates the subject area (0=general interest, 1=foundation, 2=techniques, 3=classical/thermal, 4=electrodynamics, 5=quantum, 6=experimental, 7=other/research), and the third and fourth digits number the course within a given subject area.

Students are urged to be extremely careful not to register again for a course for which they have already earned credit. Academic Regulation 17(b) is very clear on this matter:

Course # -2003	Course # 2004-07	Course # 2008-
PHY 210	PHYS 1210	PHYS 1100
PHY 211	PHYS 1211	PHYS 1101
PHY 235	PHYS 1235	PHYS 1000
PHY 236	PHYS 1236	PHYS 1001
	PHYS 1255	PHYS 1370
PHY 305	PHYS 2305	PHYS 2301
PHY 306	PHYS 2306	PHYS 2300
PHY 326	PHYS 2326	*PHYS 1500
PHY 335	PHYS 2335	PHYS 2200
PHY 355	PHYS 2355	PHYS 2400
PHY 405	PHYS 3405	PHYS 3300
PHY 417	PHYS 3417	PHYS 3350
PHY 435	PHYS 3435	PHYS 3200
PHY 436	PHYS 3436	PHYS 3201
PHY 437	PHYS 3437	PHYS 3210
PHY 445	PHYS 3445	PHYS 3600
PHY 446	PHYS 4446	PHYS 4600
PHY 457	PHYS 3457	PHYS 3400
PHY 465	PHYS 3465	PHYS 3500
PHY 466	PHYS 4466	PHYS 4500
PHY 467	PHYS 4467	PHYS 4501
PHY 472	PHYS 4472	PHYS 4380
PHY 473	PHYS 4473	PHYS 4390
PHY 474	PHYS 4474	PHYS 4510
	PHYS 4515	PHYS 4370
PHY 500	PHYS 4500	PHYS 4790

*In 2007-08 only, PHYS 1500 was listed as PHYS 1212.

Courses Descriptions

1000 Physics for Life Sciences I

3 credit hours
Prerequisites: Nova Scotia grade 11 physics and Nova Scotia grade 12 math, or equivalent.

This algebra-based physics course offers an introduction to the foundations of physics. The emphasis is on the understanding and application of equations of motion, Newton’s Laws, the nature of forces, and the extension to fluids. These ideas are applied to “real world” situations, including biological systems. This course does not satisfy the physics requirements for programs in Astrophysics, Chemistry, Engineering, or Physics. Students in these programs should take University Physics I and II.

Classes 3 hrs. and lab/tutorial 3 hrs. per week

Note: Students who wish to take PHYS 1101 following PHYS 1000 must obtain a grade of at least A in PHYS 1000 and receive the permission of the chair in order to waive the standard prerequisite requirements for PHYS 1101.

1001 Physics for Life Sciences II

3 credit hours
Prerequisite: PHYS 1000.

This algebra-based physics course builds on the foundation of PHYS 1000, and considers specific applications, such as thermodynamics, waves and sound, light and optics, electricity and magnetism, atomic physics and radioactivity. These ideas are applied to “real world” situations, including biological systems. This course does not satisfy the physics requirements for programs in Astrophysics, Chemistry, Engineering, or Physics. Students in these programs should take University Physics I and II.

Classes 3 hrs. and lab/tutorial 3 hrs. per week

1100 University Physics I

3 credit hours
Prerequisites: Nova Scotia Grade 12 physics and Nova Scotia grade 12 math pre-calculus, or equivalent.

This calculus-based physics course is intended primarily for (astro) physics and chemistry majors and engineers. Topics include kinematics, Newton’s laws of motion, conservation of energy and momentum, rotational dynamics, and Newton’s law of gravitation. Emphasis is placed on problem solving skills.

Classes 3 hrs. and lab/tutorial 3 hrs. per week

1101 University Physics II

3 credit hours
Prerequisites: PHYS 1100; and either MATH 1210 or 1190

This calculus-based physics course is a continuation of PHYS 1100, and covers the topics of oscillations and waves, thermodynamics, and electricity and magnetism.

Classes 3 hrs. and lab/tutorial 3 hrs. per week

1370 Scientific Method [PHIL 1255]

3 credit hours

Prerequisites: Nova Scotia grade 11 physics or chemistry and Nova Scotia grade 12 math or equivalent; or permission of the instructors.

This course provides a historical and logical analysis of methods commonly used in science, and is normally taught by faculty from both the Department of Astronomy and Physics and the Department of Philosophy. Topics include science vs. pseudo-science, natural vs. social sciences, modes of reasoning, observation and experimentation, construction and empirical testing of theories and models, and thought experiments.

1500 Introduction to Modern Physics

3 credit hours

Prerequisites: PHYS 1100; and either MATH 1210 or 1190

The special theory of relativity and early ideas in quantum mechanics are introduced. Topics in relativity include departures from Newtonian theory, Lorentz transformations, space and time dilation, the "Twin Paradox", and relativistic dynamics. Topics in quantum mechanics include the quantum theory of light, the Bohr model of the atom, the wave nature of particles and the Schrödinger equation applied to simple one-dimensional problems.

2300 Vibrations, Waves and Optics

3 credit hours

Prerequisites: PHYS 1101 and MATH 1211.

This course focuses on the production, propagation and manipulation of waves including light. Topics include geometric optics, forced damped oscillators, elasticity and distortion, the wave equation, wave speed and propagation, polarisation, wave packets, interference and diffraction 3-D waves, plane and circular waves and physical optics.

Classes 3 hrs. and lab 3 hrs. per week.

2301 Analytical Mechanics

3 credit hours

Prerequisites: PHYS 2300 or equivalent, MATH 2301 and MATH 2311.

This course continues on some of the ideas introduced in PHYS 2300, and introduces the student to a broad range of other areas in classical mechanics. Topics include coupled and 3-D oscillators, non-inertial reference frames, central forces (celestial mechanics), N-body dynamics, rigid bodies, angular momentum and torques, deformation and vibration of beams.

Note: Credit cannot be given to students who already have a credit for PHYS 2305, Newtonian Mechanics.

2400 Electricity and Magnetism

3 credit hours

Prerequisites: PHYS 1101, MATH 2301, and MATH 2311.

This course gives a comprehensive introduction to the self-consistent mathematical theory for electric and magnet fields which was developed during the latter half of the 19th century. Topics include electric field and potential, Gauss' law, capacitance, elementary circuit analysis, Ampère's law, the Law of Boit and Savart, magnetisation of matter, Faraday's law of inductance, and Maxwell's equations in integral and differential form.

Classes 3 hrs. and lab 3 hrs. per week.

3200 Mathematical Methods in Physics I

3 credit hours

Prerequisites: PHYS 2301 and MATH 2303.

This course provides the student with the mathematical techniques needed to solve problems in advanced physics courses. Topics in complex analysis include the Cauchy-Riemann conditions, Cauchy Theorem and Integrals, Laurent expansions, and the calculus of residues. Topics in differential equations and the separation of variables, the Method of Frobenius and Sturm-Liouville theory.

Note: Credit cannot be given to students who already have a credit for MATH 3405 and/or MATH 4436.

3201 Mathematical Methods in Physics II

3 credit hours

Prerequisite: either PHYS 3200 or MATH 3405/4436.

This course is a continuation of PHYS 3200 and covers additional topics in mathematical physics, including special functions (Bessel, Neumann, Lagrange, etc.), Green's functions, Fourier series and transforms, Laplace transforms, integro-differential equations, and Hilbert-Schmidt theory.

Note: Credit cannot be given to students who already have a credit for MATH 3406 and/or MATH 4437.

3210 Computational Methods in Physics

3 credit hours

Prerequisites: PHYS 3500 and either PHYS 3200 or MATH 3405.

This course introduces the student to methods of solving mathematically difficult or tedious problems using the computer. After a brief introduction to Unix and Fortran or C, the course focuses on some of the algorithms most useful to a physicist, including root-finding, spline fitting, Richardson extrapolation, Romberg integration, Runge-Kutta and Monte Carlo methods. Student complete a term project which applies learned algorithms to problems in computational (astro) physics.

3300 Classical Mechanics

3 credit hours

Prerequisites: PHYS 1500, 2301, and MATH 2303

This advanced course in Classical Mechanics introduces the student to the calculus of variations, constrained problems,

and generalised Lagrangian and Hamiltonian dynamics. Applications are made to oscillations, the “brachistochrone problem”, central force problems, rigid bodies, and the motion of tops. Additional topics include relativistic mechanics, canonical perturbation theory, and chaos.

3350 Thermal Physics

3 credit hours

Prerequisites: PHYS 3500 and either PHYS 3200 or MATH 3405/4436.

This course gives a comprehensive overview of thermodynamics and statistical mechanics. Topics in thermodynamics include equations of state, the three laws of thermodynamics, the Maxwell relations, and the kinetic theory of gases. Topics in statistical mechanics include the idea of particle ensembles and the partition function, classical and quantum statistics, thermodynamics of magnetism, Bose-Einstein and Fermi-Dirac gases, and information theory.

3400 Electrodynamics

3 credit hours

Prerequisites: PHYS 1500, 2400, and either PHYS 3200 or MATH 3405/4436.

This course is a continuation of PHYS 2400 which focused primarily on electro- and magnetostatics, and turns to the more general theory of electrodynamics. Topics include Maxwell's equations in vacuo and matter, the Poynting vector, electromagnetic waves, wave guides, scalar and vector potentials, gauge transformations, Lienardt-Wiechart potentials, radiation from moving charges, and relativistic electrodynamics.

3500 Quantum Mechanics I

3 credit hours

Prerequisites: PHYS 1500, 2300, MATH 2311, and 2303.

This course builds on the foundations set in PHYS 1500. Topics in this course include the (time-independent) Schrodinger equation, one-dimensional potentials, barriers and tunnelling, the Heisenberg Uncertainty Principle, Dirac notation, expectation values, the three-dimensional Schrodinger equation, single-electron atoms, spin, and identical particles.

3600 Experimental Physics I

3 credit hours

Prerequisites: PHYS 2300 and 2400

This course provides the student with the necessary skills to be a successful experimental (astro)physicist. Students assemble labs from advanced experimental equipment including computers and other digital devices, perform the experiment possibly over several weeks, and communicate their results in a scientifically useful fashion.

Note: While this is a three (3) credit course, it will be taught over two semesters.

4370 Philosophy of Physics [PHIL 4515]

3 credit hours

Prerequisite: PHYS 2400, 3500 and PHIL prerequisites as outlined in paragraph 8 in the Philosophy Calendar entry; or permission of the instructors.

This course explores methodological, conceptual, metaphysical, and epistemological questions that arise in modern physics. Possible topics include scientific revolutions, experimentation, laws of nature, space, time, matter, causality, indeterminism, non-locality, thought experiments, and theoretical unification.

4380 Fluid Dynamics

3 credit hours

Prerequisites: PHYS 3300, and either PHYS 3201 or MATH 3406/4437.

This course introduces students to the fundamentals of fluid dynamics. Discussion embraces both compressible and incompressible fluids and includes the continuity equation, the Navier-Stokes equation, Bernoulli's theorem, viscosity, the Reynolds number, vorticity, and numerous applications to “real world” problems. Some specialized numerical techniques for solving complex problems in fluid dynamics may also be discussed.

4390 General Relativity

3 credit hours

Prerequisites: PHYS 3300, and either PHYS 3201 or MATH 3406/4437.

This is an advanced course introducing Einstein's theory of general relativity and the curvature of space-time. Topics shall include manifolds, Riemannian geometry, Einstein's equations, and applications to cosmology and black holes.

4500 Quantum Mechanics II

3 credit hours

Prerequisites: PHYS 3300, 3500, and either PHYS 3201 or MATH 3406/4437.

This course is a continuation of PHYS 3500, and covers topics such as time-independent perturbation theory, the variation principle, the Werner-Kremer-Boltzmann (WKB) approximation, time-dependent perturbation theory, the adiabatic approximation, and scattering.

4501 Quantum Mechanics III

3 credit hours

Prerequisite: PHYS 4500.

This advanced course in Quantum Mechanics covers a selection of topics that may include scattering, lasers, relativistic quantum dynamics (Dirac theory), second quantization, and field theory.

4510 Subatomic Physics

3 credit hours

Prerequisite: PHYS 4500.

This course provides an introduction to modern nuclear and particle physics. Topics may include the nucleon-nucleon interaction, the deuteron, the nuclear shell model, dynamical

probes of nuclei (electron, photon, and hadron scattering), the structure of nucleons and mesons, electroweak

4600 Experimental Physics II

3 credit hours

Prerequisite: PHYS 3600

This course is designed primarily for honours physics students to study advanced topics in physics and/or astrophysics in the laboratory. Students are responsible for setting up and performing the experiments, writing computer programs to aid the analysis, and preparing and presenting their results in a professional manner. The majority of work will be project-based, each project conceived and built by the students from equipment available in the lab.

Note: While this is a three (3) credit hour course, it will be taught over two semesters.

4790 Research Thesis

6 credit hours

Prerequisite: honours standing.

A research project carried out by the student under the supervision of a faculty member in the Department throughout the Honours year. The project should be in the area of astrophysics for students in the honours astrophysics program. Results are written up in a formal thesis that adheres to standard University-set guidelines.

Directed study 3 hrs. per week; 2 semesters.

4826 – 4849 Special Topics in Physics

3 credit hours

Prerequisite: permission of instructor

4876 – 4899 Directed Study in Physics

3 credit hours

Prerequisite: permission of instructor

Political Science (POLI)

Chairperson	E. Keeble
Professors	A. Dobrowolsky, E. Keeble, R.Landes
Associate Professors	M. Doucet, S. Gaon, D. Naulls
Assistant Professor	L. Preyra (on leave)
Professor Emeritus	E. McBride

The Political Science Department offers students with diverse interests a wide range of topical, thought-provoking courses in four fields of study: *Canadian Politics*, *Comparative Politics*, *International Relations*, and *Political Thought*. The Department's aim is to provide students with a rich and rewarding learning experience, one that sharpens their critical skills, engages them in political ideas and practices, and grounds them in the world, locally and globally. The program thereby provides students with a solid foundation on which to build their future careers. For all these reasons, students are strongly encouraged to Major in Political Science and, for those interested in pursuing more advanced study, to apply to the Political Science Department's Honours program.

Departmental Policy for Majors

To earn a Major in Political Science, students must complete a minimum of forty-two (42) credit hours in Political Science courses. The Department requires six (6) credit hours at the 1000-level. Of these, three (3) credit hours must be in Political Science. The remaining three (3) credit hours may be either in Political Science or in one of the following cognate disciplines: Economics, History, Philosophy or Sociology. Students who intend to graduate with a Major in Political Science must complete a minimum of eighteen (18) credit hours (of the forty-two (42) required credits) at the 2000-level, chosen from among the courses surveying the core fields of the discipline: POLI 2304 Canadian Politics in the 21st Century, POLI

2380 Comparative Politics, POLI 2305 International Relations, and POLI 2335 History of Political Thought. The remaining eighteen (18) of the forty-two (42) required credits must be completed in 3000-level and 4000-level Political Science courses.

Students require a minimum grade of C (2.00) in 1000 level Political Science Courses in order to declare a Major. Upon declaring a Major, students are also required to meet with the Department Chair or the Political Science Program Advisor, to review program requirements and course selection options.

Departmental Policy for Honours

The objective of the Bachelor of Arts Honours program in Political Science is to attract and graduate students with a demonstrated capacity to conduct original research. Students interested in pursuing postgraduate degrees are particularly encouraged to apply.

Admission Requirements

Students should officially apply for admission to the Honours program upon the completion of their 1000 and 2000-level Political Science course requirements. Forms are available from the Registrar's/Records Office. As part of the admissions process, the Department, in consultation with the Honours applicants, will assign an Honours advisor and will approve the major area of concentration.

In order to be considered for admission to the Political Science Honours program, a student must normally have a cumulative grade point average of at least 3.33 in both Political Science and non-Political Science courses.

Students are reminded that the admission requirements mentioned above constitute a minimum.