

SECTION 11:

FACULTY OF EDUCATION

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11.1 Degrees offered

Bachelor of Education (Primary/Junior) - BEd

Bachelor of Education (Intermediate/Senior) - BEd

Bachelor of Science (Honours)/Bachelor of Education (Intermediate/Senior) - BSc (Hons)/BEd

The Faculty of Education enables prospective teachers to develop communication, critical thinking and problem-solving skills essential for success in the classroom. Our faculty members are highly skilled in the use of technology in teaching to ensure that our graduates are well prepared to be 21st-century educational leaders. Our secondary education program focuses on the preparation of teachers in the sciences, mathematics and computing, as well as English and visual arts. Students participate in cooperative learning activities based on realistic problems and scenarios and learn from extensive practical experiences.

The Faculty of Education offers choices to its students. The Consecutive programs are one-year, post-degree programs and prepare graduates to teach at either the Primary/Junior (Kindergarten to Grade 6) or Intermediate/Senior (Grade 7 to Grade 12) level. The Concurrent program enables students to pursue a Bachelor of Science degree while also completing a Bachelor of Education (Intermediate/Senior) degree.

The laptop is integral to our programs and students will use information technology in a variety of ways to enhance their learning experience. Students benefit from support through the university's mobile learning environment (section 1.2).

The faculty's research is primarily focused on improving educational technology and includes topics such as online learning, digital storytelling, learning objects, video case studies, instructional design and mini-clips.

11.2 Program information - Bachelor of Education (Consecutive)

11.2.1 General information

The Faculty of Education offers a one-year consecutive program in the preparation of Primary-Junior (P/J) and Intermediate-Senior (I/S) teachers. The emphasis on technology in teaching is a defining element of UOIT's Bachelor of Education program.

Teacher candidates use technology in their own learning experiences so that they will understand how to integrate technology into classroom practice. Cooperative learning activities based on realistic problems and scenarios prepare candidates for situations which they will likely encounter in their practica and their own classrooms upon graduation. Courses use inquiry and problem-solving approaches with focus on the importance of subject matter as the catalyst for teacher-learner interaction, as well as individual learning and teaching in shaping learning conditions. A required course in understanding and applying educational research is a distinctive feature of this program, as is an optional course in advanced instructional design.

11.2.2 Admission requirements

Selection of candidates is based on the following combination of academic criteria, experience and references:

11.2.2.1 Primary/Junior program

Applicants will hold an undergraduate degree from a recognized university, with an overall average of 70 percent in their last two years of full-time study. Preference will be given to students with four-year honours degrees.

Because Primary/Junior teachers deal with a wide range of subject areas, it is desirable that applicants have a broad academic background. In assessing the academic breadth of Primary/Junior applicants, the Faculty of Education gives preference to candidates who have one or more 3-credit hour undergraduate or graduate courses in the subject groupings listed below:

- English/Linguistics/Languages
- Mathematics/Statistics
- Physical Sciences/Life Sciences
- Visual Arts/Music/Drama
- Social Sciences/Humanities

Clearly, very few applicants will have coursework in all of the above areas; however, we consider that the more areas an applicant has covered, the stronger the application.

Each candidate must have received the required undergraduate degree by July 1, 2007.

The application service (through Ontario Universities' Application Centre - OUAC) opens mid-September for Professional Program Applications to the Teacher Education Application Service (TEAS) and closes December 1. A complete application includes:

- 1) Transcripts (Applicants must ensure that any courses in progress are listed on the OUAC/TEAS application form, especially when appropriate prerequisites do not appear on the official transcripts being forwarded.)
- 2) A supplementary application, consisting of:
 - A personal profile addressing skills and related work experience, and
 - Letters of reference.
- 3) Evidence of oral and written proficiency in English.

An interview may be required.

All successful applicants will be required to present a clear tuberculin (TB) test and criminal record check upon registration.

Enrolment in the program is competitive. Consequently, possession of the minimum requirements does not guarantee admission. Acceptance is based on the number and calibre of applications received in a given year for the spaces available in the program.

11.2.2.2 Intermediate/Senior (I/S) program

Applicants will hold an undergraduate degree from a recognized university, with an overall average of 70 percent (GPA= 2.7) in their last year of full-time study. Preference will be given to students with four-year honours degrees. Each candidate must have received the required undergraduate degree by July 1, 2007.

- Applicants must have completed a minimum of 30 credit hours in university courses (equivalent to five full courses, or 10 one-semester courses) in a first teachable subject and 18 credit hours (equivalent to three full courses, or six one-semester courses) in a second teachable subject.
- A minimum B- (70 percent) overall average in the last year of full-time study is required with a minimum B- (70 percent) average in courses applicable to each teaching subject.

The application service (through Ontario Universities' Application Centre - OUAC) opens mid-September for Professional Program Applications to the Teacher Education Application Service (TEAS) and closes December 1. A complete application includes:

- 1) Transcripts (Applicants must ensure that any courses in progress are listed on the OUAC/TEAS application form, especially when appropriate prerequisites do not appear on the official transcripts being forwarded.)
- 2) A supplementary application, consisting of:
 - A personal profile addressing skills and related work experience, and
 - Letters of reference.
- 3) Evidence of oral and written proficiency in English.

An interview may be required.

All successful applicants will be required to present a clear tuberculin (TB) test and criminal record check upon registration.

Enrolment in the program is competitive. Consequently, possession of the minimum requirements does not guarantee admission. Acceptance is based on the number and calibre of applications received in a given year for the spaces available in the program.

11.2.3 Practicum

Students will be required to complete a minimum of 60 days of field experience and practicum in local elementary and secondary schools.

11.2.4 Careers

Graduates are prepared to teach in the Ontario education system, as well as in other provinces. The emphasis on technology enhanced teaching and learning also provides some graduates with career opportunities in college-level teaching or in training and professional development in corporate settings.

11.2.5 Teacher certification

The university's Bachelor of Education (Consecutive) programs are designed to meet all Ontario legislated requirements and incorporate the Standards of Practice and Ethical Standards for the Teaching Profession of the Ontario College of Teachers. Graduates will be recommended by the university to the Ontario College of Teachers for certification to practice in the Ontario education system.

11.2.6 Degree requirements

To be eligible for the BEd degree, students must successfully complete the courses outlined below. Students must achieve a minimum grade point average of 2.70 to be eligible for promotion in and graduation from the Bachelor of Education (Consecutive) degree program. For course descriptions, see section 16.

PRIMARY/JUNIOR PROGRAM

Semester 1 (18 credit hours)

CURS 3510U Math Technology Camp
CURS 4200U Core Curriculum
CURS 4210U Language Arts I
CURS 4240U Mathematics I
CURS 4280U Science and Technology I
EDUC 3500U Technology in P/J Education
EDUC 3610U Contemporary Educational Practice
EDUC 3750U Learning and Human Development
EDUC 4380U Analysis and Management of Classroom Behaviour
EDUC 4910U Field Experience and Practicum I and II (33 days)

PRIMARY/JUNIOR PROGRAM

Semester 2 (19.5 credit hours)

CURS 3511U Science Technology Camp
CURS 4201U Core Curriculum
CURS 4211U Language Arts II
CURS 4241U Mathematics II
CURS 4251U Visual Arts, Music, Drama, Dance
CURS 4281U Science and Technology II
CURS 4271U Social Studies
CURS 4291U Health and Physical Education
EDUC 3800U Teaching for Individual Needs and Diversity
EDUC 4240U Understanding Educational Research, Theory and Practice
EDUC 4911U Field Experience and Practicum III (28 days)
One of:
EDUC 3460U Problem Based Learning
EDUC 3470U Issues in Education
EDUC 3480U Outdoor and Experiential Education
EDUC 3560U Religious Education: Teaching in Ontario Catholic Schools
EDUC 3450U Teaching Kindergarten
EDUC 4610U Advanced Instructional Design

INTERMEDIATE/SENIOR PROGRAM

Semester 1 (16.5 credit hours)

EDUC 3400U Technology in I/S Education
EDUC 3610U Contemporary Educational Practice
EDUC 3750U Learning and Human Development
EDUC 4380U Analysis and Management of Classroom Behaviour
EDUC 4900U Field Experience and Practicum I and II (33 days)
CURS 4000U Core Curriculum
Curriculum Studies I *
Curriculum Studies I *

Semester 2 (13.5 credit hours)

EDUC 3800U Teaching for Individual Needs and Diversity

EDUC 4240U Understanding Educational Research, Theory and Practice

EDUC 4590U Assessment and Evaluation

EDUC 4901U Field Experience and Practicum III (28 days)

Curriculum Studies II **

Curriculum Studies II **

One of:

EDUC 3460U Problem Based Learning

EDUC 3470U Issues in Education

EDUC 3480U Outdoor and Experiential Education

EDUC 3560U Religious Education: Teaching in Ontario Catholic Schools

EDUC 4610U Advanced Instructional Design

*Students will complete two of the following courses in semester 1: CURS 4100U, CURS 4110U, CURS 4120U, CURS 4130U, CURS 4140U, CURS 4150U, CURS 4160U, CURS 4180U, one for each teachable area under which he/she was admitted.

**Students will complete two of the following courses in semester two: CURS 4101U, CURS 4111U, CURS 4121U, CURS 4131U, CURS 4141U, CURS 4151U, CURS 4161U, CURS 4181U. These courses will be chosen so that a student completes a second course in curriculum studies for each teachable subject area under which he/she was admitted.

Curriculum Studies courses:

CURS 4100U and CURS 4101U I/S Biology

CURS 4110U and CURS 4111U I/S English

CURS 4120U and CURS 4121U I/S Chemistry

CURS 4130U and CURS 4131U I/S Physics

CURS 4140U and CURS 4141U I/S Mathematics

CURS 4150U and CURS 4151U I/S Visual Arts

CURS 4160U and CURS 4161U I/S Computer Studies

CURS 4180U and CURS 4181U I/S General Science

11.3 Program information - Concurrent Education

Bachelor of Science (Honours)/Bachelor of Education (Intermediate/Senior)

- BSc (Hons)/BEd

11.3.1 General information

In cooperation with the Faculty of Science, a Concurrent Education program is offered whereby candidates complete education courses concurrently with their science courses. Students will complete all the required coursework for an Honours BSc degree and must take a minimum of 10 courses in their first teachable subject and six courses in their second teachable subject. The teachable subjects offered in the Concurrent Education program are:

- Biology
- Chemistry
- Computer Studies
- Mathematics
- Physics
- General Science (see information at the end of this section)

To continue to the fifth year of the Concurrent Education program, students must have an overall minimum average of a B- (GPA 2.7) based on an average of years three and four, in addition to a minimum average of B- (GPA 2.7) on the 10 courses in the first teachable subject and on the six courses in the second teachable subject.

The Faculty of Education's Concurrent Education program prepares students to teach in the areas of science, mathematics or computer science. The emphasis on technology in teaching is a defining element of the Concurrent Education programs. Students use technology in both their science and education classes so that they will understand how to integrate technology into classroom practice.

Cooperative learning activities based on realistic problems and scenarios prepare candidates for situations which they will likely encounter in their practica and their own classrooms upon graduation. There is a specific focus on the new and very rigorous Ontario mathematics and science curriculum. Graduates of these programs will be prepared to teach in the Intermediate/Senior (I/S) divisions (Grades 7-12) of Ontario schools.

11.3.2 Admission requirements

Current Ontario secondary school students must complete the Ontario Secondary School Diploma (OSSD) with a minimum overall average of 75 percent on six 4U or 4M credits including English (ENG4U), calculus (MCB4U) and two of biology (SBI4U), chemistry (SCH4U), physics (SPH4U) or algebra and geometry (MGA4U). In addition, a combined minimum 75 percent average in mathematics and science courses is required. All other applicants should refer to section 4.5 of this calendar for the requirements for their specific category of admission.

A clear criminal record check and a Tuberculin (TB) test are post-admission requirements.

Enrolment in the program is competitive. Consequently, possession of the minimum requirements does not guarantee admission. Acceptance is based on the number and calibre of applications received in a given year for the spaces available in the program.

11.3.3 Practicum

Students will be required to complete a minimum of 100 days of field experience and practicum in local elementary and secondary schools.

11.3.4 Careers

Graduates are prepared to teach in the Ontario education system where the demand for teachers of mathematics, science and computer science is on the rise. Graduates are also prepared to teach outside the province and some may be able to teach at the college-level or to undertake roles in business in the areas of training and professional development.

11.3.5 Teacher certification

The university's Bachelor of Education Concurrent programs are designed to meet all Ontario legislated requirements and incorporates the Standards of Practice and Ethical Standards for the Teaching Profession of the Ontario College of Teachers. Graduates will be recommended by the university to the Ontario College of Teachers for certification to practice in the Ontario education system.

11.3.6 Degree requirements - Bachelor of Science (Honours)/Bachelor of Education

All programs must satisfy the general requirements for Science Honours programs; therefore, at least 12 courses must be at third- or fourth-year level, and at least four of these must be at the fourth-year level; for Biology Honours, at least two of the fourth-year courses must be in biology. At most 14 courses in total (five in addition to the required first-year core) may be at the first-year level.

11.3.6.1 Biological Science major / Biology first teachable

Students may wish to specialize in Pharmaceutical Biotechnology, Environmental Toxicology or Life Sciences or they may complete a complementary studies option under the direction of the science student advisor.

Program details

The order and timing of courses may be changed subject to availability and prerequisite requirements.

YEAR 1

Semester 1 (15 credit hours)

BIOL 1010U Biology I
CHEM 1010U Chemistry I
CSCI 1000U Scientific Computing Tools
MATH 1010U Calculus I
PHY 1030U Physics for Biosciences I*

Semester 2 (15 credit hours)

BIOL 1020U Biology II
CHEM 1020U Chemistry II
EDUC 2900U Introduction to Teaching and Field Experience I (10 days)
MATH 1020U Calculus II
PHY 1040U Physics for Biosciences II*

*Students who wish to have physics as one of their teachable subjects should take PHY 1010U and PHY 1020U. However, students who achieve a B standing or higher in both PHY 1030U and PHY 1040U will be permitted to proceed to second-year physics courses.

YEAR 2

Semester 1 (15 credit hours)

BIOL 2010U Introductory Physiology
BIOL 2030U Cell Biology
CHEM 2020U Introduction to Organic Chemistry
STAT 2020U Statistics and Probability for Biological Science
One course from second teachable subject

Semester 2 (15 credit hours)

BIOL 2020U Genetics and Molecular Biology
BIOL 2040U Biochemistry
EDUC 2901U Field Experience II (15 days)
EDUC 3750U Learning and Human Development
One course from second teachable subject
One elective

YEAR 3

Semester 1 (15 credit hours)

BIOL 3050U Developmental Biology
EDUC 3610U Contemporary Educational Practice
BIOL 3030U Microbiology and Immunology
Two courses from second teachable subject

Semester 2 (15 credit hours)

EDUC 4902U Field Experience III (Practicum) (20 days)
Two courses from biology
Three electives

YEAR 4

Semester 1 (15 credit hours)

Three courses from biology
BIOL 4430U Directed Studies in Biology or
BIOL 4410U Thesis Project in Biology I
One elective

Semester 2 (15 credit hours)

BIOL 4080U Bioethics
Two courses from biology
BIOL 4420U Thesis Project in Biology II or
One elective
One elective

YEAR 5

Semester 1 (13.5 credit hours)

EDUC 3400U Technology in I/S Education
EDUC 4380 Analysis and Management of Classroom Behaviour
EDUC 4903U Field Experience IV (Practicum) (33 days)
CURS 4000U Core Curriculum
Curriculum Studies I from first teachable
Curriculum Studies I from second teachable
One education elective

Semester 2 (16.5 credit hours)

EDUC 3800U Teaching for Individual Needs and Diversity
EDUC 4240U Understanding Educational Research, Theory and Practice
EDUC 4590U Assessment and Evaluation
EDUC 4904U Field Experience V (Practicum) (28 days)
Curriculum Studies II from first teachable
Curriculum Studies II from second teachable
Two education electives

Note 1: Second teachable subjects

1. If Computing Science provides the second teachable (Computer Studies), one of the unspecified science courses will have to be a computing science course.
2. Statistics and Probability or Introduction to Organic Chemistry count as one of the required courses for mathematics or chemistry second teachables, respectively.

Note 2: Electives and breadth requirements

Students must complete 24 elective credit hours; nine of these credit hours must be in science courses. In order to satisfy breadth requirements for the BSc 12 elective credit hours must be in courses outside the Faculty of Science; two education electives taken in the fifth year of the program will be included in this total.

Note 3: Education electives

Students may take education electives prior to year five only if they have completed year two requirements and have a GPA of 2.7.

Note 4: Directed Studies and Thesis Project courses

Students who meet the requirements will take BIOL 4430U Directed Studies in Biology in year four. BIOL 4430U may be taken in either semester by interchanging with an elective. Students have the option to apply to do a two-course sequence consisting of BIOL 4410U and BIOL 4420U Thesis Project in Biology I and II in year four, in place of BIOL 4430U plus one elective. Opportunities for this option are limited; students must apply to the science fourth-year thesis coordinator by April 30 following completion of the first three years of the program.

11.3.6.2 Chemistry major / Chemistry first teachable

Program Details

The order and timing of courses may be changed subject to availability and prerequisite requirements.

YEAR 1

Semester 1 (15 credit hours)

BIOL 1010U Biology I
CHEM 1010U Chemistry I
CSCI 1000U Scientific Computing Tools
MATH 1010U Calculus I
PHY 1010U Physics I *

Semester 2 (15 credit hours)

BIOL 1020U Biology II
CHEM 1020U Chemistry II
EDUC 2900U Introduction to Teaching and Field Experience I (10 days)
MATH 1020U Calculus II
PHY 1020U Physics II *

*Students who wish to have physics as one of their teachable subjects should take PHY 1010U and PHY 1020U. However, students who achieve a B standing or higher in both PHY 1030U and PHY 1040U will be permitted to proceed to second-year physics courses.

YEAR 2

Semester 1 (15 credit hours)

CHEM 2010U Structure and Bonding
CHEM 2020U Introduction to Organic Chemistry
CHEM 2030U Analytical Chemistry
STAT 2010U Statistics and Probability for Physical Science
One course from second teachable subject

Semester 2 (15 credit hours)

BIOL 2040U Biochemistry
CHEM 2040U Thermodynamics and Kinetics
CHEM 2120U Organic Chemistry
EDUC 2901U Field Experience II (15 days)
EDUC 3750U Learning and Human Development
One course from second teachable subject

YEAR 3

Semester 1 (15 credit hours)

CHEM 3220U Structure Determination of Organic Molecules
CHEM 3510U Inorganic Chemistry I
CHEM 3530U Instrumental Analytical Chemistry I
EDUC 3610U Contemporary Educational Practice
One course from second teachable subject

Semester 2 (15 credit hours)

CHEM 3040U Fundamentals of Physical Chemistry
CHEM 3120U Advanced Organic Chemistry
CHEM 3520U Inorganic Chemistry II
CHEM 3540U Instrumental Analytical Chemistry II
EDUC 4902U Field Experience III (Practicum) (20 days)
One elective

YEAR 4

Semester 1 (15 credit hours)

CHEM 4040U Physical Chemistry
CHEM 4050U Environmental Chemistry
CHEM 4430U Directed Studies in Chemistry or
CHEM 4410U Thesis Project in Chemistry I
Two electives

Semester 2 (15 credit hours)

CHEM 4010U Industrial Chemistry
CHEM 4060U Chemical and Molecular Spectroscopy
One course from second teachable subject
CHEM 4420U Thesis Project in Chemistry II or
One science elective
One elective

YEAR 5

Semester 1 (13.5 credit hours)

EDUC 3400U Technology in I/S Education
EDUC 4380U Analysis and Management of Classroom Behaviour
EDUC 4903U Field Experience IV (Practicum) (33 days)
CURS 4000U Core Curriculum
Curriculum Studies I from first teachable subject
Curriculum Studies I from second teachable subject
One education elective

Semester 2 (13.5 credit hours)

EDUC 3800U Teaching for Individual Needs and Diversity
EDUC 4240U Understanding Educational Research, Theory and Practice
EDUC 4590U Assessment and Evaluation
EDUC 4904U Field Experience V (Practicum) (28 days)
Curriculum Studies II from first teachable subject
Curriculum Studies II from second teachable subject
Two education electives

Note 1: Second teachable subjects

1. If Computing Science provides the second teachable (Computer Studies), the senior science elective will have to be a computing science course.
2. Statistics and Probability counts as one of the required courses for mathematics second teachable.

Note 2: Electives and breadth requirements

Students must complete 18 elective credit hours. In order to satisfy breadth requirements for the BSc 12 elective credit hours must be in courses outside the Faculty of Science; two education electives taken in the fifth year of the program will be included in this total.

Note 3: Education electives

Students may take education electives prior to year five only if they have completed year two requirements and have a GPA of 2.7.

Note 4: Directed Studies and Thesis Project courses

Students who have completed all requirements of the first three years will take CHEM 4430U Directed Studies in Chemistry in year four. CHEM 4430U may be taken in either semester by interchanging with an elective. Students have the option to apply to do a

two-course sequence consisting of CHEM 4410U and CHEM 4420U Thesis Project in Chemistry I and II in year four, in place of CHEM 4430U plus one elective. Opportunities for the thesis option are limited; students must apply to the science fourth-year thesis coordinator by April 30 following completion of the first three years of the program.

11.3.6.3 Computing Science major / Computer Studies first teachable

Program Details

The order and timing of courses may be changed subject to availability and prerequisite requirements.

YEAR 1

Semester 1 (15 credit hours)

CHEM 1010U Chemistry I
CSCI 1000U Scientific Computing Tools
MATH 1010U Calculus I
MATH 2050U Linear Algebra
PHY 1010U Physics I*

Semester 2 (15 credit hours)

CHEM 1020U Chemistry II
CSCI 1020U Fundamentals of Programming
EDUC 2900U Introduction to Teaching and Field Experience I (10 days)
MATH 1020U Calculus II
PHY 1020U Physics II*

*Students who wish to have physics as one of their teachable subjects should take PHY 1010U and PHY 1020U. However, students who achieve a B standing or higher in both PHY 1030U and PHY 1040U will be permitted to proceed to second-year physics courses.

YEAR 2

Semester 1 (15 credit hours)

CSCI 2010U Principles of Computer Science
CSCI 2050U Computer Architecture
CSCI 2110U Discrete Structures in Computer Science
STAT 2010U Statistics and Probability for Physical Science
One course from second teachable area

Semester 2 (15 credit hours)

BIOL 1840U Biology for Engineers
CSCI 2020U Software Systems Development and Integration
EDUC 2901U Field Experience II (15 days)
EDUC 3750U Learning and Human Development
MATH 2072U Computational Science I
One course from second teachable area

YEAR 3

Semester 1 (15 credit hours)

CSCI 3020U Operating Systems
CSCI 3030U Database Systems and Concepts
CSCI 3040U System Analysis and Design in Applications
CSCI 3070U Analysis and Design of Algorithms
EDUC 3610U Contemporary Educational Practice

Semester 2 (15 credit hours)

CSCI 3050U Computer Architecture II
CSCI 3060U Software Engineering
CSCI 3090U Scientific Visualization and Computer Graphics
CSCI 4020U Compilers
EDUC 4902U Field Experience III (Practicum) (20 days)
One course from second teachable subject

YEAR 4

Semester 1 (15 credit hours)

CSCI 3010U Simulation and Modelling
CSCI 3150U Computer Networks
Computing science elective
One course from second teachable subject
CSCI 4400U Thesis Project

Semester 2 (15 credit hours)

CSCI 4040 Ethics, Law and the Social Impact of Computing
Two computing science electives
Two electives

YEAR 5

Semester 1 (16.5 credit hours)

EDUC 3400U Technology in I/S Education
EDUC 4380U Analysis and Management of Classroom Behaviour
EDUC 4903U Field Experience IV (Practicum) (33 days)
CURS 4000U Core Curriculum
Curriculum Studies I from first teachable subject
Curriculum Studies I from second teachable subject
One education elective

Semester 2 (13.5 credit hours)

EDUC 3800U Teaching for Individual Needs and Diversity
EDUC 4240U Understanding Educational Research, Theory and Practice
EDUC 4590U Assessment and Evaluation
EDUC 4904U Field Experience V (Practicum) (28 days)
Curriculum Studies II from first teachable subject
Curriculum Studies II from second teachable subject
Two education electives

Note 1: Second teachable subjects

1. Biochemistry may count as one of the required courses for Chemistry as a second teachable.
2. Statistics and Probability counts as one of the required courses for a Mathematics additional teachable; since there are six mathematics courses specified in the program, mathematics is always an additional teachable in this program.
3. If Biology is the second teachable, students must take Biology I and Biology II in second year, replace Biology for Engineers by a liberal studies elective in second year, and replace two liberal studies electives in fourth year by two additional biology courses.

Note 2: Electives and breadth requirements

Students must complete 12 elective credit hours aside from the computing science electives. In order to satisfy breadth requirements for the BSc all 12 elective credit hours must be in courses outside the Faculty of Science; two education electives taken in the fifth year of the program will be included in this total.

Note 3: Education electives

Students may take education electives prior to year five only if they have completed year two requirements and have a GPA of 2.7.

Note 4: Computing science electives

CSCI 4610U Artificial Intelligence
 CSCI 4620U Human-Computer Interaction
 CSCI 4630U High-Performance Computing
 CSCI 4640U Distributed Computing
 CSCI 4650U Elements of Theory of Computation
 MATH 4020U Computational Science II

Note 5: Thesis Project course

Students who have completed all requirements of the first three years will take CSCI 4400U Thesis Project in year four.

11.3.6.4 Applied and Industrial Mathematics major / Mathematics first teachable**Program Details**

The order and timing of courses may be changed subject to availability and prerequisite requirements.

YEAR 1

Semester 1 (15 credit hours)

BIOL 1010U Biology I
 CHEM 1010U Chemistry I
 CSCI 1000U Scientific Computing Tools
 MATH 1010U Calculus I
 PHY 1010U Physics I*

Semester 2 (15 credit hours)

BIOL 1020U Biology II
 CHEM 1020U Chemistry II
 EDUC 2900U Introduction to Teaching and Field Experience I (10 days)
 MATH 1020U Calculus II
 PHY 1020U Physics II*

* Students who wish to have Physics as one of their teachable subjects should take PHY 1010U and PHY 1020U. However, students who achieve a B standing or higher in both PHY 1030U and PHY 1040U will be permitted to proceed to second-year physics courses.

YEAR 2

Semester 1 (15 credit hours)

MATH 2010U Advanced Calculus I
 MATH 2050U Linear Algebra
 MATH 2080U Discrete Mathematics
 STAT 2010U Statistics and Probability for Physical Science
 One course from second teachable subject

Semester 2 (15 credit hours)

CSCI 1020U Fundamentals of Programming
 EDUC 2901U Field Experience II (Practicum - 15 days)
 EDUC 3750U Learning and Human Development

MATH 2020U Advanced Calculus II
MATH 2060U Differential Equations
MATH 2072U Computational Science I

YEAR 3

Semester 1 (15 credit hours)

EDUC 3610U Contemporary Educational Practice
MATH 3020U Real Analysis
MATH 3040U Optimization
Two electives

Semester 2 (15 credit hours)

EDUC 4902U Field Experience III (Practicum - 20 days)
MATH 3050U Mathematical Modelling
MATH 3060U Complex Analysis
MATH 3070U Algebraic Structures
One elective
One course from second teachable subject

YEAR 4

Semester 1 (15 credit hours)

MATH 4010U Dynamical Systems and Chaos
MATH 4020U Computational Science II
MATH 4060U Industrial Mathematics
MATH 4041U Topics in Applied Mathematics I or
One elective
One course from second teachable subject

Semester 2 (15 credit hours)

MATH 4030U Applied Functional Analysis
MATH 4050U Partial Differential Equations
One course from second teachable subject
MATH 4400U Thesis Project
MATH 4042U Topics in Applied Mathematics II or
One elective

YEAR 5

Semester 1 (16.5 credit hours)

EDUC 3400U Technology in I/S Education
EDUC 4380U Analysis and Management of Classroom Behaviour
EDUC 4903U Field Experience IV (Practicum - 33 days)
CURS 4000U Core Curriculum
Curriculum Studies I from first teachable subject
Curriculum Studies I from second teachable subject
One education elective

Semester 2 (13.5 credit hours)

EDUC 3800U Teaching for Individual Needs and Diversity
EDUC 4240U Understanding Educational Research, Theory and Practice
EDUC 4590U Assessment and Evaluation
EDUC 4904U Field Experience V (Practicum - 28 days)
Curriculum Studies II from first teachable subject
Curriculum Studies II from second teachable subject
Two education electives

Note 1: Second teachable subjects

1. Biochemistry counts as one of the required courses for Chemistry as a second teachable.
2. If Computing Science is the second teachable (Computer Studies), one or two of the unspecified courses in the second teachable can be replaced by electives, since there are already four computing science courses specified explicitly in the program.

Note 2: Electives and breadth requirements

Students must complete 18 elective credit hours; three of these credit hours must be in science courses. In order to satisfy breadth requirements for the BSc 12 elective credit hours must be in courses outside the Faculty of Science; two education electives taken in the fifth year of the program will be included in this total.

Note 3: Education electives

Students may take education electives prior to year five only if they have completed year two requirements and have a GPA of 2.7.

Note 4: Thesis Project course

Students who have completed all requirements of the first three years will take MATH 4400U Thesis Project in year four.

Note 5: Topics in Applied Mathematics I and II

At least one of MATH 4041U or MATH 4042U must be completed.

11.3.6.5 Physics major / Physics first teachable**Program details**

The order and timing of courses may be changed subject to availability and prerequisite requirements.

YEAR 1

Semester 1 (15 credit hours)

BIOL 1010U Biology I
 CHEM 1010U Chemistry I
 CSCI 1000U Scientific Computing Tools
 MATH 1010U Calculus I
 PHY 1010U Physics I

Semester 2 (15 credit hours)

BIOL 1020U Biology II
 CHEM 1020U Chemistry II
 EDUC 2900U Introduction to Teaching and Field Experience I (Practicum - 10 days)
 MATH 1020U Calculus II
 PHY 1020U Physics II

YEAR 2

Semester 1 (15 credit hours)

MATH 2050U Linear Algebra
 PHY 2010U Electricity and Magnetism I
 PHY 2030U Mechanics I
 PHY 2060U Nuclear Physics and Relativity
 STAT 2010U Statistics and Probability for Physical Science

Semester 2 (15 credit hours)

EDUC 2901U Field Experience II (Practicum - 15 days)
EDUC 3750U Learning and Human Development
MATH 2060U Differential Equations
PHY 2020U Electricity and Magnetism II
PHY 2040U Mechanics II
PHY 2050U Thermodynamics and Heat Transfer

YEAR 3

Semester 1 (15 credit hours)

EDUC 3610U Contemporary Educational Practice
PHY 3010U Statistical Mechanics I
PHY 3020U Quantum Mechanics I
PHY 3030U Electronics
One course from second teachable subject

Semester 2 (15 credit hours)

EDUC 4902U Field Experience III (Practicum - 20 days)
PHY 3040U Mathematical Physics
PHY 3050U Waves and Optics
PHY 3060U Fluid Mechanics
One course from second teachable subject
One elective

YEAR 4

Semester 1 (15 credit hours)

PHY 4020U Quantum Mechanics II
One course from second teachable subject
Senior physics elective - any other 4000 level physics course
PHY 4430U Directed Studies in Physics or
PHY 4410U Thesis Project in Physics I
One elective

Semester 2 (15 credit hours)

PHY 4010U Statistical Mechanics II
PHY 4030U Modern Physics
One course from second teachable subject
Senior physics elective - any other 4000 level physics course
PHY 4420U Thesis Project in Physics II or
One elective

YEAR 5

Semester 1 (16.5 credit hours)

EDUC 3400U Technology in I/S Education
EDUC 4380U Analysis and Management of Classroom Behaviour
EDUC 4903U Field Experience IV (Practicum - 33 days)
CURS 4000U Core Curriculum
Curriculum Studies I from first teachable subject
Curriculum Studies I from second teachable subject
One education elective

Semester 2 (13.5 credit hours)

EDUC 3800U Teaching for Individual Needs and Diversity
EDUC 4240U Understanding Educational Research, Theory and Practice
EDUC 4590U Assessment and Evaluation
EDUC 4904U Field Experience V (Practicum - 28 days)
Curriculum Studies II from first teachable subject
Curriculum Studies II from second teachable subject
Two education electives

Note 1: Second teachable subjects

1. If Computing Science provides the second teachable (Computer Studies), one of the unspecified science courses will have to be a computing science course.
2. Statistics and Probability or Biochemistry count as one of the required courses for Mathematics or Chemistry second teachables, respectively.

Note 2: Electives and breadth requirements

Students must complete 12 elective credit hours, aside from the senior physics electives. If the second teachable is not Mathematics, one of the electives must be a mathematics course at the second year (MATH 2000-series) or higher level not explicitly specified in the program map. In order to satisfy breadth requirements for the BSc 12 elective credit hours must be in courses outside the Faculty of Science; two education electives taken in the fifth year of the program will be included in this total. An exception will be made for students who take the thesis project sequence (see note 4 below) and who do not have mathematics as their second teachable; in that case only 9 elective credit hours must be in courses outside the Faculty of Science.

Note 3: Education electives

Students may take education electives prior to year five only if they have completed year two requirements and have a GPA of 2.7.

Note 4: Directed Studies and Thesis Project courses

Students who have completed all requirements of the first three years will take PHY 4430U Directed Studies in Physics in year four. PHY 4430U may be taken in either semester by interchanging with an elective. Students may optionally apply to do a two-course sequence consisting of PHY 4410U and PHY 4420U Thesis Project in Physics I and II in year four, in place of PHY 4430U plus one elective. Opportunities for the thesis option are limited; students must apply to the science fourth-year thesis coordinator by April 30 following completion of the first three years of the program.

11.3.7 General Science as a teachable subject

General Science as a teachable subject involves a combination of biology, chemistry and physics courses. Students who wish to have General Science as a first or a second teachable subject should consult the Faculty of Science student advisor.

11.3.8 Minor programs

Students may complete minor programs in Biology, Chemistry, Mathematics, Physics or Computational Science by making appropriate selections of courses in the second teachable subject. Please consult the detailed descriptions of minor programs in the Faculty of Science section (section 15) of this calendar. Completion of minor programs will be noted on students' transcripts but will not appear on the degree.