



UNIVERSITY OF
TORONTO

University of Toronto Mississauga

Sciences Curriculum Proposals Report

October 24, 2021

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Forensic Science, Programs in

3 Minor Program Modifications:

Forensic Anthropology - Specialist (Science)

Completion Requirements:

A minimum of 15.5 credits are required.

First Year: ANT101H5, ANT102H5; BIO152H5, BIO153H5; FSC239Y5

Second Year: ANT200H5, ANT202H5, ANT203H5, ANT205H5; FSC271H5; ~~FSC341H5~~ ~~STA215H5~~/ANT407H5

Third Year: ANT306H5, ANT312H5/ANT317H5, ANT334H5, ANT340H5; (FSC300H5, FSC302H5)/(FSC210H5, FSC303H5), FSC316H5, FSC330H5, FSC335H5, FSC340H5, FSC360H5

Fourth Year: ANT415H5, ANT436H5/FSC307H5; ANT439H5, ANT441H5; FSC401H5, FSC439H5, FSC481Y5/(FSC482H5, FSC483H5)

NOTES:

1. The program requirements in effect at the time the student is admitted to the program must be met in order to fulfill the degree requirements.
2. Prospective students already holding a degree in Anthropology may not complete the Forensic Anthropology Specialist Program due to the overlap of course content for courses already completed in their first specialty.
3. **Students without pre- and co-requisites or written permission of the instructor can be de-registered from courses at any time.** Once a student has been admitted into a FSC program stream, written authorization from the Forensic Science program advisor **MUST** be obtained for any request of change in a student's area of study within the Forensic Science program.

Rationale: FSC341 is intended to replace the current statistics course requirement (STA215H5), as forensic students require specific foundational statistical concepts and research methods more relevant to the actual analysis used in the professional discipline. The concepts in this course will provide preparation for the workplace and contribute to the steps towards accreditation.

Course was tested as a "special topics" in 2021-2022 (see attached syllabus).

Resource Implications:

Forensic Biology - Specialist (Science)

Completion Requirements:

A minimum of 16.0 credits are required.

First Year: BIO152H5, BIO153H5; CHM110H5, CHM120H5; FSC239Y5; (MAT132H5, MAT134H5)/(MAT135H5, MAT136H5)/MAT134Y5/MAT135Y5/MAT137Y5/MAT157Y5; PHY136H5, PHY137H5

Second Year: BIO206H5, BIO207H5, ~~BIO259H5~~, (BIO208H5, BIO209H5)/FSC316H5; CHM242H5, CHM243H5; FSC271H5 ; ~~STA215H5~~

Third and Fourth Years:

1. BIO362H5/~~FSC108H5~~/~~JCP265H5~~; CHM361H5; (FSC300H5, FSC302H5)/(FSC210H5, FSC303H5 ;), FSC315H5, FSC330H5, FSC335H5, FSC340H5, FSC360H5
2. BIO458H5/BIO372H5/BIO341H5; FSC415H5, FSC416H5, FSC481Y5/(FSC482H5, FSC483H5)
3. **0.5 additional credits from:** BIO341H5, BIO374H5, FSC307H5, ~~FSC341H5~~, FSC350H5, FSC370H5, FSC371H5, FSC401H5, FSC402H5, FSC406H5, FSC407H5

NOTES:

1. The program requirements in effect at the time the student is admitted to the program must be met in order to fulfill the degree requirements.
2. Prospective students already holding a degree in Biology, may not complete the Forensic Biology Specialist Program due to the overlap of course content already completed in their first specialty.
3. **Students without pre- and co-requisites or written permission of the instructor can be de-registered from courses at any time.**
4. Once a student has been admitted into a FSC program, written authorization from the Forensic Science program advisor **MUST** be obtained for any request of change in a student's area of study within the Forensic Science program.

Description of Proposed Changes:

STA215H5 replaced with new BIO259H5 course to mirror Biology dept's replacement.

FSC341 (Forensic Statistics) added as an elective option, and CSC108 and JCP265 removed as alternative statistics options.

Rationale: Students will be gaining specialist-specific statistics education

Resource Implications:**Forensic Science - Major (Science)****Completion Requirements:**

Note: This program must be taken concurrently with a second Major program (see notes below).

9.0 credits are required including at least 2.0 at the 300/400 level.

First Year: BIO152H5, BIO153H5; CHM110H5, CHM120H5; FSC239Y5; (MAT132H5, MAT134H5)/(MAT135H5, MAT136H5)/MAT134Y5/MAT135Y5/MAT137Y5; PHY136H5, PHY137H5

Second Year: CHM242H5, CHM243H5; FSC271H5; **FSC341H5/ANT407H5/STA215H5/STA220H5/PSY201H5**

Third Year: FSC303H5/FSC300H5; FSC330H5; FSC360H5;

Fourth Year: 0.5 credit from the following: FSC302H5, FSC307H5, FSC311H5, FSC314H5, FSC315H5, FSC316H5, FSC320H5, FSC335H5, FSC340H5, FSC350H5, FSC351H5, FSC361H5, FSC370H5, FSC401H5, FSC402H5, FSC403H5, FSC406H5, FSC407H5, FSC416H5, FSC430H5, FSC489H5

NOTES:

1. The Forensic Science Major **MUST** be completed in conjunction with one of the following approved second major programs: **Anthropology (Science), Biology, Chemistry, Computer Science or Psychology** (Other 2nd Majors may be possible with permission of the Forensic Science program director).
2. Students intending to complete the Forensic Science Major with an Anthropology Major **MUST** select the **ERMAJ0105 Anthropology (Science) Major**. As part of the ANT (SCI) Major requirement of 3.0 additional ANT credits, students are recommended to choose from the following: ANT205H5; ANT306H5, ANT334H5, ANT340H5, ANT415H5, ANT436H5, ANT439H5.
3. For information on program requirements and enrolment procedures for each of the second major programs, students should consult the individual departmental faculty advisor or the departmental program descriptions listed within this calendar.
4. In each of the 2nd majors, certain courses are compulsory and where a choice of courses is available, students should consult the Forensic Science Student Advisor for the most appropriate selection.
5. The program requirements in effect at the time the student is admitted to the program must be met in order to fulfill the degree requirements.
6. Once a student has been admitted into a FSC program stream, written authorization from the Forensic Science program advisor **MUST** be obtained for any request of change in a student's area of study within the Forensic Science program, **including the second science major**.

7. Prospective students already holding a degree in Biology, Chemistry, Psychology or Anthropology may not complete a Forensic Science program in their first specialty due to the overlap of course content for courses already completed.

Description of Proposed Changes:

FSC341 (Forensic Statistics) and discipline statistic alternatives added as an additional options for program completion.

Rationale: Given that students enrolled in ERMAJ0205 may be completing this degree in conjunction with a variety or second majors, we have offered several discipline-complimentary statistic options to provide more relevant applications to complement their second major of choice.

Resource Implications:

2 New Courses:

FSC341H5: Applied Forensic Statistics

Contact Hours: *Lecture:* 12 / *Practical:* 24

Description:

Designed as a companion course to FSC340H5, Forensic Statistics will introduce students to basic analytic methods necessary to evaluate quantitative data in forensic science. Students will learn methods of visualizing and analyzing univariate, bivariate, and multivariate data in forensic science, with emphasis on practical applications of statistics in various forensic sub-disciplines. No prior knowledge of statistics and mathematics is required.

Prerequisites: FSC239Y5

Corequisites:

Exclusions:

Recommended Preparation:

Rationale: This course is intended to replace the current statistics course requirement (STA215H5), as forensic students require specific foundational statistical concepts and research methods more relevant to the actual analysis used in the professional discipline. The concepts in this course will provide preparation for the workplace and contribute to the steps towards accreditation.

Course was tested as a "special topics" in 2021-2022 (see attached syllabus).

Resources: Resource Implications Form has been submitted

FSC485H5: Professional Opportunity in Forensic Science

Contact Hours:

Description:

This course provides students with the opportunity to engage in, and reflect on, a professional forensic experience that contributes to their employment eligibility after graduation. They will develop networking skills, enhance professional competencies, and are given the opportunity to locate and select their own experience relevant to their career goals, which may include (but is not limited to) a possible: work-study position, conference workshop, professional certification, field school, paid or unpaid internship or agency co-op. All opportunities must be approved by the program director.

Prerequisites: Enrolment in a Forensic Science Specialist Program and completion of the forensic program statistics course(s) requirement and any third-level IDENT course and permission of instructor.

Corequisites: FSC482H5

Exclusions: FSC483H5 or FSC481Y5

Recommended Preparation:

Rationale: As the Forensic Science Program expands, additional capstone experiences are required to accommodate enrolment growth, provide opportunities for a variety of learning styles and applications, and cater to employment eligibility for graduates. This course will contribute to program plans for future accreditation.

Students are not obliged to take this course, as it is one of several potential options for their capstone experience. Additionally, there is no obligation to choose an experience that costs any additional funds above and beyond their tuition. However, if they elect to choose an experience that has an additional cost, we will consider

Resources: Resource Implications Form has been submitted

6 Course Modifications:

FSC335H5: Forensic Theory

Title: Forensic Epistemology and Theory

Abbreviated Title: FSC Epistemology and Forensic Theory

Rationale: Change made to be more descriptive, reflecting that students will learn the study of "how we know" concepts in forensic science, not just aspects of theory. This is to increase clarity about the type of knowledge building applied in this course.

Resources:

FSC402H5: Forensic Toxicology

Description:

Forensic toxicology involves is the study application of the adverse effects of drugs, alcohol principles and poisons on biological systems methods used in a medicolegal context toxicology to matters related to the law. This course The fundamental foundation of forensic toxicology is pharmacology and analytical chemistry; thus lectures will include a focus on the review of pharmacokinetics, pharmacodynamics, analytical techniques and quality assurance measures used in forensic toxicology, the effects of drugs on human performance, and post-mortem toxicology of illicit drugs, pharmaceutical drugs, and other poisons. The major focus of this course will be the role that a forensic toxicologist plays in criminal and death investigations.[36L]

Rationale: Course description updated to be more reflective of course content.

Resources:

FSC407H5: Forensic Identification Field School

Abbreviated Title:

Previous: Forensic Identifctn Feild Schl

New: Forensic IDENT Field School

Enrolment Limits: Priority given first to Forensic Science Specialists and Majors Majors; then Minors. Limited Enrolment and Course Application required. Application Process see: [https:// www.utm.utoronto.ca/forensic/applications](https://www.utm.utoronto.ca/forensic/applications)

Rationale: Minor eligibility removed from enrolment limits. Minors are required to take an alternative third level course (FSC303) that is an anti-requisite to the FSC407 prerequisite (FSC300/302)

Resources:

FSC481Y5: Internship in Forensic Science

Prerequisites: Enrolment in a Forensic Science Specialist Program and completion of the forensic program statistics course(s) requirement listed within the student 's Forensic Science Program (ie. STA215H5 and STA220H5 and STA221H5 and BIO360H5 and BIO361H5 and PSY201H5 and PSY202H5) and FSC300H5 and any third-level IDENT course, FSC302H5 and permission of instructor. (Restricted to Forensic Science Specialists)

Exclusions: FSC482H5 or FSC483H5 or FSC485H5

Rationale: Prerequisites simplified for student clarity.

Resources:

FSC482H5: Professional Practice in Forensic Science

Prerequisites: Enrolment in a Forensic Science Specialist Program and completion of the forensic program statistics course(s) requirement listed within the student's Forensic Science Program (ie. STA215H5 and STA220H5 and STA221H5 and BIO360H5 and BIO361H5 and PSY201H5 and PSY202H5) and FSC300H5 and FSC302H5 and any third-level IDENT course FSC340H5 and permission of instructor.

Exclusions: FSC481Y5 or FSC485H5

Rationale: Prerequisites simplified for student clarity.

Resources:

FSC483H5: Collaborative Research Internship

Prerequisites: Enrolment in a Forensic Science Specialist Program and completion of the forensic program statistics course(s) requirement listed within the student's Forensic Science Program (STA215H5 and STA220H5 and STA221H5 and BIO360H5 and BIO361H5 and PSY201H5 and PSY202H5) and FSC300H5 and any third-level IDENT course FSC302H5 and permission of instructor. (Restricted to Forensic Science Specialists)

Exclusions: FSC481Y5 or FSC489Y5 or FSC485H5

Rationale: Prerequisites simplifies for student clarity.

Resources:

8 Minor Program Modifications:

Biological Chemistry - Specialist (Science)

Completion Requirements:

14.0-14.5 credits are required.

First Year:

1. BIO152H5
2. CHM110H5 and CHM120H5
3. (MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5
4. (PHY136H5 and PHY137H5) or (PHY146H5 and PHY147H5)
5. For students entering the program in 2023-2024 (and beyond): ISP100H5

Second Year:

1. CHM211H5 and CHM231H5 and CHM242H5 and CHM243H5
2. JCP221H5
3. BIO206H5 and BIO207H5
4. 0.5 credit of MAT or CSC or STA (at any level)

Third Year:

1. CHM333H5 and (CHM341H5 or CHM345H5) and CHM347H5 and CHM361H5 and CHM362H5 and CHM372H5 and CHM373H5
2. BIO372H5

Fourth Year:

1. CHM399Y5 or CHM489Y5 or CPS489Y5 or CPS400Y5 or JCB487Y5 or (BCH472Y1 or BCH473Y1, with permission of the CHM Program Advisor)
2. 1.5 credits from the following courses: BIO324H5 or CHM412H5 or CHM444H5 or CHM462H5 or CHM485H5 or JCP410H5 or JCP422H5 or JCP463H5 or JBC472H5 or CHM447H1 or CHM479H1 or any 400 level BCH lecture course.

Rationale:

CHM485H5 as an option was missing from the 4th year level in 2021-22 calendar. We had this option before 2021-22 calendar

Resource Implications:

Biomedical Physics - Specialist (Science)

Enrolment Requirements:

Limited Enrolment – Enrolment in this program is based on completion of 4.0 credits, including:

1. PHY146H5 (with a minimum grade of 65% ~~70%~~) or PHY136H5 (with a minimum grade of 80% ~~90%~~);
2. PHY147H5 (with a minimum grade of 65% ~~70%~~) or PHY137H5 (with a minimum grade of 80% ~~90%~~); and
3. ISP100H5
4. ([MAT132H5](#) and [MAT134H5](#) (minimum grade of 65%)) or ([MAT135H5](#) and [MAT136H5](#) (minimum grade of 65%)) or [MAT134Y5](#) or [MAT135Y5](#) or [MAT137Y5](#) or [MAT157Y5](#) (minimum grade of 65%)
5. A minimum CGPA of 2.5-

Completion Requirements:

14.0 credits are required.

First Year:

1. (PHY146H5 and PHY147H5) or (PHY136H5 and PHY137H5)
2. BIO152H5
3. CHM110H5 and CHM120H5
4. (MAT135H5 and MAT136H5) or MAT135Y5 or MAT137Y5 or MAT157Y5
5. ISP100H5

Second Year:

1. PHY241H5 and PHY245H5 and PHY255H5
2. JCP221H5 and JCP265H5
3. MAT232H5 and (MAT212H5 or MAT244H5 or STA256H5)
4. BIO206H5

Third Year:

1. PHY324H5 and PHY325H5 and PHY332H5 and PHY333H5 and PHY347H5
2. JCP321H5 and JCP322H5

Fourth Year:

1. PHY426H5 and PHY451H5 and JCP421H5
2. [(PHY433H5 or JCP463H5) and PHY473H5] or PHY489Y5 or CPS489Y5 or CPS400Y5 or JCB487Y5 or PHY399Y5

NOTES:

1. At least 65% mark in PHY146 and PHY147
2. At least 80% in PHY136 and PHY137
3. ~~1.~~ Not all 300 and 400 level courses are offered every year. Please check the course timetable carefully each academic year.
4. Check all prerequisites and corequisites when registering for 200+ level courses.

Description of Proposed Changes:

Entry Requirements are updated and ROP course (PHY399Y5) is added as an optional course in the upper years. The course was missing from the 2021-22 calendar.

Rationale: On reflection of trends observed in program enrolment since implementing grade thresholds for entry, we have come to the realization that these thresholds may have been set too aggressively. We therefore propose a reduction in these grade thresholds to bring them into accord with those used for other CPS programs of study (e.g. Chemistry Specialist, Biological Chemistry Specialist and Chemistry Major). Math requirements, with grade thresholds, and CGPA thresholds are also specified, which are also in line with other CPS programs and should serve to ensure student preparedness.

Resource Implications:**Chemistry - Major (Science)****Completion Requirements:**

8.0-8.5 credits are required.

First Year:

1. CHM110H5 and CHM120H5
2. (MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5
3. For students entering the program in 2023-2024 (and beyond): ISP100H5

Second Year:

1. CHM211H5 and CHM231H5 and CHM242H5 and CHM243H5
2. JCP221H5

Higher Years:

1. (CHM372H5 and CHM373H5) or (CHM394H5 and CHM395H5) or (CHM396H5 and CHM397H5)
2. 1.5 credits from lecture courses: CHM311H5 or CHM331H5 or CHM333H5 or CHM341H5 or CHM345H5 or CHM347H5 or CHM361H5 or CHM362H5 or CHM436H5 or CHM412H5 or CHM414H5 or CHM416H5 or CHM442H5 or CHM444H5 or CHM462H5 or JCP321H5 or JCP322H5 or JCP410H5 or JCP421H5 or JCP422H5 or JCP463H5
3. 1.0 credit from: CHM311H5 or CHM331H5 or CHM333H5 or CHM341H5 or CHM345H5 or CHM347H5 or CHM361H5 or CHM362H5 or CHM372H5 or CHM373H5 or CHM394H5 or CHM395H5 or CHM396H5 or CHM397H5 or CHM399Y5 or CHM412H5 or CHM414H5 or CHM416H5 or CHM436H5 or CHM442H5 or CHM444H5 or CHM462H5 or CHM485H5 or CHM489Y5 or CPS489Y5 or CPS398H5 or CPS400Y5 or FSC311H5 or JCP321H5 or JCP322H5 or JCP410H5 or JCP421H5 or JCP422H5 or JCP463H5 or JCB472H5 or JCB487Y5

Rationale:

CHM485H5 as an option was missing from the 4th year level in 2021-22 calendar. We had this option before 2021-22 calendar

Resource Implications:**Chemistry - Minor (Science)****Completion Requirements:**

4.0 credits in CHM/JCP are required.

First Year:

1. CHM110H5 and CHM120H5

Higher Years:

1. 2.0 credits from: CHM211H5 or CHM231H5 or CHM242H5 or CHM243H5 or CHM311H5 or CHM331H5 or CHM333H5 or CHM341H5 or CHM345H5 or CHM347H5 or CHM361H5 or CHM362H5 or CHM372H5 or CHM373H5 or CHM394H5 or CHM395H5 or CHM396H5 or CHM397H5 or CHM412H5 or CHM414H5 or CHM416H5 or CHM436H5 or CHM442H5 or CHM444H5 or CHM462H5 or JCP221H5 or JCP321H5 or JCP322H5 or JCP410H5 or JCP421H5 or JCP422H5 or JCP463H5 or FSC311H5
2. 1.0 credits at 300/400 level from: CHM311H5 or CHM331H5 or CHM333H5 or CHM341H5 or CHM345H5 or CHM347H5 or CHM361H5 or CHM362H5 or CHM372H5 or CHM373H5 or CHM394H5 or CHM395H5 or CHM396H5 or CHM397H5 or CHM412H5 or CHM414H5 or CHM416H5 or CHM436H5 or CHM442H5 or CHM444H5 or CHM462H5 or JCP321H5 or FSC311H5 or JCP322H5 or JCP410H5 or JCP421H5 or JCP422H5 or JCP463H5

Notes :

1. (MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5 is required for all 200-level CHM/JCP courses-
2. CHM299Y5 does not count towards the completion of this program.

Rationale:

The note created confusion among students. The interpretation was that it is fine to take upper year ROP courses to fulfill CHM Minor program. No ROP course are to be used for fulfilling CHM Minor requirements

Resource Implications:**Chemistry - Specialist (Science)****Completion Requirements:**

13.0-13.5 credits are required.

First Year:

1. CHM110H5 and CHM120H5

2. (MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5
3. (PHY136H5 and PHY137H5) or (PHY146H5 and PHY147H5)
4. For students entering the program in 2023-2024 (and beyond): ISP100H5

Second Year:

1. CHM211H5 and CHM231H5 and CHM242H5 and CHM243H5
2. JCP221H5
3. MAT212H5 or MAT232H5

Third Year:

1. CHM311H5 and CHM331H5 and CHM361H5 and CHM394H5 and CHM396H5
2. CHM341H5 or CHM345H5
3. JCP321H5

Fourth Year:

1. (CHM395H5 and CHM397H5) or CHM399Y5 or CHM489Y5 or CPS489Y5 or CPS400Y5 or CPS401Y5 or JCB487Y5
2. 1.5 credits lecture courses from: CHM412H5 or CHM414H5 or CHM416H5 or CHM436H5 or CHM442H5 or CHM444H5 or CHM462H5 or JCP421H5 or JCP422H5 or JCP410H5 or JCP463H5
3. 1.0 credit from: CHM333H5 or CHM341H5 or CHM345H5 or CHM347H5 or CHM362H5 or CHM372H or CHM373H5 or CHM395H or CHM397H5 or CHM412H5 or CHM414H5 or CHM416H5 or CHM436H5 or CHM442H5 or CHM444H5 or CHM462H5 or **CHM485H5** or CPS398H5 or FSC311H5 or JCP321H5 or JCP322H5 or JCP410H5 or JCP421H5 or JCP422H5 or JCP463H5

Rationale:

CHM485H5 as an option was missing from the 4th year level in 2021-22 calendar. We had this option before 2021-22 calendar

Resource Implications:

Earth Science - Minor (Science)

Completion Requirements:

4.0-4.5 credits are required.

First Year: ERS101H5 or ERS111H5 or ENV100Y5

Higher Years:

1. 1.5 credits from ERS201H5 or ERS202H5 or ERS203H5 or ERS211H5 or ERS225H5
2. 2.0 credits of Earth Science (ERS) from: ERS301H5 or ERS302H5 or ERS303H5 or ERS304H5 or ERS311H5 or ERS312H5 or ERS315H5 or **ERS325H5** or ERS381H5 or ERS401H5 or ERS402H5 or ERS403H5 or ERS404H5 or ERS411H5 or ERS412H5 or JGE378H5 or PHY351H5

Rationale:

ERS325H5 was missing from the optional courses for ERS Minor program . Students can use ERS325H5 as an option.

Resource Implications:

Physics - Major (Science)

Enrolment Requirements:

Limited Enrolment – Enrolment in this program is based on completion of 4.0 credits, including:

- ~~ISP100H5; and~~
- ONE of the following:
- PHY146H5 (with a minimum grade of 60%) and PHY147H5 (with a minimum grade of 60%)

- PHY136H5 (with a minimum grade of 80% 90%) and PHY137H5 (with a minimum grade of 80% 90%)
- [ISP100H5](#)
- ([MAT132H5](#) and [MAT134H5](#)) or ([MAT135H5](#) and [MAT136H5](#)) or [MAT134Y5](#) or [MAT135Y5](#) or [MAT137Y5](#) or [MAT157Y5](#)

Completion Requirements:

8.5 credits are required.

First Year:

1. (PHY146H5 and PHY147H5) or (PHY136H5 or PHY137H5)
2. (MAT135H5 and MAT136H5) or MAT135Y5 or MAT137Y5 or MAT157Y5
3. ISP100H5

Second Year:

1. PHY241H5 and PHY245H5
2. JCP221H5 and JCP265H5

Third & Fourth Years:

PHY324H5 and PHY325H5 and PHY343H5 and PHY347H5 and PHY451H5 and JCP321H5 and JCP322H5 and JCP421H5

NOTES:

1. At least 60% mark in PHY146 and PHY147
2. At least 80% in PHY136 and PHY137
3. ~~1.~~ Not all 300 and 400 level courses are offered every year. Please check the course timetable carefully each academic year.
- 2.4. Check all prerequisites and corequisites when registering for 200+ level courses.

Rationale:

On reflection of trends observed in program enrolment since implementing grade thresholds for entry, we have come to the realization that these thresholds may have been set too aggressively. We therefore propose a reduction in these grade thresholds to bring them into accord with those used for other CPS programs of study (e.g. Chemistry Specialist, Biological Chemistry Specialist and Chemistry Major). Math requirements, with grade thresholds, and CGPA thresholds are also specified, which are also in line with other CPS programs and should serve to ensure student preparedness.

Resource Implications:

Physics - Minor (Science)

Enrolment Requirements:

Limited Enrolment — Enrolment in this program is based on completion of 4.0 credits including ~~one of the following~~:

- (PHY146H5(minimum grade of 60%)and PHY147H5 (minimum grade of 60%)) ; or (
- PHY136H5 (with a minimum grade of 80% 90%) and PHY137H5 (with a minimum grade of 80%) 90%)
- ([MAT132H5](#) and [MAT134H5](#)) or ([MAT135H5](#) and [MAT136H5](#)) or [MAT134Y5](#) or [MAT135Y5](#) or [MAT137Y5](#) or [MAT157Y5](#)

Completion Requirements:

4.0 credits are required including at least 1.5 credits at the 300/400 level. Please note that a number of these courses have MAT pre-requisites and/or co-requisites.

First Year: (PHY146H5 and PHY147H5) or (PHY136H5 and PHY137H5)

Second Year: PHY241H5 and PHY245H5 and JCP265H5

Higher Years:

1.5 credits from: JCP321H5, JCP322H5, JCP421H5, PHY324H5, PHY325H5, PHY332H5, PHY333H5, PHY343H5, PHY347H5, PHY351H5, PHY426H5, PHY433H5, PHY451H5.

NOTES:

1. At least 60% mark in PHY146 and PHY147

2. At least 80% in PHY136 and PHY137

3. ~~1.~~ Not all 300 and 400 level courses are offered every year. Please check the course timetable carefully each academic year.

~~2.~~ 4. Check all prerequisites and corequisites when registering for 200+ level courses.

Rationale:

On reflection of trends observed in program enrolment since implementing grade thresholds for entry, we have come to the realization that these thresholds may have been set too aggressively. We therefore propose a reduction in these grade thresholds to bring them into accord with those used for other CPS programs of study (e.g. Chemistry Specialist, Biological Chemistry Specialist and Chemistry Major). Math requirements, with grade thresholds, and CGPA thresholds are also specified, which are also in line with other CPS programs and should serve to ensure student preparedness.

Resource Implications:

8 Course Modifications:

AST215H5: Astronomical Revolutions

New Course Code: AST115H5

Title:

Previous: Astronomical Revolutions

New: Cultural Astronomy

Abbreviated Title:

Previous: Astronomical Revolutions

New: Cultural Astronomy

Description:

Previous: An examination of the revolutions that have shaped astronomy from the time of Copernicus to the current day. Emphasis is placed on the process of discovery that has led to major advances in our knowledge about the Universe. The course includes an outline of the puzzles that have inspired the important shifts in our understanding of the Universe. These have been central to the development of astronomy, but also to physics and earth science, as well as philosophy, and the current discoveries of other solar systems is likely to have a major impact on the life sciences. This course is suited for both science and non-science students. [36L]

New: This course will explore the historic and ongoing relationship between astronomy and human culture. In this course, students will approach astronomical concepts through the lens of archaeoastronomy – the exploration of astronomical practices in ancient cultures, and ethnoastronomy – the study of modern astronomical practices by cultures around the world. Topics will include cultural interpretations of the motions of the stars, planets, moon, and sun, methods of navigation and timekeeping, puzzles that have inspired important shifts in our understanding of the Universe, and varying cultural conceptions of what science is and how it is done.

Rationale:

Renumbering - Rationale for Change: Astronomical Revolutions addresses astronomy topics from a social and historic perspective. As such, it does not significantly overlap with any other general interest astronomy courses. There is potential to include astronomy knowledges from diverse groups and cultures in the course content taught in this course. This content will be more accessible to a general audience at the first-year level, which will hopefully improve enrollment in the course, especially for students specializing in the humanities.

Course Description- Rationale for Change: This course will be redeveloped as a cultural astronomy course, focusing not only on advancements in Western astronomical thinking, but also drawing in astronomical practices and knowledges from cultures around the world. The new course description is less focused on Western/European astronomical revolutions, and emphasizes the contributions from other cultures.

Course Title - Rationale for Change – The new title better captures the intended content of the course, emphasizing the multi-cultural approach the course will take to studying historic and modern astronomical knowledge construction

Resources: None

AST252H5: Cosmic Evolution

Title:

Previous: Cosmic Evolution

New: Life in the Universe

Abbreviated Title:

Previous: Cosmic Evolution

New: Life in the Universe

Rationale: The new title more clearly defines the course's focus on astrobiology – the evolution of life both on Earth and on other planets in and outside the Solar System. It is also consistent with the title of the equivalent course on the UTSG campus.

Resources:

AST320H5: Astrophysics III – Formation and Evolution of Astronomical Objects

Title: Astrophysics III – ~~Unsolved Problems in Astrophysics~~ ~~Formation and Evolution of Astronomical Objects~~

Description:

This course explores the formation, equilibrium, and evolution of structure on ~~various all~~ astronomical scales ~~through, from the smallest to~~ the ~~investigation largest: stars, gas clouds, clusters~~ of major open questions in modern astrophysics. Topics may include exoplanet formation and evolution ~~stars, the Milky Way,~~ supermassive black holes ~~galaxies,~~ the progenitors ~~clusters~~ of type Ia supernovae, galaxy evolution ~~galaxies,~~ and the nature of dark matter ~~whole universe.~~

Rationale:

Course Title - Rationale for Change – The new title better captures the intended content of the course, and better emphasizes the focus on exciting open questions and challenges in modern astrophysics.

Course Description: Rationale for Change – This course will focus primarily on major open questions in modern astrophysics, through which students will delve deeply into concepts of formation, equilibrium, and evolution on various astronomical scales. The previous course description lacks an emphasis on these open questions, which will form a backbone of the course content.

Resources:

JCP265H5: Introduction to Scientific Computing

Prerequisites: (PHY146H5 or PHY136H5 (minimum grade of 80%)) and (PHY147H5 or PHY137H5 (minimum grade of 80%)) and (MAT135H5 and MAT136H5) or (MAT135Y5 or MAT137Y5)

Rationale: PHY136H5 & PHY137H5 are added as optional prerequisite courses

Resources:

PHY147H5: Principles of Physics II

Prerequisites: PHY146H5 or PHY136H5 (minimum grade of ~~80%~~ 90%)

Rationale: The percentage requirement of the prerequisite course (PHY136H5) is changed to align with the entry requirements.

Resources:

PHY241H5: Electromagnetism

Prerequisites: [(PHY146H5 or PHY136H5 (minimum grade of 80%)) and (PHY147H5 or PHY137H5 (minimum grade of 80%))] and [(MAT135H5 and MAT136H5) or (MAT135Y5 or MAT137Y5)]

Rationale: PHY136H5 & PHY137H5 are added as optional prerequisites courses.

Resources:

PHY242H5: Thermal Physics and Fluid Mechanics

Prerequisites: [(PHY146H5 or PHY136H5 (minimum grade of 80%)) and (PHY147H5 or PHY137H5 (minimum grade of 80%))] and [(MAT135H5 and MAT136H5) or (MAT135Y5 or MAT137Y5)]

Rationale: PHY136H5 & PHY137H5 are added as optional prerequisites courses.

Resources:

PHY245H5: Vibrations and Waves

Prerequisites: [(PHY146H5 or PHY136H5 (minimum grade of 80%)) and (PHY147H5 or PHY137H5 (minimum grade of 80%))] and [(MAT135H5 and MAT136H5) or (MAT135Y5 or MAT137Y5)]

Rationale: PHY136H5 & PHY137H5 are added as optional prerequisites courses.

Resources:

6 Minor Program Modifications:

Biology - Major (Science)

Completion Requirements:

8.0 credits are required including at least 2.0 at the 300/400 level.

1. BIO152H5, BIO153H5; CHM110H5, CHM120H5; (MAT132H5, MAT134H5)/MAT134Y5 */(MAT135H5, MAT136H5)/MAT135Y5/MAT137Y5

* Note (MAT132H5, MAT134H5) - for Life Sciences is highly recommended.

2. BIO202H5, BIO203H5, BIO205H5, BIO206H5, BIO207H5; ~~STA215H5~~** BIO259H5 or ~~PSY201H5~~

3. ~~2.0 in UTM Biology courses at the 300 or STA215H5 400 level.~~

** PSY201H5 or STA215H5 will no longer be accepted as an appropriate courses for this program AFTER 2022-2023 Academic year. Beginning 2023-2024 Academic year all students will be required to complete BIO259H5 as the statistics course for this program. Students who plan to take BIO360H5 or who plan to transfer to a Biology Specialist program should enrol in BIO259H5.

4. ~~2.0 in UTM Biology courses at the 300 or 400 level STA215H5.~~

NOTES

- Students should be aware of the distinct credit requirement for their degree (see section 8.6 - HBSc Degree Requirements for full details). Completion of this program with another Biology Major or Biology Minor will not satisfy the min. 12.0 distinct credit requirement for a degree. Please choose programs and courses accordingly.
- PSL201Y1, offered on the St. George campus, will not meet the Physiology requirements for the Biology Major program and cannot be used for this program.
- Students may take no more than 2.0 credits combined in ROP, Internship Program, or Individual Project/Thesis courses at the 300/400-level for credit toward their Biology program.
- Students must consult with the Undergraduate Advisor before enrolling in any St. George course that they wish to use for credit toward any Biology program.

Rationale: Adding newly proposed BIO259H5 course to program completion requirements.

Resource Implications:

Biology - Specialist (Science)

Completion Requirements:

13.5 credits are required, including at least 6.0 credits at the 300/400 level, of which 1.0 credit must be at the 400 level.

First Year:

1. BIO152H5 and BIO153H5

2. CHM110H5 and CHM120H5

3. (MAT132H5 and MAT134H5) or MAT134Y5 or (MAT135H5 and MAT136H5) or MAT135Y5 or MAT137Y5

4. 1.0 credit from: CLA201H5 or ENV100Y5 or (ERS101H5 or ERS120H5) or PHY136H5 or PHY137H5 or PSY100Y5 or WRI173H5 or WRI307H5

Note - (MAT132H5 and MAT134H5) - Calculus for Life Sciences is highly recommended.

Second Year:

1. BIO202H5 and BIO203H5 and BIO205H5 and BIO206H5 and BIO207H5

2. BIO259H5 or STA215H5

* STA215H5 will no longer be accepted as an appropriate course for this program AFTER 2022-2023 Academic year. Beginning 2023-2024 Academic year all students will be required to complete BIO259H5 as the statistics course for this program.

Third and Fourth Years:

1. BIO313H5 or BIO314H5 or BIO409H5
2. BIO360H5
3. 5.5 additional UTM BIO credits. At least 5.0 of these credits must be at the 300 level or above, of which at least 1.0 must be at the 400 level

It is recommended that students in the specialist program include at least 0.5 credit from each of four of the following groups:

- **Ecology and Field Biology:** BIO311H5 or BIO312H5 or BIO313H5 or BIO330H5 or BIO331H5 or BIO333H5 or BIO373H5 or BIO376H5 or BIO378H5 or BIO412H5 or BIO416H5 or BIO464H5
- **Biology of Whole Organisms:** BIO325H5 or BIO326H5 or BIO335H5 or BIO338H5 or BIO354H5 or BIO356H5 or BIO376H5 or BIO378H5
- **Genetics and Evolution:** BIO341H5 or BIO342H5 or BIO347H5 or BIO407H5 or BIO422H5 or BIO427H5 or BIO443H5 or BIO445H5 or BIO464H5
- **Cell, Molecular and Developmental Biology:** BIO314H5 or BIO315H5 or BIO324H5 or BIO362H5 or (BIO370Y5 or BIO371H5) or BIO372H5 or BIO374H5 or BIO375H5 or BIO380H5 or BIO404H5 or BIO407H5 or BIO408H5 or BIO417H5 or BIO419H5 or BIO422H5 or BIO458H5 or BIO475H5 or BIO476H5 or BIO477H5
- **Physiology and Behaviour:** (BIO208H5 or BIO209H5) or BIO304H5 or BIO310H5 or BIO312H5 or (BIO318Y5 or BIO328H5) or BIO320H5 or BIO368H5 or BIO405H5 or BIO408H5 or BIO409H5 or BIO410H5 or BIO411H5 or BIO414H5 or BIO429H5 or BIO434H5

Up to 1.0 credit may be taken from the following biology-related courses: GGR227H5 or GGR305H5 or GGR307H5 or GGR309H5 or GGR311H5 or GGR312H5 or CHM347H5 or CHM361H5 or CHM362H5 or CHM372H5 or CHM373H5 or PHY332H5 or PHY333H5 or PSY290H5 or PSY355H5 or PSY357H5 or PSY392H5 or PSY395H5 or PSY397H5 or ANT334H5 or ANT336H5 or ANT340H5.

Additional courses: BIO361H5 or BIO400Y5 or BIO481Y5 or JCB487Y5

Rationale: Adding newly proposed BIO259H5 course to program completion requirements.

Resource Implications:

Biology for Health Sciences - Major (Science)

Completion Requirements:

8.5 credits are required including at least 2.0 at the 300/400 level.

Program Requirements:

1. BIO152H5, BIO153H5; CHM110H5, CHM120H5; (MAT132H5, MAT134H5)/MAT134Y5 */(MAT135H5, MAT136H5)/MAT135Y5/MAT137Y5
* Note (MAT132H5, MAT134H5) - for Life Sciences is highly recommended.
2. BIO202H5, BIO206H5, BIO207H5, (BIO208H5, BIO209H5), BIO304H5, BIO310H5, BIO380H5; ~~STA215H5~~** BIO259H5 or ~~PSY201H5~~ or STA215
** PSY201H5 or STA215H5 will no longer be accepted as appropriate courses for this program AFTER 2022-2023 Academic year. Beginning 2023-2024 Academic year all students will be required to complete BIO259H5 as the statistics course for this program. Students who plan to take BIO360H5 or who plan to transfer to a Biology Specialist program should enrol in BIO259H5.
3. 1.0 credits from **one** of the following lists:
 - **Cell, Molecular, and Biotechnology Stream:** BIO200H5, BIO314H5, BIO315H5, BIO324H5, BIO360H5, BIO370Y5/BIO371H5, BIO372H5, BIO374H5, BIO375H5, BIO404H5, BIO417H5, BIO419H5, BIO422H5, BIO475H5, BIO476H5, BIO477H5; JBC472H5

- **Neuroscience Stream:** BIO320H5, BIO360H5, BIO403H5, BIO408H5, BIO409H5, BIO411H5, **BIO429H5**
 - **Genes and Behaviour Stream:** BIO315H5, BIO318Y5/BIO328H5, BIO341H5, BIO342H5, BIO347H5, BIO360H5, BIO361H5, BIO368H5, BIO405H5, BIO407H5, BIO414H5, BIO422H5, **BIO427H5**, BIO443H5
- ** Students who plan to take BIO360 or who plan to transfer to a Biology Specialist program should enrol in STA215H5.**

NOTES

- Students should be aware of the distinct credit requirement for their degree (see section 8.6 - HBSc Degree Requirements for full details). Completion of this program with another Biology Major or Biology Minor will not satisfy the min. 12.0 distinct credit requirement for a degree. Please choose programs and courses accordingly.
- As part of your degree requirement the 'Biology for Health Sciences' Major would be academically complemented by a Major in Psychology, Anthropology, Exceptionality in Human Learning, Forensic Science, and Chemistry, as well as other disciplines such as the Major in Management. This major program would also be complemented by a Minor in Biomedical Communications (Science).

Rationale: Adding newly proposed BIO259H5 course to program completion requirements.

Resource Implications:

Comparative Physiology - Specialist (Science)

Completion Requirements:

14.5 credits are required, including at least 5.0 at the 300/400 level, of which 1.0 credit must be at the 400 level.

First Year:

1. BIO152H5 and BIO153H5
2. CHM110H5 and CHM120H5
3. (MAT132H5 and MAT134H5) or MAT134Y5 or (MAT135H5 and MAT136H5) or MAT135Y5 or MAT137Y5
4. 1.0 credit from CLA201H5 or ENV100Y5 or ERS101H5 or PHY136H5 or PHY137H5 or PSY100Y5 or WRI173H5 or WRI307H5

Note: (MAT132H5 and MAT134H5) - Calculus for Life Sciences is highly recommended.

Second Year:

1. BIO202H5 and BIO203H5 and BIO205H5 and BIO206H5 and BIO207H5 and BIO208H5 and BIO209H5
2. **BIO259H5 or STA215H5**
 - * **STA215H5 will no longer be accepted as an appropriate course for this program AFTER 2022-2023 Academic year. Beginning 2023-2024 Academic year all students will be required to complete BIO259H5 as the statistics course for this program.**

Third and Fourth Years:

1. BIO304H5 and BIO310H5 and BIO312H5 and BIO360H5 and BIO409H5;
2. CHM242H5 and CHM243H5
3. At least 2.0 credits from: BIO320H5 or BIO347H5 or BIO354H5 or BIO361H5 or BIO372H5 or BIO404H5 or BIO408H5 or BIO410H5 or BIO411H5 or BIO412H5 or BIO414H5 or BIO417H5 or BIO419H5 or BIO422H5 or **BIO429H5** or BIO481Y5 or CHM361H5 or CHM362H5 or JCB487Y5 or PHY332H5 or PHY333H5 or PSY290H5 or PSY395H5
4. 1.0 additional BIO credit taken at U of T Mississauga campus

No substitute statistics course will be allowed for BIO360H5. Students may take no more than 2.0 credits combined in ROP, Internship Program, or Individual Project/Thesis courses at the 300/400-level for credit toward their Biology program. Students must consult with the Undergraduate Advisor before enrolling in any St. George course that they wish to use for credit toward any Biology program.

Rationale: Adding newly proposed BIO259H5 course to program completion requirements.

Resource Implications:

Ecology and Evolution - Specialist (Science)

Completion Requirements:

14.5 credits are required, including at least 6.0 credits at the 300/400 level, of which **1.0 1.5** credits must be at the 400 level.

First Year:

1. BIO152H5 and BIO153H5
2. CHM110H5 and CHM120H5
3. (MAT132H5 and MAT134H5) or MAT134Y5 or (MAT135H5 and MAT136H5) or MAT135Y5 or MAT137Y5
4. 1.0 credit from: CLA201H5 or ENV100Y5 or ERS101H5 or PHY136H5 or PHY137H5 or PSY100Y5 or WRI173H5 or WRI307H5

Note: (MAT132H5 and MAT134H5) - Calculus for Life Sciences is highly recommended.

Second Year:

1. BIO202H5 and BIO203H5 and BIO205H5 and BIO206H5 and BIO207H5 and **BIO259H5** or STA215H5
* **STA215H5 will no longer be accepted as an appropriate course for this program AFTER 2022-2023 Academic year. Beginning 2023-2024 Academic year all students will be required to complete BIO259H5 as the statistics course for this program.**

Third and Fourth Years:

1. BIO313H5 and BIO342H5 and BIO360H5 and BIO443H5
2. 1.0 credit from courses in organismal biology: BIO325H5 or BIO326H5 or BIO335H5 or BIO338H5 or BIO339H5 or BIO354H5 or BIO356H5 or (BIO370Y5 or BIO371H5)
3. 0.5 credit from field courses: BIO416H5 or other 2-week Ontario Universities Program in Field Biology (OUPFB) Courses
4. 2.0 credits from core ecology/evolutionary biology courses: BIO311H5 or BIO330H5 or BIO331H5 or BIO333H5 or BIO341H5 or BIO361H5 or BIO373H5 or BIO376H5 or BIO378H5 or BIO406H5 or **BIO427H5** or BIO445H5 or BIO464H5 or GGR312H5 or JBH471H5
5. 1.0 credit from other UTM biology courses at the 300/400 level.
6. 1.0 credit from related courses from other departments: MAT212H5 or MAT222H5 or MAT232H5 or STA302H5 or STA322H5 or GGR227H5 or GGR278H5 or GGR305H5 or GGR307H5 or GGR309H5 or GGR311H5 or from courses listed in #4, #5 and #6

Rationale: Currently the calendar mentions that of the 14.5 credits required to complete the program, 1.5 must credits be at the 400 level. The only 400 level courses that are mandatory for the program are BIO416H5 & BIO443H5. This should be changed to reflect that 1.0 credits must be at the 400 level (not 1.5 at the 400 level).

Resource Implications:

Molecular Biology - Specialist (Science)

Completion Requirements:

First Year:

1. BIO152H5 and BIO153H5
2. CHM110H5 and CHM120H5
3. (MAT132H5 and MAT134H5) or MAT134Y5 or (MAT135H5 and MAT136H5) or MAT135Y5 or MAT137Y5
4. 1.0 credit from: CLA201H5 or ENV100Y5 or (ERS101H5 or ERS120H5) or PHY136H5 or PHY137H5 or PSY100Y5 or WRI173H5 or WRI307H5

Note: (MAT132H5 and MAT134H5) - Calculus for Life Sciences is highly recommended.

Second Year:

1. BIO206H5 and BIO207H5
2. CHM242H5 and CHM243H5

3. BIO259H5 or STA215H5

4. 1.0 credit from BIO202H5 or BIO203H5 or BIO205H5

* STA215H5 will no longer be accepted as an appropriate course for this program AFTER 2022-2023 Academic year. Beginning 2023-2024 Academic year all students will be required to complete BIO259H5 as the statistics course for this program.

Third Year:

1. BIO314H5 and BIO315H5 and BIO342H5 and BIO360H5 and BIO370Y5 and BIO372H5

2. CHM361H5 and CHM362H5 and CHM372H5 and CHM373H5

3. 0.5 credit from BIO304H5 or BIO310H5 or BIO341H5 or BIO347H5 or BIO362H5 or BIO368H5 or BIO374H5 or BIO375H5 or BIO380H5 or CHM347H5 or PHY332H5 or PHY333H5 or BCH335H1 or BCH340H1

Fourth Year:

1. BIO477H5 or BIO419H5**

2. 1.0 credit from BIO403H5 or BIO407H5 or BIO408H5 or BIO411H5 or BIO417H5 or BIO419H5 or BIO422H5 or BIO429H5 or BIO443H5 or BIO458H5 or BIO476H5 or BIO477H5 or BIO481Y5 or BCH441H1 or CHM444H5 or CHM462H5 or CHM489Y5 or JBC472H5 or JCB487Y5 or JCP463H5 or CSB435H1 or CSB450H1 or CSB459H1 or CSB472H1 or CSB473H1 or CSB474H1 or CSB475H1 or MGY425H1 or MGY428H1 or MGY440H1 or MGY445H1 or MGY451H1 or MGY452H1 or MGY470H1 or MIJ485H1

** Please note that both BIO477H5 and BIO419H5 can be taken, but each will be counted only once in the total 1.5 credits required in this section.

Rationale: Adding newly proposed BIO259H5 course to program completion requirements.

Resource Implications:

3 New Courses:

BIO259H5: Introduction to Biological Data

Contact Hours: *Lecture:* 24 / *Practical:* 24 / *Tutorial:* 12

Description:

This course introduces students to the exploration and analysis of biological data through computation. Students will learn to import biological datasets, parse and manipulate the data, and develop an intuition for basic statistical thinking through practical exercises and lectures.

Prerequisites: BIO152H5 and BIO153H5

Corequisites:

Exclusions: BIOB20H3

Recommended Preparation:

Rationale: The scale and scope of biological data has escalated our reliance on computational tools for sharing and analyzing data. In line with our self-study, independent external evaluation emphasized the need to offer more computational biology programming in our curriculum. We began last year with building first-year numeracy modules in BIO152 & BIO153 to introduce students to computational biology. This course builds on these first-year numeracy modules by applying computational skills to advanced statistical techniques. We will provide practical guidance for students to learn computational programming and statistical testing with a strong emphasis on the analysis of biological datasets. Students who complete this course will also be prepared for the advanced statistics courses in the department (BIO360 and BIO361), and two new upper-level proposed machine learning courses BIO427H5 and BIO429H5. The course will significantly benefit students' undergraduate experiences and better prepare them for the growing scope of biological data.

Resources: Resource Form Submitted

Description:

Biology has become a data-driven science with the arrival of complex datasets. Extracting information from these large-scale experiments requires approaches that unify statistics and computer science. The course will focus on strengthening mathematical intuition on core topics such as hypothesis testing and statistical models while connecting these to machine learning.

Prerequisites: BIO360H5

Corequisites:

Exclusions: BIO429H5 or CSC311H1 or CSC311H5 or CSC413H1 or CSC413H5 or CSCC11H3 or STA314H1 or STA314H5

Recommended Preparation: BIO361H5

Rationale: This course builds on the new biology computational curriculum to introduce students to statistical techniques and computation throughout the whole undergraduate experience. This course reflects the strategy devised by the Biology department in response to the major need, as evaluated through a self-study and through external evaluation, to develop computational skillset in biology at the undergraduate level. The proposed course is an advanced theoretical exploration of these missing topics through the lens of biological data. The course focuses on the basics of machine learning and data modeling, where students will learn to understand what makes machine learning work and where it can be applied in biology.

Resources:

BIO429H5: Data analysis in Neurobiology

Contact Hours: *Lecture:* 24 / *Practical:* 12

Description: This course explains the fundamental principles of biological data analysis by focusing on neuroscience datasets. Students will learn methods for sampling data, testing hypotheses, multiple linear regression, PCA, clustering through both lectures and practical exercises. These methods will be discussed in the context of current research in understanding brain functions.

Prerequisites: BIO360H5 or permission of instructor

Corequisites:

Exclusions: BIO427H5 or CSC311H1 or CSC311H5 or CSC413H1 or CSC413H5 or CSCC11H3 or STA314H1 or STA314H5

Recommended Preparation:

Rationale: To facilitate the transition to a professional career or research, it is important that students are exposed to computational skills and concepts throughout their undergraduate years. This was identified as important in the self-study conducted by the UTM Department of Biology and has led to multiple numeracy modules throughout the undergraduate years to facilitate learning: first year numeracy modules BIO152 and BIO153, new BIO2xx that introduces statistical concepts through computer simulations, BIO360 and BIO361, and two 4th year advanced methods courses.

Resources:

19 Course Modifications:

BIO152H5: Introduction to Evolution and Evolutionary Genetics

Prerequisites: Grade 12 SBI4U ~~12U~~ Biology (minimum grade of 70%) Note: Although 12U CHM and MAT are not prerequisites for BIO152H5, students intending to pursue a major or any specialist program in Biology must note that CHM110H5 and CHM120H5 and (MAT134Y5 or MAT135Y5 or MAT137Y5) are requirements for these programs.

Rationale: The Biology department would like to maintain a certain level of knowledge and experience based on high school courses and performance, which is reflected in our regular cut-off for acceptance to Life Sciences. Students who have not met Biology admission cut-offs but have accepted alternate offers to Psychology or Social Sciences can currently still enrol into first year Biology courses. These students often have little (Psychology requires a minimum of 50% Grade 12 Biology) or no (Social Science does not require Bio from High School - or does not check for it) background in Biology and consequently these students are struggling in first year Biology courses and continue to have difficulties in keeping up with course contents. Setting a minimum grade for High School Grade 12 Biology would alleviate this issue somewhat. It is also in line with the prerequisites for first-year CHM110H5 course.

Resources:

BIO200H5: Introduction to Pharmacology: Pharmacokinetic Principles

Prerequisites:

Previous:

New: BIO152H5 and BIO153H5 and CHM110H5 and CHM120H5

Corequisites:

Previous: (Recommended): BIO206H5

New:

Recommended Preparation:

Previous: CHM211H5 and CHM242H5 and JCP221H5

New:

Rationale: The instructor currently teaching this course feels that the course needs prerequisites in place in order that students have similar background knowledge before enrolling in the course. The instructor felt that the corequisite of BIO206 and the recommended prep courses was not necessary with the addition of first year chemistry courses.

Resources:

BIO207H5: Introductory Genetics

Prerequisites: BIO152H5 and BIO153H5 and BIO206H5

Corequisites:

Previous: BIO153H5

New:

Rationale: Foundational knowledge and skills gained in BIO153H5 are integral to student success in BIO207H5 and will allow the instructor to delve deeper into BIO207H5 course content, rather than reviewing background knowledge from BIO153H5.

Resources:

BIO311H5: Landscape Ecology

Prerequisites: BIO205H5 and (BIO259H5 or STA215H5) and permission of instructor * STA215H5 will no longer be accepted as an appropriate prerequisite course AFTER 2022-2023 Academic year. Beginning 2023-2024 Academic year all students will be required to complete BIO259H5 as the statistics prerequisite course. ~~instructor~~

Corequisites:

Previous: BIO360H5 or STA215H5 or STA220H5

New:

Recommended Preparation:

Previous:

New: BIO360H5

Rationale: Addition of new Biology numeracy course to prerequisites. Instructor no longer felt corequisites were suitable for the course. Change in recommended prep course is a course the instructor currently teaches.

Resources:

BIO313H5: Field Methods and Experimental Design in Ecology

Prerequisites: (BIO205H5 or BIO259H5 or STA215H5 or PSY201H5) or equivalent * PSY201H5 and STA215H5 will no longer be accepted as an appropriate prerequisite course AFTER 2022-2023 Academic year. Beginning 2023-2024 Academic year all students will be required to complete BIO259H5 as the prerequisite statistics course.

Corequisites:

Previous: (STA215H5 or PSY201H5) or equivalent

New:

Rationale: Instructor has decided that the previous co-requisites should be prerequisites in order for students to have the knowledge needed to be successful in this course.

Resources:

BIO320H5: Sensory and Cognitive Ecology

Description:

The acquisition and transduction of environmental information will be explored in the context of decision making and ~~adaptive behaviour~~ ~~behavioural output~~. This course will focus on the form and function of visual, auditory, tactile, and chemical senses and signals, ~~and information transfer between sources~~ and ~~animal communication~~ ~~writ large~~ ~~receivers~~. Post-acquisition, cognitive processes concerned with learning and memory will also be discussed. A comparative approach will be taken throughout to examine the ways that different animals and animal groups rely on different sources of information and a diverse variety of sensory and cognitive mechanisms. All topics will be covered in the context of species-specific ecology and evolution.

Rationale: The instructor teaches BIO320H5 and BIO405H5. He is changing the title and topics taught in both courses and as BIO320 is being used as one of the prerequisites for BIO405, both descriptions will need to be changed slightly.

Resources:

BIO324H5: Plant Biochemistry

Contact Hours:

Previous: Lecture: 36

New: Lecture: 36 / **Tutorial:** 12

Rationale: The course is largely a "chalk-talk" lecture format. Based on student evaluations students have suggested that a tutorial hour in addition to the lecture hour, should be added so that students can develop organic chemistry skills related to drawing pathways. They have also commented on large amount of material covered in lecture lacks a review session. The tutorial would be dedicated to reviewing course material. Instructor is willing to teach both the lecture and tutorial sections so no additional TA resources needed.

Resources:

BIO333H5: Freshwater Ecology

Prerequisites: BIO205H5 and CHM110H5 and CHM120H5

Corequisites:

Previous: BIO205H5

New:

Rationale:

Instructor has confirmed the previous corequisite is required knowledge for the course so it will now be a pre-requisite.

Resources:

BIO342H5: Evolutionary Biology

Recommended Preparation: (BIO259H5 or BIO360H5 or STA215H5)(strongly recommended)

Rationale: To introduce the new STATS BIO259 course, as this will be the preferred STATS course for all majors and specialists in the department going forward.

Resources:

BIO356H5: Major Features of Vertebrate Evolution

Prerequisites:

Previous:

New: (BIO208H5 and BIO209H5) or BIO210Y5Y

Corequisites:

Previous: (BIO208H5 and BIO209H5) or BIO210Y5

New:

Recommended Preparation: BIO259H5 or BIO360H5 or STA215H5

Rationale: Instructor has decided that the co-requisites should be prerequisites in order that students have the required knowledge before enrolling into this course.

Resources:

BIO360H5: Biometrics I

Prerequisites: BIO259H5 or STA215H5 * STA215H5 will no longer be accepted as an appropriate prerequisite course AFTER 2022-2023 Academic year. Beginning 2023-2024 Academic year all students will be required to complete BIO259H5 as the statistics prerequisite course.

Rationale: Instructor would like to add the new statistics course to the prerequisites.

Resources:

BIO372H5: Molecular Biology

Contact Hours:

Previous: *Lecture:* 36

New: *Lecture:* 24 / *Tutorial:* 12

Description:

Previous: The organization, storage and transmission of genetic information. Structural features of nucleic acids and genes. DNA replication and repair. Transcription mechanisms and regulation. The genetic code and protein synthesis. Introduction to mechanisms of recombination. Selected topics in biotechnology (mutagenesis, gene manipulation, PCR). [36L]

New: This course provides an overview of the field of molecular biology, including DNA replication, DNA repair, homologous recombination, genome structure, chromatin regulation, transcription cycle, RNA splicing, translation, and genetic code. The course will enable students to learn the fundamental concepts of molecular biology and master critical thinking and problem-solving in the field of molecular biology.

Prerequisites: BIO206H5 and BIO207H5 and CHM242H5

Corequisites:

Previous: BIO207H5

New:

Rationale: The course only provided lectures to overview topics. Instructor would like to adjust teaching hours to include tutorials in order to discuss and evaluate the topics using literature, quizzes and assignments. Students will gain the ability of critical thinking and problem-solving. The change in course description is currently how the course is being taught. BIO207 is preferred as a prerequisite rather than a corequisite.

Resources:

BIO375H5: Introductory Medical Biotechnology

Prerequisites: Completion of 2.0 credits in Biology, plus(BIO259H5 or BIO360H5 or STA215H5 or STA220H5 or PSY201H5)

Rationale: Instructor wanted to add the new statistics course.

Resources:

BIO403H5: Developmental Neurobiology

Exclusions:

Previous:

New: BIO483H5 (Winter 2021)

Rationale: The instructor was to go on sabbatical leave in 2021 but (due to Covid)cancelled the leave. He had to teach a course and so decided to teach a special topics course (BIO483). The topics covered in BIO483 and his BIO403 have significant overlap in course content.

Resources:

BIO405H5: Evolutionary Perspectives on Cognition and Behaviour

Title: Evolutionary Perspectives on ~~Cognition and~~ Behaviour

Abbreviated Title: Evol ~~Perspectives~~ ~~Perspec~~ on ~~Cog &~~ Behav

Rationale: Instructor is changing title and description in BIO320 & BIO405. BIO320 will cover sensory ecology and cognitive ecology, whereas dropping the cognitive aspect in the title of BIO405 will imply less overlap with BIO320. The change in description is a better description for students as to how the course will be taught going forward.

Resources:

BIO406H5: Current Topics in Ecology and Evolution

Prerequisites: BIO205H5 and (BIO259H5 or STA215H5 or BIO360H5)* STA215H5 will no longer be accepted as an appropriate prerequisite course AFTER the 2022-2023 Academic year. Beginning in the 2023-2024 Academic year all students will be required to complete BIO259H5 or BIO360H5 as the statistics prerequisite course.

Rationale: To introduce the new STATS BIO259 course, as this will be the preferred STATS course for all majors and specialists in the department going forward.

Resources:

BIO407H5: Behaviour Genetics

Prerequisites: BIO207H5 and BIO318Y5 and (BIO259H5 or BIO360H5 or STA215H5)* STA215H5 will no longer be accepted as an appropriate prerequisite course AFTER 2022-2023 Academic year. Beginning 2023-2024 Academic year all students will be required to complete BIO259H5 or BIO360H5 as the statistics prerequisite course.

Corequisites:

Previous: BIO318Y5 or PSY252H5

New:

Rationale: Instructor has decided to remove the co-requisites and make them prerequisites. We have removed PYS252H5 from the list as this course was last offered in 2014.

Resources:

BIO419H5: Mammalian Gene Regulation

Title: Molecular Aspects of ~~Mammalian~~ Gene Regulation

Abbreviated Title: Molecular ~~Mammalian~~ Gene Regulation

Description:

Gene expression is regulated during development in multicellular organisms. The study of gene regulation is tightly linked to our understanding of cell types and functions in ~~developmental biology~~. This course provides an overview of the molecular aspects field of ~~mammalian~~ gene expression regulation, including transcription, regulatory RNAs, chromatin regulation, and ~~genomic regulation~~ ~~genomics~~. Students will read, critique, and present recently published research articles on gene regulation in eukaryotes ~~mammalian development~~. [24L, 12S]

Prerequisites: (BIO207H5 and BIO372H5) or permission of instructor

Exclusions: BIO484H5 (Fall ~~Fall~~ 2018) or MGY420H1

Rationale: Currently the course focuses on an overview of the regulation of gene expression in mammals. The instructor would like to focus more on molecular biology aspects of gene regulation in various organisms such as yeast, C.elegans,

Drosophila, mouse and human. With the change in title and description the students will learn the concepts of molecular mechanisms of gene regulation in various eukaryotic organism.

Resources:

BIO443H5: Phylogenetic Principles

Recommended Preparation: BIO259H5 ~~STA215H5 or PSY201H5~~ or BIO314H5 or BIO360H5 or STA215H5 or PSY201H5

Rationale: To introduce the new STATS BIO259 course, as this will be the preferred STATS course for all majors and specialists in the department going forward.

Resources:

3 New Courses:

IMI299H5: Research Opportunity Program

Description:

This course provides a rewarding opportunity for students in their second year to work in the research project of a professor in return for IMI299H5 course credit. Based on the nature of the project, projects may satisfy the Sciences, Social Sciences, or Humanities distribution requirement. Students enrolled have an opportunity to become involved in original research, learn research methods and share in the excitement and discovery of acquiring new knowledge. Participating faculty members post their project descriptions for the following summer and fall/winter sessions in early February and students are invited to apply in early March. See [Experiential and International Opportunities](#) for more details.

Prerequisites:**Corequisites:**

Exclusions: Concurrent enrolment in IMI399H5 or IMI499H5.

Recommended Preparation:**Rationale:**

The course enables students to become involved in original research supervised by a faculty member at an advanced level. Experience with working hands-on with different forms of data, learning research methods, and communicating discoveries are crucial for acquiring new knowledge and developing critical thinking skills necessary for future professionals.

Resources: None.

IMI399H5: Research Opportunity Program

Description:

This course provides a rewarding opportunity for students in their third or fourth year to undertake relatively advanced work in the research project of a professor in return for IMI399H5 course credit. Based on the nature of the project, projects may satisfy the Sciences, Social Sciences, or Humanities distribution requirement. Students enrolled have an opportunity to become involved in original research, learn research methods and share in the excitement and discovery of acquiring new knowledge. Participating faculty members post their project descriptions for the following summer and fall/winter sessions in early February and students are invited to apply in early March. See [Experiential and International Opportunities](#) for more details.

Prerequisites: 8.0 credits and permission of instructor

Corequisites:

Exclusions: Concurrent enrolment in IMI299H5 or IMI499H5

Recommended Preparation:**Rationale:**

The course enables students to become involved in original research supervised by a faculty member at an advanced level. Experience with working hands-on with different forms of data, learning research methods, and communicating discoveries are crucial for acquiring new knowledge and developing critical thinking skills necessary for future professionals.

Resources: None.

IMI499H5: Independent Study

Description:

This course provides a rewarding opportunity for students in their fourth year to undertake relatively advanced work in the research project of a professor in return for IMI499H5 course credit. Based on the nature of the project, projects may satisfy the Sciences, Social Sciences, or Humanities distribution requirement. Students enrolled have an opportunity to become involved in original research, learn research methods and share in the excitement and discovery of acquiring new knowledge. Participating faculty members post their project descriptions for the following summer and fall/winter sessions in early February and students are invited to apply in early March. See [Experiential and International Opportunities](#) for more details.

Prerequisites: 14.0 credits and permission of instructor

Corequisites:

Exclusions: Concurrent enrolment in IMI299H5 or IMI399H5

Recommended Preparation:**Rationale:**

The course enables students to become involved in original research supervised by a faculty member at an advanced level. Experience with working hands-on with different forms of data, learning research methods, and communicating discoveries are crucial for acquiring new knowledge and developing critical thinking skills necessary for future professionals.

Resources: None.

Anthropology (UTM), Department of

2 Minor Program Modifications:

Anthropology - Major (Science)

Completion Requirements:

7.5 credits are required.

First Year: ANT101H5 and ANT102H5 and ISP100H5

Second Year:

1. ANT200H5 and ANT201H5 and ANT202H5 and ANT203H5 and ANT220H5
2. ANT204H5
3. ANT206H5 or ANT207H5

Higher Years:

2.5 additional ANT credits, of which at least 2.0 must be ANT science courses. At least 1.0 of the 2.5 credits must be at the 300 level, including 0.5 credit at the 400 level.

NOTE: HSC401H5, HSC402H5, HSC403H5, ~~and~~ HSC404H5 and HSC405H5 are science credits and can be used to fulfill ANT program requirements.

Rationale:

For the two science programs (Major and Specialist), we currently have a notation at the bottom which only includes 2 out of 5 possible HSC science courses. In consultation with the ANT curriculum committee members and the Chair, we reviewed all the HSC science 400 level courses and decided that all 5 courses: 401, 402, 403, 404 and 405 are acceptable to be used towards our science ANT Major and Specialist programs.

Resource Implications:

Anthropology - Specialist (Science)

Completion Requirements:

10.5 credits are required.

First Year: ANT101H5, ANT102H5, ISP100H5

Second Year:

1. ANT200H5, ANT201H5, ANT202H5, ANT203H5, ANT220H5
2. ANT204H5
3. ANT206H5 or ANT207H5

Higher Years:

5.5 additional ANT credits, of which at least 4.0 must be ANT science courses. At least 3.5 of the 5.5 credits must be at the 300/400 level, including 1.0 credit at the 400 level.

NOTE: HSC401H5, HSC402H5, HSC403H5, ~~and~~ HSC404H5 and HSC405H5 are science credits and can be used to fulfill ANT program requirements.

Rationale:

For the two science programs (Major and Specialist), we currently have a notation at the bottom which only includes 2 out of 5 possible HSC science courses. In consultation with the ANT curriculum committee members and the Chair, we

reviewed all the HSC science 400 level courses and decided that all 5 courses: 401, 402, 403, 404 and 405 are acceptable to be used towards our science ANT Major and Specialist programs.

Resource Implications:

3 New Courses:

ANT405H5: Behind Bars: Anthropology of Institutions and Confinement

Contact Hours: *Seminar:* 24

Description:

This course explores confinement, institutions, and incarceration from a broad anthropological perspective. Bioarchaeological, archaeological, and ethnographic research on institutions (e.g., asylums, poorhouses, prisons) will be critically examined. The goal of the course is to provide students with a complex understanding of institutionalization through time and how health vulnerabilities are created and recreated.

Prerequisites: ANT200H5 and ANT220H5

Corequisites:

Exclusions:

Recommended Preparation:

Rationale:

A newly hired Assistant Professor (Madeleine Mant) would like to propose this new course to teach since it is related to her research. As well, this course would increase the available course offerings under the Anthropology of Health focus.

Resources: Resource Form Submitted

ANT497H5: Advanced Independent Study

Contact Hours:

Description:

This independent study course is designed to offer students advanced supervised reading, research and planning for a publishable report on an anthropological topic not covered in other courses, or covered only briefly. Students who wish to pursue this option with a specific faculty member should approach the faculty member early - before the start of the academic term - to negotiate the research and study program.

Prerequisites: Permission of Instructor and Permission of Department

Corequisites:

Exclusions:

Recommended Preparation:

Rationale:

Adding this course to match the numbering convention of the 300 level independent study & ROP courses. This will allow us to introduce a 400-level ROP option. Not necessary to include exclusions of previous course codes (was 498) since students are allowed to repeat an independent study course for credit. They are very individual so this will unlikely be an issue. As well, in checking who already took independent study courses in the past, we also check to see if they have already graduated (or will graduate before the fall 2022 term).

Resources: Resource Form Submitted

ANT497Y5: Advanced Independent Study

Contact Hours:

Description:

This independent study course is designed to offer students advanced supervised reading, research and planning for a publishable report on an anthropological topic not covered in other courses, or covered only briefly. Students who wish to pursue this option with a specific faculty member should approach the faculty member early - before the start of the academic term - to negotiate the research and study program.

Prerequisites: Permission of Instructor and Permission of Department

Corequisites:

Exclusions:

Recommended Preparation:

Rationale:

Adding this course to match the numbering convention of the 300 level independent study & ROP courses. This will allow us to introduce a 400-level ROP option. Not necessary to include exclusions of previous course codes (was 498) since students are allowed to repeat an independent study course for credit. They are very individual so this will unlikely be an issue. As well, in checking who already took independent study courses in the past, we also check to see if they have already graduated (or will graduate before the fall 2022 term).

Resources: Resource Form Submitted

10 Course Modifications:

ANT214H5: Anthropology of Food and Nutrition

Description:

This course explores human food use and nutrition from a broad anthropological perspective. It examines archaeological and osteological evidence of dietary patterns of human ancestors and examines contemporary phenomena such as the preference for sweetness and lactase persistence that are the legacy of ancestral adaptations. It explores significant food revolutions 'revolutions', from the origins of agriculture to the relatively recent phenomenon of biotechnological food production. It uses a wide range of theoretical approaches from biological and looks at both sociocultural anthropology to understand the positive and negative effects of these changes on patterns of human growth food production, distribution and health consumption observed today. The goal of the course is to provide students with a basic broad understanding of nutrition science that is contextualized in contemporary the many anthropological debates about approaches to the costs study of changing food systems and nutrition.[24L]

Rationale: Updating the description for accuracy.

Resources:

ANT220H5: Introduction to the Anthropology of Health

Description:

This course introduces students to the many strategies diverse approaches used by anthropologists use to understand patterns of examine human health and disease in human populations through time illness. It will serve as an entry point into the Anthropology of Health focus and will be a prerequisite for later courses in Growth and Development Archaeological, Infectious Disease biological, sociocultural and medical anthropology examine health and the Advanced Seminar disease in the Anthropology past and present populations using a wide variety of Health theoretical and methodological tools. In this course, the The concept of health is examined will be explored using bioarchaeology, biomedicine, medical anthropology, these various and epidemiology often complementary approaches. The course examines evolutionary, epigenetic, and life history approaches goal is to understanding chronic disease risk in human populations, culminating provide students with a broad theoretical foundation for further study in an investigation of the role anthropology of poverty and social inequality on disease burden health. Although the course is designed as an introduction to the Health focus [24L], it is suitable for students seeking training in pre-health disciplines and is open to all students possessing the necessary prerequisites.[24L]

Rationale: Updating the description for accuracy.

Resources:

ANT337H5: Anthropology of Growth and Development

Description:

This course examines growth and development from a variety of theoretical perspectives. It begins with an examination of the fundamental biological principles of growth and how these are expressed throughout evolution. It explores the evolution of growth patterns among primates and hominins and compares patterns of growth among the living primates. The course examines human growth and development throughout infancy, childhood, and adolescence and explores the influence of genetic, epigenetic, and endocrine processes on the plasticity of human growth that ultimately produces the variability observed in our species. The goal of the course is to provide students with a complex understanding of how evolutionary and environmental processes interact in the production of growth and health in human populations.[24L]

Rationale: Updating the description for accuracy.

Resources:

ANT338H5: Laboratory Methods in Biological Anthropology

Description:

Previous: Recommended for those who may specialize in biological anthropology. Students will be introduced to the process of conducting research, including selected laboratory procedures and how they are used to generate and/or analyze data. Students conduct anthropometric assessment of growth and body size, nutrition assessment through 24-hour dietary recall, and assessment of physical activity and sleep using triaxial accelerometry. These biometric techniques have numerous applications in both research and clinical settings. Students in this course will develop applied skills in bioanthropological assessment that can be used in the fields of anthropology, population health, public health nutrition, and human development. [12L, 24P]

New: This lab methods course focuses on laboratory techniques used by biological anthropologists to assess growth, health, and risk of chronic disease in human populations. In this course students will gain practical, hands-on experience in nutrition assessment, anthropometry, physical activity and sleep assessment, and human energy expenditure. State-of-the-art instruments and software are employed, ensuring students gain valuable knowledge of data management and analysis using applications suitable in both clinical and research settings.

Rationale: Updating the description for accuracy.

Resources:

ANT341H5: Anthropology of Infectious Disease

Description:

Infection ~~is a significant area of study for anthropologists because it~~ is situated at the intersection of social and biological experience. This course examines why infectious disease occupies such a central position in our contemporary understanding of health. It examines the many theoretical and methodological approaches currently used to understand how humans experience infectious illness. Perspectives from bioarchaeology, demography, environmental anthropology, **medical history**, biocultural anthropology, and medical anthropology are used to examine the way epidemics and infections have been understood throughout human history and how those understandings continue to shape human perceptions of risk, the body and identity. Social inequality is a major focus of inquiry; the course explores how colonialism, **globalization** and injustice lead to significant and persistent health inequalities for many populations. ~~[24L]~~

Rationale: Updating the description for accuracy.

Resources:

ANT437H5: Advanced Seminar in the Anthropology of Health

Description:

This **course is the culmination of the undergraduate Anthropology of Health focus and aims to prepare students for workplace application and graduate study in a wide range of clinical and research domains. The course brings together diverse branches of biological investigation (human biology, nutrition, growth and development, chronic and communicable disease)** and undertakes a critical examination of theory and methods used in the study of human health. It traces the historical development of the powerful biomedical paradigm that dominates health research today and uses a critical lens to examine the systems used to measure and classify health and disease. It explores evolutionary and biological approaches to understanding human health by examining the concepts of adaptation and plasticity, genetic and epigenetic approaches, developmental origins and life history theories, social determinants of health, and critical medical anthropology. The course explores the profoundly influential role of social inequality on the production and reproduction of health in historical and contemporary populations. ~~[24S]~~

Rationale: Updating the description for accuracy.

Resources:

ANT498H5: Advanced Independent Study

Title: Advanced Independent ~~Reading Study~~

Description:

This independent ~~reading study~~ course is designed to offer students advanced supervised reading, ~~research and planning for a publishable report~~ on an anthropological topic not covered in other courses, or covered only briefly. Students who wish to pursue this option with a specific faculty member should approach the faculty member early - before the start of the academic term - to negotiate the ~~reading research and study~~ program.

Rationale: Renaming this course to match the numbering convention of the 300 level independent study courses. This will allow us to introduce a ANT499 ROP. Not necessary to include exclusions of previous course codes since students are allowed to repeat an independent study course for credit. They are very individual so this will unlikely be an issue. As well, in checking who already took independent study courses in the past, we also check to see if they have already graduated (or will graduate before the fall 2022 term).

Resources:

ANT498Y5: Advanced Independent Study

Title: Advanced Independent ~~Reading Study~~

Description:

This independent ~~reading study~~ course is designed to offer students advanced supervised reading, ~~research and planning for a publishable report~~ on an anthropological topic not covered in other courses, or covered only briefly. Students who wish to pursue this option with a specific faculty member should approach the faculty member early - before the start of the academic term - to negotiate the ~~reading research and study~~ program.

Rationale: Renaming this course to match the numbering convention of the 300 level independent study courses. This will allow us to introduce a ANT499 ROP. Not necessary to include exclusions of previous course codes since students are allowed to repeat an independent study course for credit. They are very individual so this will unlikely be an issue. As well, in checking who already took independent study courses in the past, we also check to see if they have already graduated (or will graduate before the fall 2022 term).

Resources:

ANT499H5: Advanced Independent Research

Title: ~~Advanced Independent~~ Research ~~Opportunity Program~~

Description:

Previous: This independent research course is designed to offer students advanced supervised research and writing of a publishable report on an anthropological topic not covered in other courses, or covered only briefly. Students who wish to pursue this option with a specific faculty member should approach the faculty member early - before the start of the academic term - to negotiate the research and writing program.

New: This course provides senior undergraduate students who have developed some knowledge of a discipline and its research methods an opportunity to work in the research project of a professor in return for course credit. Students enrolled have an opportunity to become involved in original research, develop their research skills and share in the excitement and discovery of acquiring new knowledge. Based on the nature of the project,

projects may satisfy the Sciences or Social Sciences distribution requirement. Participating faculty members post their project descriptions for the following summer and fall/winter sessions in early March. See [Experiential and International Opportunities](#) for more details.

Rationale: Changing the name and description to match the numbering conventions of the 300 level ROP courses. Not necessary to include exclusions of previous course codes since students are allowed to repeat an independent study course for credit. They are very individual so this will unlikely be an issue. As well, in checking who already took independent study courses in the past, we also check to see if they have already graduated (or will graduate before the fall 2022 term).

Resources:

ANT499Y5: Advanced Independent Research

Title: ~~Advanced Independent~~ Research Opportunity Program

Description:

Previous: This independent research course is designed to offer students advanced supervised research and writing of a publishable report on an anthropological topic not covered in other courses, or covered only briefly. Students who wish to pursue this option with a specific faculty member should approach the faculty member early - before the start of the academic term - to negotiate the research and writing program.

New: This course provides senior undergraduate students who have developed some knowledge of a discipline and its research methods an opportunity to work in the research project of a professor in return for course credit. Students enrolled have an opportunity to become involved in original research, develop their research skills and share in the excitement and discovery of acquiring new knowledge. Based on the nature of the project, projects may satisfy the Sciences or Social Sciences distribution requirement. Participating faculty members post their project descriptions for the following summer and fall/winter sessions in early March. See [Experiential and International Opportunities](#) for more details.

Rationale: Introducing a 400-level ROP option. Not necessary to include exclusions of previous course codes since students are allowed to repeat an independent study course for credit. They are very individual so this will unlikely be an issue. As well, in checking who already took independent study courses in the past, we also check to see if they have already graduated (or will graduate before the fall 2022 term).

Resources:

2 Minor Program Modifications:

Geography - Major (Science)

Completion Requirements:

8.0 credits and 8 Field Days are required.

First Year: 2.0 credits:

- GGR111H5 and GGR112H5
- 1.0 credit from BIO152H5 or BIO153H5 or CHM110H5 or CHM120H5 or ERS101H5 or ISP130H5 or MAT132H5 or MAT134H5 or MAT135H5 or MAT136H5 or MAT137Y5 or PHY100H5 or PHY136H5 or PHY137H5

Second Year: 2.5 credits:

- GGR276H5
- 1.5 credits from GGR201H5 or GGR214H5 or GGR217H5 or GGR227H5
- 0.5 credit from GGR202H5 or GGR207H5 or GGR208H5 or GGR209H5 or GGR210H5 or GGR265H5

Third Year: 3.0 credits:

- 2.5 credits from GGR304H5 or GGR305H5 or GGR307H5 or GGR309H5 or GGR315H5 or GGR316H5 or GGR317H5 or GGR338H5 or GGR374H5 or GGR377H5 or GGR379H5 or GGR383H5 or GGR384H5 or JGE378H5
- 0.5 additional credit from the list above or from the following: GGR311H5 ~~or GGR312H5~~ or GGR321H5 or GGR322H5 or GGR335H5 or GGR337H5 or GGR372H5 or GGR375H5 or GGR376H5

Fourth Year: 0.5 credit :

- 0.5 credit from GGR404H5 or GGR406H5 or GGR407H5 or GGR417Y5 or GGR479H5 or GGR484H5 or JEG400Y5

Field Days: 8 days:

Eight days accumulated either through a geography field course and/or through geography courses with field day components as indicated in course descriptions.

ROP/Project courses: Maximum 2.0 credits:

Students may take no more than 2.0 credits combined in ROP, individual project courses, or thesis courses at the 300/400 level for credit toward a Geography Major program.

Description of Proposed Changes:

GGR312H5 was retired in 2018.

Rationale: This course no longer exists.

Resource Implications:

Geography - Specialist (Science)

Completion Requirements:

12.0 credits and 8 Field Days are required.

First Year: 3.0 credits:

- GGR111H5 and GGR112H5
- 2.0 credits from BIO152H5 or BIO153H5 or CHM110H5 or CHM120H5 or ERS101H5 or ISP130H5 or MAT132H5 or MAT134H5 or MAT135H5 or MAT136H5 or MAT137Y5 or PHY100H5 or PHY136H5 or PHY137H5

Second Year: 3.0 credits:

- GGR276H5 and GGR278H5

- 1.5 credits from GGR201H5 or GGR214H5 or GGR217H5 or GGR227H5
- ~~0.5 credit from GGR272H5 or GGR278H5~~
- 0.5 credit from GGR202H5 or GGR207H5 or GGR208H5 or GGR209H5 or GGR210H5 or GGR265H5 or GGR288H5

Third Year: 4.5 credits:

- 3.5 credits from GGR304H5 or GGR305H5 or GGR307H5 or GGR309H5 or GGR315H5 or GGR316H5 or GGR317H5 or GGR338H5 or GGR374H5 or GGR377H5 or GGR379H5 or GGR383H5 or GGR384H5 or JGE378H5
- 1.0 credit from the list above or from the following: GGR311H5 or GGR312H5 or GGR321H5 or GGR322H5 or GGR335H5 or GGR337H5 or GGR372H5 or GGR375H5 or GGR376H5

Fourth Year: 1.5 credit:

- GGR417Y5 or JEG400Y5
- 0.5 credit from GGR404H5 or GGR406H5 or GGR407H5 or GGR479H5 or GGR484H5

Field Days: 8 days

Eight days accumulated either through a geography field course or through geography courses with field day components as indicated in course descriptions.

ROP/Project courses: Maximum 2.0 credits

Students may take no more than 2.0 credits combined in ROP, individual project courses, or thesis courses at the 300/400 level for credit toward a Geography Specialist program.

Description of Proposed Changes:

Removed GGR272H5 from list of options.

Rationale:

The course has been re-numbered GGR382H5

Resource Implications: none

1 Course Modifications:

GGR382H5: Digital Mapping and Principles of Cartography

Exclusions: GGR272H5, ~~GGR272H1~~

Recommended Preparation: GGR276H5 and ~~7~~ STA256H5

Rationale: GGR272H1 from St. George is not an equivalent to GGR382H5.

Resources: none

2 Retired Courses:

GGR378H5: Natural Hazards: Risks and Vulnerability

Rationale: GGR378H5 was replaced with JGE378H5 in 2014.

HHS200H5: Methodological Perspectives on the Biological and Social Determinants of Health

Rationale:

This course was supposed to be part of a collaborative program in health but we could not get all of the departments to agree/come on board.

3 Minor Program Modifications:

Neuroscience - Specialist (Science)

Completion Requirements:

11.5-12.0 credits are required, including at least 3.0 credits at the 300/400 level and 1.0 credit at the 400 level.

First Year: PSY100Y5; BIO152H5, BIO153H5; CHM110H5, CHM120H5; (MAT132H5, MAT134H5)/(MAT135H5, MAT136H5)/MAT134Y5/MAT135Y5/MAT137Y5/MAT157Y5

Second Year:

1. (PSY201H5, PSY202H5)/(STA220H5, STA221H5)/(STA215H5, BIO360H5) or equivalent
2. BIO202H5; BIO206H5; BIO207H5; PSY290H5
3. one of the following: PSY210H5, PSY270H5, PSY274H5, PSY280H5

Third Year: 1.0 credit from each of the following three areas:

- a. **Behavioural Neuroscience area:** BIO318Y5, BIO320H5, BIO328H5, PSY316H5, PSY318H5, PSY346H5, PSY352H5, PSY353H5, PSY354H5, PSY355H5, PSY369H5, **PSY385H5, PSY389H5**, PSY391H5, PSY392H5, PSY393H5, PSY395H5, PSY397H5, PSY398H5
- b. **Molecular/Cellular Biology area:** BIO314H5, BIO315H5, BIO341H5, BIO347H5, BIO372H5, BIO407H5, BIO476H5, PSY355H5, PSY392H5
- c. **Neurobiology area:** BIO304H5, BIO310H5, BIO380H5, BIO404H5, BIO409H5, PSY318H5, PSY346H5, PSY369H5, PSY393H5, PSY397H5

Fourth Year:

1. One seminar from the following: BIO403H5, BIO404H5, BIO406H5, BIO407H5, BIO408H5, **PSY472H5, PSY480H5**, PSY490H5, PSY495H5
2. One thesis/research project from the following: BIO481Y5, PSY400Y5, PSY403H5/PSY404H5/PSY405H5/PSY406H5/PSY499H5

NOTES:

1. In second year, students are encouraged to consider taking the following courses depending on their planned course of study:
 - BIO202H5 - required for several courses in the Neurobiology area.
 - PSY210H5 - required for several courses in the Behavioural Neuroscience area.
2. Students interested in taking PSY400Y5 in their last year are advised to take PSY309H5 in their third year.

Description of Proposed Changes:

Listing new proposed courses, PSY385H5 and PSY389H5 in course calendar.

Adding existing seminar courses, PSY472H5 and PSY480H5 to list of seminar courses

Rationale:

New courses proposals fit within our perception cluster of courses.

We have reviewed seminar courses and feel that there is sufficient neuroscience coverage to include in our list of seminar options.

Resource Implications: none

6.5-7.0 credits in Psychology are required, including 2.0 at the 300/400 level.

First Year: PSY100Y5

Higher Years:

1. PSY201H5/ECO220Y5/ECO227Y5/SOC350H5/STA215H5/STA218H5/STA220H5
2. PSY210H5, PSY290H5
3. one of the following: PSY270H5, PSY274H5, PSY280H5
4. one of the following: PSY220H5, PSY230H5, PSY240H5
5. 1.5 credits from the following courses: 0.5 credit must be taken from each group:
 - a. Biological Bases of Behaviour: PSY318H5, PSY346H5, PSY351H5, PSY352H5, PSY353H5, PSY354H5, PSY355H5, PSY362H5, PSY372H5, PSY391H5, PSY392H5, PSY393H5, PSY395H5, PSY397H5, PSY398H5; BIO304H5, BIO310H5, BIO318Y5, BIO328H5
 - b. Perception/Cognition/Communication: PSY312H5, PSY315H5, PSY316H5, PSY360H5, PSY362H5, PSY371H5, PSY372H5, PSY374H5, PSY376H5, PSY384H5, PSY385H5, PSY387H5, PSY393H5, PSY397H5
 - c. Developmental/Abnormal/Social/Personality: PSY310H5, PSY311H5, PSY312H5, PSY313H5, PSY314H5, PSY315H5, PSY316H5, PSY317H5, PSY318H5, PSY320H5, PSY321H5, PSY324H5, PSY325H5, PSY327H5, PSY328H5, PSY331H5, PSY333H5, PSY340H5, PSY341H5, PSY343H5, PSY344H5, PSY345H5, PSY346H5, PSY353H5
6. 1.5 additional credits in Psychology. At least 0.5 must be at the 300/400 level

NOTE: A single course can be used to satisfy only one Psychology program requirement.

Description of Proposed Changes:

Inclusion of new proposed course (PSY385) to 5b.

Rationale:

Proposed course fits within our perception cluster of courses

Resource Implications: none

Psychology - Specialist (Science)

Completion Requirements:

10.0-10.5 credits in Psychology are required.

First Year: PSY100Y5

Second Year:

1. PSY201H5 and PSY202H5 (or equivalent)
2. PSY210H5 and PSY290H5
3. PSY270H5 or PSY274H5 or PSY280H5
4. PSY220H5 or PSY230H5 or PSY240H5
5. 0.5 additional PSY credit at the 200-level

Third Year:

1. PSY309H5
2. One laboratory course from the following: PSY319H5 or PSY329H5 or PSY369H5 or PSY379H5 or PSY398H5
3. 3.0 credits from the following courses (with a min. 0.5 credit from each grouping):
 - a. **Biological Bases of Behaviour:** PSY318H5, PSY346H5, PSY351H5, PSY352H5, PSY353H5, PSY354H5, PSY355H5, PSY362H5, PSY372H5, PSY391H5, PSY392H5, PSY393H5, PSY395H5, PSY397H5, PSY398H5; BIO304H5, BIO310H5, BIO318Y5, BIO328H5
 - b. **Perception/Cognition/Communication:** PSY312H5, PSY315H5, PSY316H5, PSY360H5, PSY362H5, PSY371H5, PSY372H5, PSY374H5, PSY376H5, PSY384H5, PSY385H5, PSY387H5, PSY393H5, PSY397H5

c. **Developmental/Abnormal/Social/Personality:** PSY310H5, PSY311H5, PSY312H5, PSY313H5, PSY314H5, PSY315H5, PSY316H5, PSY317H5, PSY318H5, PSY320H5, PSY321H5, PSY324H5, PSY325H5, PSY327H5, PSY328H5, PSY331H5, PSY333H5, PSY340H5, PSY341H5, PSY343H5, PSY344H5, PSY345H5, PSY346H5, PSY353H5

Fourth Year:

1. PSY400Y5 or PSY403H5 or PSY404H5 or PSY405H5 or PSY406H5 or PSY499H5
2. 1.0 credit from the following courses: PSY402H5 or PSY410H5 or PSY415H5 or PSY420H5 or PSY430H5 or PSY435H5 or PSY440H5 or PSY442Y5 or PSY471H5 or PSY480H5 or PSY490H5 or PSY495H5 or BIO403H5 or BIO407H5 or STA441H5

NOTE: A single course can be used to satisfy only one Psychology program requirement.

Description of Proposed Changes:

Inclusion of new course proposal PSY389H5 to 2.

Inclusion of new course proposal PSY385H5 to 3B

Rationale:

New Perception courses fit well in perception cluster of courses

Resource Implications: none.

3 New Courses:

PSY330H5: The Basics of Measurement in Social and Personality Psychology

Contact Hours: *Lecture:* 36

Description:

In psychology, we often talk about people in relation to concepts like attachment, happiness, and need to belong. But, how do we actually measure these psychological constructs when we cannot see and touch them? Importantly, how can we be sure that research findings are based on good measurement practices and therefore seen as trustworthy? This course explores basic issues of psychometrics – the measurement of psychological constructs -- in social and personality psychology. We will read scholarly literature on psychometrics, discuss good practices for conceptualizing and assessing psychological constructs, and learn about how we can provide evidence for the validity and reliability of people's responses to measures. We will practice using analytic techniques that examine measurement properties. The student should leave the course with a practical "measurement toolbox" which will allow them to conduct their own psychometric analyses, and better evaluate measurement practices used in social and personality psychology.

Prerequisites: PSY201H5 (or equivalent)

Corequisites:

Exclusions:

Recommended Preparation:

Rationale:

Understanding the measurement of psychological constructs is foundational for conducting and evaluating research, but most students do not get exposed to this topic until graduate school, well after they have begun conducting their own research projects. This course will give students a basic understanding of psychometrics. The goal of the course is to give students highly sought after practical skills in conducting fundamental analyses that examine measurement properties, which they can then apply in future research endeavors and in their evaluation of current research across a variety of areas in psychology.

The proposed course would have PSY 201 as a prerequisite, because the course material will require some prior experience with conducting statistical analysis. This course would also fill a gap in the 300-level courses in the department, as there are presently no 300-level courses with a focus on psychological measurement

Resources: Resource Form submitted

Description:

How can understanding perception help to explain what we do in the world? In this course, we will consider questions from engineering and human factors through the lens of perceptual research, tackling the human side of design and engineering problems. Topics include driver behavior, interface design, data visualization and the perceptual and psychological foundations that dictate their success or failure.

Prerequisites: PSY280H5

Corequisites:

Exclusions:

Recommended Preparation:

Rationale:

Students often want to know how to apply what they have learned in other courses, particularly in perception, and the department currently offers no courses with an applied focus building on our existing offerings in perception. The course will introduce students to questions of human factors, that is, where engineering intersects with human behavior, but the course will be fundamentally grounded in perceptual and cognitive science, placing mechanism front and center. The goal of the course is to give students the tools to apply and generalize their knowledge of perception to real-world problems, based on a deep understanding of the capabilities and limitations of our perceptual abilities. This design will give students a broad foundation supporting further research and study in applied domains while they are at UTM and will provide useful background for a range of careers after graduation (e.g., user experience and user interface research, human factors research). This course builds directly on new expertise in the department, as Dr. Wolfe's and Dr. Kosovicheva's research, respectively, explicitly connect perceptual science and real-world applications.

The proposed course would have PSY280 (Sensation and Perception) as a prerequisite, building on it and focusing on application and implications. This course would also fill a gap in the 300-level courses in the department, as there are presently no 300-level courses with a focus on visual perception, and it would complement PSY371 (Higher Cognitive Processes) which focuses on cognition and PSY372 (Human Memory: The world within your Mind), which focuses on memory. In conjunction with the proposed Perception Laboratory (PSY389), which would focus on techniques and research skills, this course (PSY385) would focus on expanding students' knowledge and experience towards more real-world problems. This new course would enable us to serve our students better, providing learning opportunities focused on how students can apply their knowledge of perception, increasing their skills and their ability to employ their understanding of perception after graduation.

Resources: Resource Form submitted

PSY389H5: Perception Laboratory

Contact Hours: *Practical*: 36

Description:

In this course, students will learn how to develop and design experiments to answer scientific questions of their interest in the study of perception. Students will learn psychophysical methods, which relate the physical properties of the world to perceptual experience, and apply these advanced methods by carrying out experiments and analyzing data.

Prerequisites: PSY202H5 (or equivalent) and PSY280H5

Corequisites:

Exclusions:

Recommended Preparation:

Rationale:

Rationale: The proposed course would be an addition to current lab offerings in the department (PSY 319, 329, 369, and 379), that can be used to satisfy the same requirements as these courses.

Given the popularity of PSY280 (Sensation and Perception), there is likely considerable student demand for a laboratory course in Perception, building on this foundation and developing skills in psychophysical methods. This is particularly imperative now, given the increase in the number of Psychology Majors and Psychology Specialists, since laboratory courses are a requirement for the latter (all laboratory courses for the 2021-2022 academic year are full). In addition, we now have multiple faculty who can support such a course (Kosovicheva, Wolfe).

Relationship to Similar Courses: This course would cover different techniques than PSY379 (Cognitive Psychology Laboratory), which focuses on classical cognitive psychology methods like reaction time and accuracy measures without a psychophysical focus. The proposed course would cover different techniques, including psychophysical measurement, thresholds, and eye tracking.

Resources: Resource Form Submitted

The course would require access to a computer lab. Assignments will be based on free, open-source software for perception experiments (PsychoPy) and data analysis (R Studio). Ideally, establishing this course would also involve the one-time purchase of several inexpensive eye tracking systems (Gazepoint 3; \$795+HST per unit; five or more units so that they can be shared by students). This would enable experiential learning that cannot be achieved with pre-collected datasets, and prepares students for work in data visualization, data science, human factors, etc. No ongoing software license costs would be required. The course would also require standard TA support.

7 Course Modifications:

PSY201H5: Research Design and Analysis in Psychology I

Prerequisites: Grade 12(4U) Advanced Functions and 1.0 credit of PSY

Exclusions:

Previous: ECO220Y5 or ECO227Y5 or SOC300Y5 or SOC350H5 or STA215H5 or STA218H5 or STA220H5 or STA256H5 or STA258H5 or PSY201H1 or PSYB07H3 or STAB22H3

New: ECO220Y5 or ECO227Y5 or SOC300Y5 or SOC350H5 or STA215H5 or STA218H5 or STA220H5 or STA256H5 or STA258H5 or PSY201H1 or PSYB07H3 or STAB22H3

Rationale:

Adding prerequisite requirement to include 1.0 credits in PSY courses. Adding this prerequisite will better ensure that students entering into the courses will have better foundational preparation in Psychology and be better able to participate in lecture and tutorial experiences.

Resources:

PSY290H5: Introduction to Neuroscience

Contact Hours:

Previous: Lecture: 36

New: Lecture: 24 / **Practical:** 12

Rationale:

This matter was previously proposed and approved in 2019. The onset was delayed as a result of sabbatical (2020) and COVID challenges.

I had proposed to modify the structure of PSY290H5 from a lecture only course (36L) to a blended model lecture and a lab experience (24L, 12P).

Benefits of this modification to students include;

- Hands-on practical experience for students.
- Encourages deeper learning of lecture material.
- Lab experience aligns with a broader compliment of Psychology's Program Outcomes and Learning Outcomes.

Benefits of this modification to the Psychology program include;

- Address need for more lab experiences, as identified in Psychology's Self Study and Eternal Review (2018-2019).
- Creates more opportunity for graduate student involvement in teaching, as identified in Psychology's Self Study and Eternal Review (2018-2019).

Effective teaching of science often combines classroom teaching with hands-on laboratory experiments/activities that build upon prior learning or reinforces deeper conceptual understanding of course based-content. Labs play an essential role in Psychology's educational curriculum as emphasized in our 1st-year curriculum, 3rd-year lab courses, thesis, IRP and ROP programming. In particular, Psy100Y5 ('Introductory Psychology') is one of the few 1st-year psychology courses in the province to include laboratory experience to more than one-thousand students every year. Our department also provides lab opportunities to students through a selection of research-intensive courses in year 3 and 4 (PSY309, 319, 329, 379, 399, 400) and a growing complement of research experiences through our Research Opportunity and Independent Research Programs, serving approximately 90 students each year. Despite the success of our research opportunities, our recent external review from the Psychology Self-Study recommended strategic inclusion of more hands-on-experiences (labs) within our undergraduate curriculum to provide more access to labs for all students in our program and to create a more attractive program to our current and future Major and Specialist students.

To address this need and enhance the quality of student learning experiences in our program, I am proposing to modify the structure of the course from 36 lecture hours, to 24 lecture hour and 12 practical hours. PSY290 is well suited to benefit all Psychology students, as it is a required course for all Psychology programs and serves upwards of 560 students per year.

The labs will extend and bridge experiences from PSY290H5 lectures to provided hands-on learning experiences that are

immediately accessible to a novice student. Topics will include research ethics, neuroanatomy, neurophysiology, and behavioral neuroscience. The addition of a PSY290H5 lab aligns with our department's Learning Outcomes to include a greater appreciation of research ethics in neuroscience, the inclusion of hypothesis-driven inquiry and using empirical methods to answer research questions (see table below, LO2, 3, 5, 8, 11, 12, & 14). The inclusion of labs also creates broader benefits by providing opportunities for students to engage in 'numeracy' and 'writing' practice through structured lab reports.

Furthermore, labs in PSY290H5 will create valuable opportunities for graduate students to lead the laboratory sessions and take on a greater role in the teaching and mentorship of students.

Resources:

PSY309H5: Experimental Design and Theory

Description:

Previous: Practical problems in research design and interpretation of experimental findings. Practice in the critical evaluation of research findings. Students will gain experience in the processes involved in collecting and analyzing data and in using computers to set up psychological experiments. [36P]

New: Students participate in an immersive learning experience that replicates the process of designing, conducting, analyzing, and presenting a psychological research study. Lecture sessions will introduce best practices in psychological science. Tutorial sessions will prepare students by teaching statistical programming. Students will apply statistical methods, principles and practices to realize a significant, open-ended research project. Students will lead generation of their own research questions, direct their own literature review, propose research methodologies, and work independently on datasets, applying advanced statistical and presentation tools and techniques used in research labs to analyze and present research findings in both written and oral formats.

Prerequisites:

Previous: PSY201H5 and PSY202H5 or equivalent and 1.0 credit in PSY at the 200 level

New: PSY201H5 and (PSY202H5 or equivalent) and 1.0 credit in PSY at the 200 level

Rationale:

Updating course calendar description to better reflect the experiential nature of the course

Resources:

PSY319H5: Developmental Psychology Laboratory

Description:

In this course ~~Readings~~, students will learn how to develop ~~laboratory exercises~~ and design experiments ~~research projects designed~~ to answer scientific questions of their interest in the study of Developmental Psychology. Students will learn research ~~familiarize students with~~ methods ~~revelant~~ ~~relevant~~ to research with infants and children, and apply these advanced methods. Students will also learn to code and analyze real data using advanced computational and statistical software. ~~[36P]~~

Rationale:

Previous course description was written in a generic way that would maintain flexibility for different instructors to teach the course. We are updating course calendar description to better reflect the experiential nature of the course.

Resources:

PSY379H5: Cognitive Psychology Laboratory

Description:

In this course ~~Readings, laboratory exercises, and research projects designed to familiarize~~ students will learn how ~~with methodologies relevant~~ to design and propose original experiments to answer scientific questions of their interest ~~empirical research~~ in the field of cognitive psychology. Students will discover the mechanisms involved in the processing of information by engaging with various methodologies used by cognitive psychologists and learn to analyze real data using advanced computational and statistical software.

Rationale:

Updated course description to better reflect the nature of experiences that students will be exposed to in this course

Resources:

PSY402H5: Systems of Psychology

Title: ~~Roots~~ ~~Systems~~ of Psychology : A history of the field from the 19th century to the present day

Abbreviated Title: ~~Roots~~ ~~Systems~~ of Psychology

Description:

Previous: A critical analysis of the historical, conceptual, and methodological foundations of influential approaches to the study of mind and behaviour (e.g., behaviourism, psychoanalysis, humanistic psychology, cognitive science).

New: Where did the field of psychology come from, and where is it going? In this course we will explore these questions through the lens of theoretical frameworks, experimental methods, ideas that have (or have not) endured, recent advances, and promising new directions.

Prerequisites: 1.0 credit of PSY at 300 level ~~credit in Psychology~~

Rationale:

We propose to change the title for PSY402, "Systems of Psychology" to reflect the changed emphasis of the course, focusing on the history and evolution of the field. In particular, the course focuses on how the field has evolved, changed and built on previous work, and how these foundations have informed modern Psychology research. The course will build on what students have learned throughout the Psychology program, helping them develop an understanding of the breadth and history of the field as they come to the end of their time in the program. This emphasis on history and change will help students understand both where the field has come from, how it is changing and what the broader impacts of Psychology have been in the past and will be in the future

Resources:

PSY490H5: Advanced Topics in Neuroscience

Abbreviated Title: Adv Topics ~~Neuroscience Biol Psychol~~

Prerequisites: (PSY270H5 or PSY290H5) ~~and~~ (~~or~~ 1.0 credit from {PSY346H5 or PSY362H5 or PSY369H5 or PSY372H5 or PSY395H5 or PSY397H5 or PSY398H5 or BIO304H5})

Rationale:

Error in prerequisite list to include 'or' instead of 'and'. The change to 'and' brings prerequisite requirements to be similar to that of other Psychology Lab courses.

Resources:

10 Minor Program Modifications:

Applied Statistics - Major (Science)

Enrolment Requirements:

Limited Enrolment — Enrolment in the Major program is limited to students with a minimum of 4.0 credits, including:

1. STA107H5 or STA256H5 ~~or STA257H5~~ (with a minimum grade of 60%);
2. MAT134H5 or MAT136H5 or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5 or MAT233H5; and
3. A minimum cumulative grade point average, to be determined annually.
4. All students must complete 4.0 U of T credits before requesting this program. Courses with a grade of CR/NCR will not count as a part of the 4.0 credits required for program entry.

Completion Requirements:

7.0-7.5 credits are required.

First Year:

1. CSC108H5
2. MAT102H5
3. (MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5
4. MAT223H5 or MAT240H5

Second Year:

1. MAT232H5 or MAT233H5 or MAT257Y5
2. STA256H5 and STA258H5 and STA260H5

Higher Years:

1. STA302H5 and STA304H5 and STA305H5
2. 1.0 credit from any 300/400 level STA course ~~STA310H5 or STA312H5 or (STA313H5 or STA360H5) or STA314H5 or STA315H5 or STA348H5 or STA413H5 or STA431H5 or STA437H5 or STA441H5 or STA457H5~~ or CSC322H5 or (CSC311H5 or CSC411H5) or MAT302H5 or MAT311H5 or MAT332H5 or MAT334H5 or MAT344H5 or (MAT337H5 or MAT378H5)

NOTES:

1. MAT133Y5 is included in the credit count only if the student also completes MAT233H5 (in which case MAT232H5 is not required).
2. ECO220Y5 cannot be substituted for STA256H5 or STA258H5 and/or STA260H5.
3. ECO227Y5 can be substituted for STA256H5 and STA258H5, but not for STA260H5.
4. STA107H5 is highly recommended in first year, but it is not required.
5. MAT337H5 or MAT378H5 is highly recommended for students intending to pursue graduate level studies in statistics.

Rationale:

1. STA257H5 has been renumbered to STA256H5 many years ago. We like to have STA257H5 removed.
2. CSC411H5 was renumbered to CSC311H5 last year. We like to include both courses in the requirement.
3. The used statement is more general, and it covers all statistics courses, including independent study courses.

Resource Implications:

Applied Statistics - Specialist (Science)

Enrolment Requirements:

Limited Enrolment — Enrolment in the Specialist program is limited to students with a minimum of 4.0 credits, including:

1. STA107H5 or STA256H5 ~~or STA257H5~~ (with a minimum grade of 60%);
2. MAT137Y5 or MAT157Y5 or MAT134H5 (minimum 60%) or MAT136H5 or MAT134Y5 or MAT135Y5 or MAT233H5 (minimum 55%) ; and
3. A minimum cumulative grade point average, to be determined annually.
4. All students must complete 4.0 U of T credits before requesting this program. Courses with a grade of CR/NCR will not count as a part of the 4.0 credits required for program entry.

Completion Requirements:

12.0-12.5 credits are required.

First Year:

1. CSC108H5
2. MAT102H5
3. (MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5
4. MAT223H5 or MAT240H5

Second Year:

1. MAT232H5 or MAT233H5 or MAT257Y5
2. ~~MAT212H5~~ ~~or~~ MAT244H5
3. STA256H5 and STA258H5 and STA260H5

Higher Years:

1. STA302H5 and STA304H5 and STA305H5 and STA348H5
2. 2.0 credits of STA at the 300/400 level STA course from ~~STA312H5 or (STA313H5 or STA360H5) or STA314H5 or STA315H5 or STA413H5 or STA431H5 or STA437H5 or STA441H5 or STA457H5~~
3. 2.0 credits from CSC322H5 or (CSC311H5 or CSC411H5) or MAT302H5 or MAT311H5 or MAT332H5 or MAT334H5 or MAT344H5 or (MAT337H5 or MAT378H5)
4. 1.0 credit of STA

NOTES:

1. MAT133Y5 is included in the credit count only if the student also completes MAT233H5 (in which case MAT232H5 is not required).
2. ECO220Y5 cannot be substituted for STA256H5 or STA258H5 or STA260H5.
3. ECO227Y5 can be substituted for STA256H5 and STA258H5, but not for STA260H5.
4. STA107H5 is highly recommended in first year, but it is not required.
5. MAT337H5 or MAT378H5 is highly recommend for students intending to pursue graduate level studies in statistics.

Rationale:

1. STA257H5 has been renumbered to STA256H5 many years ago. We like to have STA257H5 removed.
2. CSC411H5 was renumbered to CSC311H5 last year. We like to include both courses in the requirement.
3. The used statement is more general, and it covers all statistics courses, including independent study courses.
4. Removing MAT212H5. It hasn't been taught in about 10 years

Resource Implications:

Bioinformatics - Specialist (Science)

Enrolment Requirements:

Limited Enrolment — Enrolment in this program is limited. Students who wish to enrol at the end of the first year (4.0 credits) must have passed all the courses listed for the first year, attained at least 60% in all 100-level computer science and mathematics courses, and have a minimum Cumulative Grade Point Average (CGPA) of 2.0.

NOTES :

1. Only CSC148H5 and MAT102H5, taken at the UTM campus, will be accepted.

2. Transfer students who have completed any postsecondary studies outside of UTM (including studies at other divisions at the University of Toronto) are not eligible to pursue a Specialist and/or Major in Computer Science at U of T Mississauga.

The Bioinformatics Specialist is a deregulated fees program and as such, tuition ~~Tuition~~ fees for students enrolled ~~enrolling~~ in this program are higher than for other regulated fee ~~Arts and Science~~ programs. Fees are charged on a program and not a per-course basis. See www.fees.utoronto.ca for more information on the fee structures .

Completion Requirements:

14.0 credits are required.

First Year:

1. BIO152H5 and BIO153H5
2. CHM110H5 and CHM120H5
3. CSC108H5 and CSC148H5
4. MAT102H5
5. (MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5

Second Year:

1. BIO206H5 and BIO207H5
2. CHM242H5
3. CSC207H5 and CSC236H5 and CSC263H5
4. MAT223H5 or MAT240H5

Third Year:

1. ~~MAT212H5 or MAT244H5~~
2. MAT232H5 and MAT244H5
3. ~~{STA246H5 or STA256H5} and STA258H5~~

Fourth Year:

1. BIO314H5 and BIO372H5 and BIO477H5
2. CSC413H5 or CSC321H5 or CSC411H5 or CSC311H5
3. CSC343H5 and CSC373H5
4. MAT332H5
5. At least 1.0 credit from the following list of recommended courses, of which at least 0.5 credit must be at the 400-level: BIO315H5 or BIO341H5 or BIO370Y5 or BIO371H5 or BIO380H5 or BIO443H5 or BIO481Y5 or CBJ481Y5 or CHM361H5 or CSC310H5 or CSC338H5 or CSC363H5 or JCP410H5 or ~~{STA302H5 or STA331H5}~~ or STA348H5 or ~~STA442H5~~

NOTES:

1. ~~Students need to obtain permission from the course instructor to take BIO207H5 without the BIO153H5 prerequisite.~~
2. If BIO477H5 is not offered in the fourth year of a student's studies, he or she must take an additional 0.5 credit from the recommended 400-level courses.
3. Students intending to take CHM361H5 as one of their fourth year recommended courses must take CHM243H5 as a prerequisite course..

Rationale:

- 1.(NOTES #1) This has been part of our PoST entry requirements, and listed on our PoST information website, for the past few years. We would like to add it to the calendar as another information point for students. The reason we accept only H5 versions of these courses is due to differences between our specific offerings and those at other campuses. These courses are crucial for PoST entry so we would like control over what our students do and learn in these courses.
2. (NOTES#2) This is already part of our admissions process and is listed in admissions materials. We would like to add it to the calendar for those students who look at the calendar directly
3. MAT212H5 hasn't been taught for about 10 years. And there is no plan to offer it in the future.
4. Replace the deregulated fee paragraph with the same one in CS major and specialist programs.
5. Adding BIO153H5 since it's the pre-requisite for BIO207H5 now.

6. Removing STA258H5. It's not required by either CS or Biology major programs and is not a pre-requisite for any courses required by Bioinformatics.
7. STA331H5 was renumbered to STA302H5 over 5 years ago. STA442H5 is no longer exist.

Resource Implications:

Computer Science - Major (Science)

Enrolment Requirements:

Limited Enrolment — Enrolment in this program is limited to students with a minimum of 4.0 credits, including the following:

1. CSC148H5(see minimum grade note below)
2. MAT102H5 (see minimum grade note below)
3. MAT134H5 or MAT136H5 or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5 or MAT233H5
4. ISP100H5
5. A cumulative grade point average (CGPA), determined annually. It is never lower than 2.5.
6. All students must complete 4.0 U of T credits before requesting this program. Courses with a grade of CR/NCR will not count as a part of the 4.0 credits required for program entry.

NOTES NOTE:

1. The minimum grade required in CSC148H5 and MAT102H5 is determined annually. It is never lower than 60%. Only CSC148H5 and MAT102H5, taken at the UTM campus, will be accepted.
2. Transfer students who have completed any postsecondary studies outside of UTM (including studies at other divisions at the University of Toronto) are not eligible to pursue a Specialist and/or Major in Computer Science at U of T Mississauga.

The Computer Science Major is a deregulated fees program and as such, tuition fees for students enrolled in this program are higher than for other regulated fee programs. Fees are charged on a program and not a per-course basis. See www.fees.utoronto.ca for more information on the fee structures.

Rationale:

This is already part of our admissions process and is listed in admissions materials. We would like to add it to the calendar for those students who look at the calendar directly.

Resource Implications:

Computer Science - Specialist (Science)

Enrolment Requirements:

Limited Enrolment — Enrolment in this program is limited to students with a minimum of 4.0 credits, including the following:

1. CSC148H5(see minimum grade note below)
2. MAT102H5 (see minimum grade note below)
3. MAT134H5 or MAT136H5 or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5 or MAT233H5
4. ISP100H5
5. A cumulative grade point average (CGPA), determined annually. It is never lower than 2.5.
6. All students must complete 4.0 U of T credits before requesting this program. Courses with a grade of CR/NCR will not count as a part of the 4.0 credits required for program entry.

NOTES NOTE:

1. The minimum grade required in CSC148H5 and MAT102H5 is determined annually. It is never lower than 65%. Only CSC148H5 and MAT102H5, taken at the UTM campus, will be accepted.

2. Transfer students who have completed any postsecondary studies outside of UTM (including studies at other divisions at the University of Toronto) are not eligible to pursue a Specialist and/or Major in Computer Science at U of T Mississauga.

The Computer Science Specialist is a deregulated fees program and as such, tuition fees for students enrolled in this program are higher than for other regulated fee programs. Fees are charged on a program and not a per-course basis. See www.fees.utoronto.ca for more information on the fee structures.

Completion Requirements:

11.5-12.5 credits are required.

First Year:

1. CSC108H5 and CSC148H5 and ISP100H5
2. MAT102H5
3. (MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5 or MAT233H5

Second Year:

1. CSC207H5 and CSC209H5 and CSC236H5 and CSC258H5 and CSC263H5
2. MAT223H5 or MAT240H5
3. MAT232H5 or MAT257Y5
4. STA246H5 or STA256H5

Higher Years:

1. CSC343H5 and CSC363H5 and CSC369H5 and CSC373H5
2. CSC358H5 or CSC458H5
3. 2.5 credits from the following: any 300/400 level CSC course (offered at UTM) or GGR335H5 or GGR337H5 or GGR437H5. At least 1.0 credit must come from 400-level courses, and no more than 1.0 credit of GGR courses may count to this requirement.

NOTE: In addition to the course requirements above, students must complete an integrative learning experience. This requirement may be met by participating in the PEY (Professional Experience Year) program. It can also be met by taking at least one of the following half-courses: CSC318H5 or CSC367H5 or CSC375H5 or CSC409H5 or CSC420H5 or CSC427H5 or CSC477H5 or CSC490H5.

Rationale:

1. Adding a note: This is already part of our admissions process and is listed in admissions materials. We would like to add it to the calendar for those students who look at the calendar directly.
2. Removing a note: Tidy up.

Resource Implications:

Computer Science - Minor (Science)

Completion Requirements:

4.0 credits are required.

First Year: CSC108H5 and CSC148H5 and MAT102H5

Second Year:

1. CSC207H5 and CSC236H5
2. One of {CSC209H5 or CSC258H5 or CSC263H5}

Third and Fourth Years: 1.0 credit Two half courses from any 300/400 level U of UTM & Mississauga CSC at the 300/400-level courses, except for CSC492H5 and CSC493H5.

NOTES:

1. Students in the CSC minor may only complete 1.5 credits of third and fourth year computer science courses. To enrol in additional upper year courses, a student must enter a CSC specialist or major program.
2. Only CSC148H5 and MAT102H5, taken at the UTM campus, will be accepted.

Rationale:

The reason we accept only H5 versions of these courses is due to differences between our specific offerings and those at other campuses. These courses are crucial for PoST entry so we would like control over what our students do and learn in these courses.

Resource Implications:

Information Security - Specialist (Science)

Enrolment Requirements:

Limited Enrolment — Enrolment in this program is limited to students with a minimum of 4.0 credits, including the following:

1. CSC148H5(see minimum grade note below);
2. MAT102H5 (see minimum grade note below) ;
3. MAT134H5 or MAT136H5 or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5 or MAT233H5;
4. ISP100H5; and
5. A cumulative grade point average (CGPA), determined annually. It is never lower than 2.5.
6. All students must complete 4.0 U of T credits before requesting this program. Courses with a grade of CR/NCR will not count as a part of the 4.0 credits required for program entry.

NOTES NOTE:

1. The minimum grade required in CSC148H5 and MAT102H5 is determined annually. It is never lower than 65%. Only CSC148H5 and MAT102H5, taken at the UTM campus, will be accepted.
2. Transfer students who have completed any postsecondary studies outside of UTM (including studies at other divisions at the University of Toronto) are not eligible to pursue a Specialist and/or Major in Computer Science at U of T Mississauga.

The Information Security Specialist is a deregulated fees program and as such, tuition fees for students enrolled in this program are higher than for other regulated fee programs. Fees are charged on a program and not a per course basis. See www.fees.utoronto.ca for more information on the fee structures.

Rationale:

This is already part of our admissions process and is listed in admissions materials. We would like to add it to the calendar for those students who look at the calendar directly.

Resource Implications:

Mathematical Sciences - Major (Science)

Completion Requirements:

8.0 ~~7.5~~ credits are required.

First Year:

1. MAT102H5
2. (MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5
3. MAT223H5 or MAT240H5

Second Year:

1. MAT202H5 and MAT244H5
2. [(MAT232H5 or MAT233H5) and MAT236H5] or MAT257Y5
3. MAT224H5 or MAT247H5

Higher Years:

1. MAT301H5 and (MAT334H5 or MAT354H5)
2. MAT337H5 or MAT378H5 or MAT392H5 or MAT405H5
3. MAT305H5 MAT236H5 or MAT311H5 or MAT332H5 or MAT257Y5
4. MAT302H5 or MAT315H5 or MAT344H5
5. STA256H5 or 0.5 credit of MAT at the 300/400 level, except MAT322H5
6. 0.5 additional credits in MAT at the 400 level

NOTES:

1. MAT137Y5 is highly recommended.
2. Mathematical Majors are strongly encouraged to enroll in MAT240H5 followed by MAT247H5.
3. Students enrolled in this program may participate in the PEY program. For more information visit www.pey.utoronto.ca

Rationale:

- MAT305 was recently added to the calendar, and should be an option for Majors.
- aligning our Major program with UTSC and UTSG, we would like to require both a third and a fourth course in Calculus for Majors, i.e. MAT232/233 AND MAT236.
- MAT332 cannot be taken, except by Math Minors, but theoretically a student in the minor could take the course and then join the Major program; so we are excluding it from the 0.5 credits at 300+ level, as this would evade our intentions for the course.

Resource Implications:

Mathematical Sciences - Minor (Science)

Completion Requirements:

4.0 credits in MAT are required, including 1.0 credit of MAT at the 300/400 level.

First Year:

1. MAT102H5
2. (MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5

Second Year:

1. MAT223H5 or MAT240H5
2. [MAT232H5 and (MAT202H5 or MAT224H5 or MAT236H5 MAT232H5 or MAT240H5 or MAT244H5 or MAT247H5 or CSC236H5) and 0.5 MAT credit at the 200+ level] or MAT257Y5

Higher Years:

1. 1.0 credit of MAT at the 300+ level

NOTES:

1. MAT223H5 may be taken in the first year.
2. Students who have the required prerequisites may take CSC236H5. CSC236H5 may fulfill 0.5 credit of MAT at the 200+ level.
3. Students may replace the combination [(MAT132H5 and MAT134H5) or (MAT135H5 and MAT136H5) or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5] and MAT232H5 with the combination (MAT133Y5 and MAT233H5)

Rationale:

- "0.5 credit of credit in MAT at the 200+ level allows, theoretically, for some strange combinations which avoid MAT232. We think that a third course in Calculus, i.e. MAT232, should be required for Minors.
- Getting rid of "0.5 @ 200+" requires replacing it with the explicit courses that can be used here; in this case, MAT202, and 236 (so effectively the second point in "Second Year" remains the same, except that MAT232 is now required.
- Note 2 regarding CSC236 can be worked into the Second Year requirements rather than being a note now.

Resource Implications:

Mathematical Sciences - Specialist (Science)

Completion Requirements:

13.5 credits are required.

First Year:

1. CSC108H5 and CSC148H5
2. MAT102H5 and MAT240H5
3. MAT137Y5 or MAT157Y5

Second Year:

1. CSC236H5
2. MAT202H5 and MAT244H5 and MAT247H5 and MAT257Y5
3. STA256H5 and (STA258H5 or STA260H5)

Higher Years:

1. MAT301H5 and (MAT334H5 or MAT354H5) and MAT392H5
2. MAT302H5 or MAT315H5
3. 2.0 additional credit from MAT302H5 or MAT309H5 or MAT311H5 or MAT315H5 or MAT332H5 or (MAT337H5 or MAT378H5) or MAT344H5
4. 1.0 additional credits in MAT at the 400 level (MAT401H5 is recommended)
5. 1.0 additional credits at the 300/400 level in CSC or MAT/STA, **except MAT322H5**
6. 0.5 additional credits in MAT at the 300+level, **except MAT322H5**

NOTES :

1. Mathematical Specialists are strongly encouraged to enroll in MAT157Y5 and MAT257Y5, and MAT354H5.
2. Students may replace MAT257Y5 with [(MAT232H5 or MAT233H5) and MAT236H5], but if they do then MAT337H5 AND MAT405H5 are required as part of "**Higher Third & Fourth** Years".
3. Students who do not feel ready for MAT257Y5 in their Second Year, may wish to take MAT232H5 that year, and then take MAT257Y5 in their Third Year.
4. Students enrolled in this program may participate in the PEY program. For more information visit www.pey.utoronto.ca

Rationale:

- MAT322H5 cannot be taken, except by Math Minors, but theoretically a student in the minor could take the course and then join the Major program; so we are excluding it from the 0.5 credits at 300+ level, as this would evade our intentions for the course.
- There was a small typo in "Note #2".

Resource Implications:

2 New Courses:

CSC478H5: Robotic Perception

Contact Hours: *Lecture:* 24 / *Practical:* 12

Description:

This course focuses on perception algorithms for robotics applications and sensors. The aim is to provide an understanding of the challenges encountered when deploying perception algorithms on a robot and introduce some of the tools and algorithms typically used to address these challenges. The algorithms will also be implemented and evaluated using real-world data from common use-cases.

Prerequisites: CSC373H5 and (CSC311H5 or CSC321H5) and CSC376H5

Corequisites:

Exclusions: CSC498H5 (Winter 2022)

Recommended Preparation: CSC338H5

Rationale:

We recently hired professor Igor Gilitschenski, and this course (Robotic Perception) will be taught by him going forward. He has taught this course once as a Special Topics course code and we are now seeking to move it to its own dedicated course. We have recently been working on scaling up our robotics course offerings, and this course helps us toward that goal.

Resources: Resource Form submitted

STA380H5: Computational Statistics

Contact Hours: *Lecture:* 36 / *Tutorial:* 12

Description:

Computational methods play a central role in modern statistics and machine learning. This course aims to give an overview of some of the computational techniques that are useful in statistics. Topics include methods of generating random variables, Monte Carlo integration and variance reduction, Monte Carlo methods in inference, bootstrap and jackknife, resampling application, permutation tests, probability density estimation, and optimization.

Prerequisites: STA260H5

Corequisites:

Exclusions: STA410H1 or STA312H5 (Winter 2020 and Winter 2022) or STA410H

Recommended Preparation:

Rationale:

- (1) After the decision of removing STA310H5 from the list of statistics courses, adding a 3rd year course becomes necessary.
- (2) The ability to design and carry out statistical computations is an essential skill for students. In fact, many problems arising in statistics rely on computer experiments and simulation. Thus, this course will help our students to understand courses better.

Resources: Resource Form submitted

47 Course Modifications:

CSC108H5: Introduction to Computer Programming

Exclusions: CSC108H1 or CSC120H1 ~~or CSC148H5 or CSC148H1 or CSC150H1~~ or CSCA08H3 or CSCA20H3

Rationale:

These are all equivalent courses or courses that should not be taken before CSC108H5. CSC150H1 doesn't exist any more.

Resources:

CSC148H5: Introduction to Computer Science

Exclusions: CSC148H1 ~~or CSC150H1~~ or CSCA48H3 **or CSC111H1**

Rationale:

CSC150H1 doesn't not exist any more. New CSC111H1 is similar to CSC148H5.

Consultation:

Resources:

CSC207H5: Software Design

Prerequisites: 60% in **CSC148H5** (Only CSC148H5 taken at the UTM campus will be accepted.)

Rationale:

This is just to further clarify a point to reduce/eliminate any remaining student confusion.

Resources:

CSC258H5: Computer Organization

Description:

An introduction to computer organization and architecture, using a common CPU architecture (~~typically MIPS~~). Core topics: ~~data boolean expressions and logic gates, numerical~~ representations, ~~design and analysis of combinational~~ and computer arithmetic ~~sequential circuits~~, processor organization ~~the control unit and datapath~~, the memory hierarchy and caching, instruction set and addressing modes ~~architectures~~, and quantitative performance evaluation of computing systems ~~assembly programming~~. Students will ~~design circuits and~~ program in ~~using~~ assembly and will evaluate simulated processor architectures. ~~[24L, 24P]~~

Prerequisites: CSC148H5 ~~and MAT102H5~~

Note:

Previous:

New: Students wishing to complete CSC385H1 (Microprocessor Systems) should consider enrolling in CSC258H1 and/or to self-study the use of hardware design languages to create digital logic.

Rationale:

The current formulation of CSC258H5 (Computer Organization) allocates almost half of the semester on gate- and device-level digital design, leading up to students using schematic-based design tools to build a simple processor. While some digital logic design experience is valuable, particularly in giving students active experience working with computation at a different level, the topic is not covered in sufficient depth or with appropriate tools to allow them to

engage in further digital logic design work. We believe that the time spent on digital logic design might be better spent on topics that are better connected to existing upper-year courses at UTM. This proposal targets additions that support several systems courses: CSC367 (parallel programming), CSC358 (principles of computer networks), CSC369 (operating systems), and CSC488 (compilers and interpreters).

Resources:

CSC413H5: Neural Networks and Deep Learning

Exclusions: CSC321H5 or CSC321H1 or CSC413H1 or CSC421H1

Rationale:

Adding other machine learning courses that overlap this course.

Resources:

CSC420H5: Introduction to Image Understanding

Exclusions:

Previous:

New: CSC420H1

Rationale:

Adding same course at StG as exclusion.

Resources:

CSC311H5: Introduction to Machine Learning

Exclusions: CSC411H5 or CSC311H1 or CSC311H3

Rationale:

Adding same courses at other campuses as exclusions.

Resources:

CSC384H5: Introduction to Artificial Intelligence

Description:

Theories and algorithms that capture (or approximate) some of ~~A broad introduction to~~ the core elements ~~sub-~~disciplines of computational intelligence AI. Topics include ~~Core topics:~~search methods, logical representations ~~game playing~~ and ~~rule-based systems.~~ Overview of: natural language understanding, knowledge representation, reasoning, classical automated planning, ~~vision~~, representing and reasoning with uncertainty ~~robotics~~, learning, decision making (planning) under uncertainty ~~and neural networks~~. Assignments provide practical experience, in both theory and programming, of the core topics.

Prerequisites: CSC263H5 ~~CSC324H5~~ and(STA246H5 or STA256H5)

Exclusions: CSC384H1 ~~or CSC484H1~~ or CSCD84H3

Rationale:

1. CSC384 used to rely on logic programming material from CSC324. But CSC324 no longer teaches this material, and CSC384 doesn't need this material as the course has shifted to more classic AI (given that our other, new AI courses like

CSC413 and CSC420 cover specialized topics). CSC263 covers introductory search algorithms that are expanded upon in CSC384.

2.Change course description to follow the description from A&S. Rationale: our course description is out of date and refers to topics such as robotics and neural networks that now have their own dedicated courses.

3.Equivalent AI courses at other campuses. CSC484H1 is no longer exist.

Resources:

CSC415H5: Introduction to Reinforcement Learning

Exclusions: CSC498H5(Winter 2021 and Fall2021)

Rationale:

CSC415H5 was taught as CSC498H5 in 2021 Fall again.

Resources:

CSC493H5: Computer Science Expository Work

Exclusions:

Previous: CSC494H1 or CSC495H1 or CSCD94H3 or CSCD95H3

New:

Rationale:

The exclusion courses listed are all Independent Study/ capstone courses. They are not exclusive to each other.

Per the guidelines given to us, each time these courses are offered, all students (typically a very small number, like 1 or 2 students) who take these courses will work (solely) with their instructor to determine a reading list, research-related goals, and methodologies and plans for reaching those goals, etc. While there is wide latitude for what instructors and students can agree to, and while the projects/goals agreed to can vary widely across disciplines, it is always focused on researching some topic or area not covered in our typical courses.

Resources: No.

MAT223H5: Linear Algebra I

Exclusions: MAT223H1 or MATA22H3 MAT188H1 or MATA23H3 or MAT240H1 or MAT240H5

Rationale:

MAT188H1 does not exist anymore. MATA22H3 is equivalent to MAT223H5.

Resources:

MAT244H5: Differential Equations I

Exclusions: MAT322H5 MAT212H5 or MAT244H1 or MAT267H1 MATB44H3 or MATB44H3 MAT322H5

Rationale:

MAT212H5 hasn't been taught in about 10 years.

MAT267H1 added as exclusion since it's equivalent to MAT244H5.

Resources:

MAT301H5: Groups and Symmetries

Exclusions: MAT301H1 or MAT347Y1 or MATC01H3

Rationale:

MAT347Y1 added as exclusion since we accept MAT337Y1 to replace MAT301H5.

Resources:

MAT305H5: Elementary Lie Theory

Prerequisites: [(MAT224H5 or MAT240H5) and MAT236H5 MAT232H5] or MAT257Y5

Rationale:

- Brings us in line with UTSC and UTSG Math Major programs which require two half-courses in 2nd-Year Calculus (UTSC requires MATB41H3 and MATB42H3; UTSG requires one of MAT235Y1, MAT237Y1 or MAT257Y1.)
- Students going into various upper-year courses (see list below) would have a more sophisticated Calculus background. In many instances, just 232/233 is not enough background and holds back what instructors in these upper year courses can expect from students.
- Currently MAT236 is underused in the curriculum - it is not a prerequisite for any courses.
- We have chosen courses to add MAT236 as a prerequisite where we believe students would benefit the most from the additional preparation in Calculus or just in mathematical maturity.

Resources:

MAT307H5: Curves and Surfaces

Exclusions:

Previous:

New: MAT363H1 or MAT367H1 or MATC63H3 or MATD26H3 or MATD67H3

Rationale:

These courses are equivalent to MAT307H5.

Resources:

MAT309H5: Introduction to Mathematical Logic

Prerequisites: MAT257Y5 or [MAT236H5 (~~MAT134H5 or MAT136H5 or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5~~) and (MAT202H5 or MAT224H5 or MAT240H5) and at least 0.5 MAT credit at 300+ level]

Exclusions: CSC438H1 or MAT309H1 or MAT409H1 or MAT357Y1 ~~CSC463H1~~ or MATC09H3

Rationale:

This course requires mathematical maturity and a broad MAT background; this is already indicated with 0.5 at MAT300+ and MAT202/224/240, but students should also have completed more calculus again as a signal towards maturity and broad MAT background.

MAT309H1 and MAT409H1 and MAT357Y1 are added as exclusions since we accept them to replace MAT309H5. CSC463H1 is different enough to be removed.

Resources:

MAT311H5: Partial Differential Equations

Prerequisites: MAT257Y5 or ~~(MAT102H5 and~~(MAT236H5 ~~MAT232H5 or MAT233H5)~~ and ~~(MAT212H5 or MAT244H5)~~)

Exclusions: APM346H1 or APM351Y1 or MAT351Y1 or MATC46H3

Rationale:

- MAT212H5 hasn't been offered for about 10 years.
- Brings us in line with UTSC and UTSG Math Major programs which require two half-courses in 2nd-Year Calculus (UTSC requires MATB41H3 and MATB42H3; UTSG requires one of MAT235Y1, MAT237Y1 or MAT257Y1.)
- Students going into various upper-year courses (see list below) would have a more sophisticated Calculus background. In many instances, just 232/233 is not enough background and holds back what instructors in these upper year courses can expect from students.
- Currently MAT236 is underused in the curriculum - it is not a prerequisite for any courses.
- We have chosen courses to add MAT236 as a prerequisite where we believe students would benefit the most from the additional preparation in Calculus or just in mathematical maturity.
- MAT351Y1 added as exclusion since we accept MAT351Y1 to replace MAT311H5.

Resources:

MAT332H5: Introduction to Nonlinear Dynamics and Chaos

Prerequisites: ~~(MAT232H5 or MAT233H5 or~~ MAT257Y5 or [MAT236H5] and (MAT223H5 or MAT240H5) and ~~(MAT212H5 or MAT244H5)]~~

Rationale:

- Re MAT257: This has been done with many other courses in our curriculum, as MAT257 is adequate preparation for essentially any of our non-algebra courses.
 - MAT212H5 has been offered for about 10 years
- Replace MAT232H5/233H5 with MAT236H5:
- Brings us in line with UTSC and UTSG Math Major programs which require two half-courses in 2nd-Year Calculus (UTSC requires MATB41H3 and MATB42H3; UTSG requires one of MAT235Y1, MAT237Y1 or MAT257Y1.)
 - Students going into various upper-year courses (see list below) would have a more sophisticated Calculus background. In many instances, just 232/233 is not enough background and holds back what instructors in these upper year courses can expect from students.
 - Currently MAT236 is underused in the curriculum - it is not a prerequisite for any courses.
 - We have chosen courses to add MAT236 as a prerequisite where we believe students would benefit the most from the additional preparation in Calculus or just in mathematical maturity.

Resources:

MAT334H5: Complex Variables

Prerequisites: MAT257Y5 or [(MAT232H5 or MAT233H5) and (MAT202H5 or MAT240H5 or at least 0.5 credit of MAT at the 300+ level with a mark of at least 60% ~~MAT337H5~~)]

Rationale:

To offer more flexibility to students who want to take this course, and to make a more fair prerequisite. The MAT202/240/337 prerequisite was added to make sure students who took the course were sufficiently prepared in a general 'mathematical maturity' sense to take this course. However, this narrows the number of students who can take this course significantly. Students with at least one upper-year MAT course with a good mark will on average be sufficiently prepared compared with students who have MAT202 or the specific upper-year course MAT337H5. This type of prerequisite (or similar) is used elsewhere already in our course prerequisites, e.g. MAT405H5.

Resources:

MAT337H5: Introduction to Real Analysis

Prerequisites: MAT257Y5 or [(MAT224H5 or MAT240H5) and MAT236H5 (~~MAT212H5 or MAT244H5~~) and MAT244H5] (~~MAT232H5 or MAT233H5 or MAT257Y5~~)

Exclusions: MAT378H5 or MAT337H1 or MAT357H1 or MATB43H3 or MATC37H3 or ~~MAT378H5~~

Rationale:

Related to MAT257Y5, MAT236H5, MAT212H5 changes.

Resources:

MAT354H5: Complex Analysis

Exclusions: MAT334H1 or MAT334H5 or MAT354H1 or MATC34H3 or MATD34H3

Rationale:

MATD34H3 is equivalent to MAT354H5.

Resources:

MAT401H5: Polynomial Equations and Fields

Prerequisites: ~~MAT102H5 and~~ (MAT224H5 or MAT240H5) and (MAT236H5 ~~MAT232H5 or MAT233H5~~ or MAT257Y5) and MAT301H5 ~~MAT301H5~~.

Rationale:

- Brings us in line with UTSC and UTSG Math Major programs which require two half-courses in 2nd-Year Calculus (UTSC requires MATB41H3 and MATB42H3; UTSG requires one of MAT235Y1, MAT237Y1 or MAT257Y1.)
- Students going into various upper-year courses (see list below) would have a more sophisticated Calculus background. In many instances, just 232/233 is not enough background and holds back what instructors in these upper year courses can expect from students.
- Currently MAT236 is underused in the curriculum - it is not a prerequisite for any courses.
- We have chosen courses to add MAT236 as a prerequisite where we believe students would benefit the most from the additional preparation in Calculus or just in mathematical maturity.

Resources:

MAT405H5: Introduction to Topology

Prerequisites: MAT257Y5 or [~~MAT102H5 and~~ (MAT224H5 or MAT240H5) and MAT236H5 (~~MAT232H5 or MAT233H5~~) and at least 0.5 credit of ~~one~~ MAT ~~half-course~~ at the 300+ level with a mark of at least 65%]

Rationale:

- Brings us in line with UTSC and UTSG Math Major programs which require two half-courses in 2nd-Year Calculus (UTSC requires MATB41H3 and MATB42H3; UTSG requires one of MAT235Y1, MAT237Y1 or MAT257Y1.)
- Students going into various upper-year courses (see list below) would have a more sophisticated Calculus background. In many instances, just 232/233 is not enough background and holds back what instructors in these upper year courses can expect from students.
- Currently MAT236 is underused in the curriculum - it is not a prerequisite for any courses.
- We have chosen courses to add MAT236 as a prerequisite where we believe students would benefit the most from the additional preparation in Calculus or just in mathematical maturity.

Resources:

MAT406H5: Mathematical Introduction to Game Theory

Exclusions: ECO316H1 or MATD50H3

Rationale:

MATD50H3 is equivalent to MAT406H5.

Resources:

MAT492H5: Senior Thesis

Prerequisites: MAT392H5 and ~~MAT392H5~~; 2.0 additional credits in MAT at the 300 level and a minimum CGPA of 2.5 ~~2.5~~.

Rationale:

Per the guidelines given to us, each time these courses are offered, all students (typically a very small number, like 1 or 2 students) who take these courses will work (solely) with their instructor to determine a reading list, research-related goals, and methodologies and plans for reaching those goals, etc. While there is wide latitude for what instructors and students can agree to, and while the projects/goals agreed to can vary widely across disciplines, it is always focused on researching some topic or area not covered in our typical courses.

Resources:

MAT497H5: Further Studies in Mathematics

Prerequisites: Departmental permission and a minimum CGPA of ~~permission~~; ~~Minimum 2.5 CGPA~~.

Rationale:

Per the guidelines given to us, each time these courses are offered, all students (typically a very small number, like 1 or 2 students) who take these courses will work (solely) with their instructor to determine a reading list, research-related goals, and methodologies and plans for reaching those goals, etc. While there is wide latitude for what instructors and students can agree to, and while the projects/goals agreed to can vary widely across disciplines, it is always focused on researching some topic or area not covered in our typical courses.

Resources:

MAT498H5: Further Studies in Mathematics

Prerequisites: Departmental permission and a minimum CGPA of ~~Minimum 2.5 CGPA~~.

Rationale:

Per the guidelines given to us, each time these courses are offered, all students (typically a very small number, like 1 or 2 students) who take these courses will work (solely) with their instructor to determine a reading list, research-related goals, and methodologies and plans for reaching those goals, etc. While there is wide latitude for what instructors and students can agree to, and while the projects/goals agreed to can vary widely across disciplines, it is always focused on researching some topic or area not covered in our typical courses.

Resources:

STA107H5: An Introduction to Probability and Modelling

Exclusions: STA256H5 or STA257H1 or STAB52H3 or STA246H5 or STA237H1 or STA247H1 ~~STA257H5~~ or ECO227Y5

Rationale:

To address equivalent/new courses across the three campuses.

Resources:

STA215H5: Introduction to Applied Statistics

Exclusions: STA218H5 or STA220H5 or STA220H1 or STA256H5 or STA257H1 or STAB52H3 ~~STA257H5~~ or STAB22H3 or STA246H5 or STA237H1 or STA247H1 or ECO220Y5 or ECO227Y5 or PSY201H5 or PSYB07H3 or SOC350H5

Rationale:

To address equivalent/new courses across the three campuses.

Resources:

STA218H5: Statistics for Management

Exclusions: STA215H5 or STA220H5 or STA220H1 or STA256H5 or STA257H1 or STAB52H3 ~~STA257H5~~ or STAB22H3 or STA246H5 or STA237H1 or STA247H1 or ECO220Y5 or ECO227Y5 or PSY201H5 or PSYB07H3 or SOC350H5

Rationale:

To address equivalent/new courses across the three campuses.

Resources:

STA220H5: The Practice of Statistics I

Exclusions: STA215H5 or STA218H5 or STA256H5 or STA257H1 or STAB52H3 ~~STA257H5~~ or STA220H1 or STAB22H3 or ~~ECO220Y5 or ECO227Y5~~ or STA246H5 ~~PSY201H5~~ or STA237H1 ~~PSYB07H3~~ or STA247H1 ~~SOC350H5~~

Rationale:

To address equivalent/new courses across the three campuses.

Resources:

STA221H5: The Practice of Statistics II

Exclusions: STA221H1 or ~~STA256H5 or STA257H5 or STA257H1~~ or STA258H5 or STA248H1 or STAB27H3 or STA302H5 or STA302H1 or STAC67H3 or BIO360H5 or ECO220Y5 or ECO227Y5 or PSY202H5 or PSYB08H3

Rationale:

1. To address equivalent/new courses across the three campuses.
2. To have consistency across campuses.

Resources:

STA256H5: Probability and Statistics I

Description:

~~(Formerly STA257H5)~~ This course covers probability including its role in statistical modeling. Topics include probability distributions, expectation, continuous and discrete random variables and vectors, distribution functions. Basic limiting results and the normal distribution presented with a view to their applications in statistics.

Exclusions: STA246H5 ~~or STA257H5~~ or STA257H1 or ECO227Y5 or STAB52H3

Rationale:

STA257H5 has been renumbered to STA256H5 for many years. We like to have STA257H5 removed.

Resources:

STA258H5: Statistics with Applied Probability

Prerequisites: STA256H5 ~~or STA257H5~~

Rationale:

Tidy up. STA257H5 has been renumbered as STA256H5.

Resources:

STA260H5: Probability and Statistics II

Description:

~~(Formerly STA261H5)~~ A sequel to STA256H5 giving an introduction to current statistical theory and methodology. Topics include: estimation, testing, and confidence intervals; unbiasedness, sufficiency, likelihood; simple ~~linear and generalized~~ linear ~~models~~.

Prerequisites: STA256H5 ~~or STA257H5~~ or ECO227Y5

Exclusions: STAB57H3 or STA261H5 or STA261H1 or STAC58H3 ~~or STA238H1~~

Rationale:

1. Tidy up. STA261H5 has been renumbered as STA260H5 for many years.
2. No instructor ever covers this topic.
3. Tidy up. STA257H5 has been renumbered as STA256H5.
4. Add STA238H1 to exclusion: To address equivalent/new courses across the three campuses.

Resources:

STA302H5: Regression Analysis

Prerequisites: ~~(STA260H5 or STA261H1)~~ and (MAT223H5 or MAT240H5)

Rationale:

Tidy up. STA261H5 has been renumbered as STA260H5 for more than 5 years.

Resources:

STA304H5: Surveys, Sampling and Observational Data

Prerequisites: ~~STA221H5 or~~ STA258H5 ~~STA260H5 or STA238H1 or STA255H1~~ or ECO227Y5

Exclusions: STA304H1 ~~or STAC50H3 or STAC53H3~~

Recommended Preparation:

Previous: STA260H5 or STA261H1 strongly recommended

New:

Rationale:

- (a) To address new courses across the three campuses.
- (b) To have consistency across campuses: STA304H1

Resources:

STA305H5: Experimental Design

Prerequisites: ~~STA302H1~~ or STA302H5 or ~~STA331H5~~ or ECO375H5

Exclusions: ~~STA332H5~~ or STA305H1

Rationale:

Tidy up. STA331H5 and STA332H5 have been renumbered as STA302H5 & STA305H5, respectively for more than five years.

Resources:

STA312H5: Topics in Statistics: Applied Statistical Modelling

Prerequisites:

Previous: Permission of the instructor

New: Appropriate prerequisite requirement(s) will be available on the UTM timetable along with the topic title prior to course registration.

Rationale:

Pre-requisite update for topic course.

Resources:

STA313H5: Topics in Statistics: Applications of Statistical Models

Prerequisites:

Previous: Permission of the instructor

New: Appropriate prerequisite requirement(s) will be available on the UTM timetable along with the topic title prior to course registration.

Rationale:

Pre-requisite update for this topic course.

Resources:

STA314H5: Introduction to Statistical Learning

Corequisites:

Previous: STA302H5 and Permission of the Instructor

New: STA302H5

Exclusions:

Previous:

New: STA314H1

Rationale:

1. Permission of instructor not required.
2. To address equivalent course.

Resources:

STA315H5: Advanced Statistical Learning

Prerequisites:

Previous: STA314H5 and Permission of the Instructor

New: STA314H5

Rationale:

Permission of the Instructor is not required.

Resources:

STA348H5: Introduction to Stochastic Processes

Prerequisites: (STA260H5 ~~or STA261H5~~) and (MAT223H5 or MAT240H5)

Rationale:

STA261H5 has been renumbered to STA261H5 for many years. We would like to have it removed.

Resources:

STA360H5: Introduction to Bayesian Statistics

Prerequisites:

Previous: (MAT134H5 or MAT136H5 or MAT134Y5 or MAT135Y5 or MAT137Y5 or MAT157Y5 or MAT233H5) and (STA215H5 or STA220H5 or STA257H1 or STA256H5 or ECO220Y5 or ECO227Y5 or PSY201H5)

New: STA258H5 or STA238H1 or STA255H1 or ECO227Y5 or ECO227Y1 or STA260H5 or STA246H5

Exclusions:

Previous: STA313H5 or STA258H5 or STA248H1 or STA255H1 or STAB57H3 or ECO227Y5 or STA365H1

New: STA313H5 (Winter 2020 and Winter 2022) or STA365H1

Rationale:

According to the current exclusion, if student completed STA258H5 and then take STA360H5, STA360H5 will be marked Extra. Which means it will not be included in their total credits and will not affect the CGPA. Our STA students don't have many upper-level courses to take. We don't want to limit their choices. Additionally, STA360H5 instructor wanted students to take STA258 prior to taking STA360 –the opposite way as stated in the calendar.

Resources:

STA413H5: Estimation and Testing

Prerequisites: STA260H5 ~~or STA261H5~~

Rationale:

STA261H1 has been renumbered to STA260H5 more than five years ago.

Resources:

STA437H5: Applied Multivariate Statistics

Prerequisites: ~~STA302H1~~ or STA302H5 or ~~STA331H5~~ or ECO375H5

Rationale:

STA331H5 has been renumbered to STA302H5 for more than five years

Resources:

STA457H5: Applied Time Series Analysis

Prerequisites: ~~STA302H1~~ or STA302H5 or ~~STA331H5~~ or ECO227Y5

Rationale:

STA331H5 has been renumbered to STA302H5 for more than five years.

Resources:

3 Retired Courses:

CSC320H5: Introduction to Visual Computing

Rationale:

we have not offered CSC320H5 (Visual Computing) in at least ten years. These are not areas that we see faculty growth and have no plans to offer these courses in the foreseeable future.

CSC448H5: Formal Languages and Automata

Rationale:

we have not offered CSC448 (Formal Languages and Automata) in at least ten years. These are not areas that we see faculty growth and have no plans to offer these courses in the foreseeable future.

MAT212H5: Modeling with Differential Equations in Life Sciences and Medicine

Rationale:

It hasn't been taught in about 10 years, and we don't plan to offer it.

Addendum: SCI Course Experience Tags (Fall 2021)

Unit	Course Experience	Code	Calendar Title & Description
Anthropology (UTM), Department of			
University-Based Experience			
	ANT306H5	Forensic Anthropology Field School	Introduction to the field of forensic anthropological field techniques and scene interpretation. A 2-week field school will be held on the U of T Mississauga campus (Monday to Friday 9 a.m. to 5 p.m., two weeks in August). Weekly 2-hour classes will be held during the fall term. In these classes, students will examine casts, maps, photos and other evidence collected in the field, for the purposes of scene reconstruction and presentation in court. Limited Enrolment and Application Process: see Anthropology department website for more details.
	ANT318H5	Archaeological Fieldwork	Introduction to archaeological field methods. Practical component of the field school takes place on the UTM campus during the last two weeks of August (Monday-Friday 9:00 am - 5:00 pm). Morning lectures (week one) covering note taking, map making, cultural landscapes, material culture identification and survey and excavation methods, are followed by afternoons in the field applying skills taught that morning. Week two is spent excavating at an archaeological site. During weekly laboratory sessions September - December students learn to process, identify, and catalogue artifacts recovered during the field component. Limited Enrolment and Application Process: see Anthropology department website for more details.
	ANT418H5	Advanced Archaeological Fieldwork	Practical experience for students who completed ANT318H5 and are ready for more advanced field experiences. During practical component (last two weeks of August, Monday-Friday 9:00 am - 5:00 pm) students have responsibility for recording/documenting an archaeological site in the field, including survey and detailed mapping. Students also act as mentors to ANT318 students during pedestrian and subsurface survey, and excavation. During weekly laboratory sessions September - December students process, identify, and catalogue artifacts, and learn to write an archaeological report and site record form. Limited Enrolment and Application Process: see Anthropology department website for more details.
Biology (UTM), Department of			
Partnership-Based Experience			
	BIO400Y5	Biology Internship	Through a part-time, unpaid, 200-hour work placement, fourth year students apply biology content and skills. Placements are made throughout the GTA in both the private (e.g. pharmaceutical or biotech companies) or public (e.g. Peel Region Medical Office, hospitals, Great Lakes Laboratory) sector. Biweekly class meetings plus year-end report and presentation are required. Students in a biology specialist program are given priority. Updated application information will be on-line at www.utm.utoronto.ca/intern by February 1st of each year. Please see the Internship Office (DV 3201D) for more information.
University-Based Experience			
	BIO481Y5	Biology Research Project	Students in this course will conduct a research project under the supervision of a faculty member in the Department of Biology. The course is open to third and fourth year students. Students learn how to design, carry out, and evaluate the results of a research project. Students are required to write and present a research proposal, write a term paper, and present a seminar on the results of their research project. All students interested in a research project must approach potential faculty supervisors several months in advance of the beginning of term. Students must obtain permission from the faculty member whom they would like to serve as their project supervisor. Students must meet with the course coordinator periodically throughout the academic year.

Unit	Course Experience	Code	Calendar Title & Description
Chemical and Physical Sciences (UTM), Department of			
Partnership-Based Experience			
	CPS400Y5	Chemical and Physical Sciences Internship	<p>This internship opportunity will allow students to apply theoretical and practical skills acquired during their undergraduate education in order to gain vital industry experience. Students will be trained in effective job searching skills (writing a CV and a Cover Letter, participating in job interviews) and will gain valuable experiences that are sought after by employers in both public and private sectors. Students will be placed with various employers in the GTA based on their interest and skill set, and on the employer needs and availability. The placement is a 200 h unpaid internship. The Course Coordinator/Instructor(s) will schedule biweekly meetings to discuss the setup and progress of the student projects. Student attendance is mandatory. At the end of the term, students must submit a written report and prepare an oral presentation about the outcomes of their work experience. In order to be considered for the internship, students must apply for the course. The Course Coordinator will approve enrolment in the course based on the number of internship opportunities available, which will vary from year-to-year, and student qualifications (e.g. GPA, experience, qualifications related to the requirements of the available placement(s), and interview performance).</p>
University-Based Experience			
	AST299Y5	Research Opportunity Program	<p>This courses provides a richly rewarding opportunity for students in their second year to work in the research project of a professor in return for 299Y course credit. Students enrolled have an opportunity to become involved in original research, learn research methods and share in the excitement and discovery of acquiring new knowledge. Participating faculty members post their project descriptions for the following summer and fall/winter sessions in early February and students are invited to apply in early March. See Experiential and International Opportunities for more details.</p>
	AST399Y5	Research Opportunity Program	<p>This course provides third-year undergraduate students (after completing at least 9.0 credits) who have developed some knowledge of astronomical research with an opportunity to assist in a research project of a professor in return for course credit. Students enrolled in this course have the opportunity to enhance their research skills and share in the excitement of acquiring new knowledge and in the discovery process of science. Participating faculty members post their project descriptions for the following summer and fall/winter sessions in early February, and students are invited to apply in early March. See Experiential and International Opportunities for more detail.</p>
	CHM396H5	Analytical and Physical Chemistry Instrumentation Laboratory I	<p>This analytical and physical chemistry laboratory course represents an integration of the study of fundamental physical chemistry with wide-ranging applications to instrumental methods of analysis, such as separation science, electrochemistry and spectroscopy. The course will provide a solid hands-on grounding in many of the major topics covered in analytical and physical chemistry, and the optimization of instrumental analytical measurements by the application of physical principles. Students select from a variety of instruments to customize their program, and develop their own analytical methods to address analytical problems of interest to the student.</p>
	CHM397H5	Analytical and Physical Chemistry Instrumentation Laboratory II	<p>This analytical and physical chemistry laboratory course carries on from CHM396 to introduce more advanced topics in instrumental methods of analysis and physical chemistry concepts. The course will include experimental modules focused on instrument design and computer interfacing, molecular spectroscopy (e.g. fluorescence, infrared and Raman, and NMR), plasmon resonance methods for biomolecule determinations and kinetic analysis, microfluidics and lab-on-a-chip technologies. The course will provide practical experience in the optimization of instrumental analytical measurements, experiment design, and topics of relevance to research in analytical and physical chemistry.</p>

Unit	Course Experience	Code	Calendar Title & Description
		CHM399Y5	<p>Research Opportunity Program</p> <p>This course provides third-year undergraduate students (after completion of 8.0 credits) who have developed some knowledge of Chemistry and its research methods, an opportunity to work in the research project of a professor in return for course credit. Students enrolled have the opportunity to become involved in original research, enhance their research skills and share in the excitement of acquiring new knowledge and in the discovery process of science. This course does not count as one of the requirements in the Chemistry Minor program. Participating faculty members post their project descriptions for the following summer and fall/winter sessions in early February and students are invited to apply in early March. See Experiential and International Opportunities for more details.</p>
		CPS398H5	<p>Teaching Opportunity Program in Sciences</p> <p>A scholarly, active learning project in which students integrate and apply their understanding of science and pedagogy by observing, actively participating in, and reflecting on the teaching and learning process under the supervision of an experienced instructor/mentor. This course may be taken in either the Summer, Fall or Winter terms. Enrolment requires submitting an application to the department before the end of the term prior to that in which it is intended to undertake the research. Independent Studies Application Forms may be found at http://uoft.me/cpsforms. Students should plan for the course in March of the previous academic year and register as soon as their registration period begins. Students are encouraged to consult with, and obtain the consent of, prospective supervisors before applying for enrolment. Enrolment will depend on the availability of positions.</p>
		CPS401Y5	<p>Research and Development in Science Education</p> <p>This course is intended for students in a CPS or Environmental Science Major or Specialist program. It provides an experiential learning opportunity with secondary school students and teachers. Students will research the literature of science pedagogy and acquire pedagogical content knowledge, particularly that of problem-based learning and the use of case studies. Then, through the creation of original, problem-based learning materials for Grades 11 and 12 classes and the preparation of teachers' notes for these materials, they will enhance their subject specialization knowledge. They will then assist a teacher in implementing their materials in a school or, where the materials involve experiments, in the field or in the UTM teaching laboratories. The course is normally taken in the student's fourth year. Enrollment requires submitting an application to the CPS Department in the spring term, with the application due date being the final day of classes. Independent Studies Application Forms may be found at http://uoft.me/cpsforms. Applications should be submitted to the CPS Undergraduate Assistant. Registration on ACORN is also required.</p>
		CPS489Y5	<p>Introduction to Research in the Chemical and Physical Sciences</p> <p>Students will work toward the completion of an experimental or theoretical research project in an area of study within the chemical and physical sciences, namely, astronomy, chemistry, earth sciences or physics. Projects will be based on current trends in research and students will work to complete their projects with guidance provided by a team of facilitators and faculty advisors consisting of course coordinators and a researcher from the Department of Chemical and Physical Sciences. In addition to the rigorous development of research skills, the course will also provide students with training and practical experience in project management techniques and practical research, literary and communications skills development. CPS489Y5 requires submitting an application to the department. Application forms may be found at http://uoft.me/cpsforms. Applications should be submitted to the CPS Undergraduate Assistant.</p>

Unit	Course Experience	Code	Calendar Title & Description
		ERS299Y5	<p>Research Opportunity Program</p> <p>This courses provides a richly rewarding opportunity for students in their second year to work in the research project of a professor in return for 299Y course credit. Students enrolled have an opportunity to become involved in original research, learn research methods and share in the excitement and discovery of acquiring new knowledge. Participating faculty members post their project descriptions for the following summer and fall/winter sessions in early February and students are invited to apply in early March. See Experiential and International Opportunities for more details.</p>
		ERS325H5	<p>Field Camp I</p> <p>This course, held on the north shore of Lake Huron in the summer, covers geological mapping skills, stratigraphic section measurements, and the recognition of rock types, fossils and geological structures in an authentic field-based learning environment in order to interpret ancient geological environments (approx. 12 days of field instruction). Students in this course receive an instructor lead introduction to the regional geology at whitefish falls, Ontario, before engaging in individual or small group projects in which geologic maps of a defined region will be assembled over 5-6 days of student-led field work. Students will complete an oral field examinations at the end of the field days. Students must pay a course fee, which includes transportation and accommodation at the camp, but does not include the cost of food nor does it cover any course fees charged by the Office of the Registrar. Note: This course is identical to ESS330H1 (formerly GLG340H1). U of T Mississauga students must register in the Summer Session, and provide consent waivers and the course fee to the Undergraduate Assistant for Earth Sciences in the Department of Chemical and Physical Sciences. This field camp is usually held in early May. Registration and fee payment deadline: mid-March. For specific yearly course information, please see the UTM CPS Earth Science Fieldtrip page for more information on dates, required field gear and other information.</p>
		ERS399Y5	<p>Research Opportunity Program</p> <p>This course provides a richly rewarding opportunity for third or higher year students to work on the research project of a professor in earth sciences in return for 399Y course credit. Students enrolled have an opportunity to become involved in original research, enhance their research skills and share in the excitement and discovery of acquiring new knowledge. Participating faculty members post their project description for the following summer and fall/winter session on the ROP website in mid-February and students are invited to apply at that time. See Experiential and International Opportunities for more details.</p>
		ERS425H5	<p>Geology of North America</p> <p>This course will provide students with a first-hand FIELD exposure to geologic outcrops in North America, where knowledge gained during classroom instruction throughout their studies can be applied to textbook examples of a variety of real-world geologic features. The course is structured around one major field trip during the fall break where student-led group work on rock outcrops is done, followed by the provision of individual presentations and the preparation of field reports. There is a nonrefundable fee associated with this course beyond tuition. Students must register on ROSI, on a first-come first-serve and non-refundable deposit basis. The deposit must be received by the Department within one week from the first day of enrollment or the student will be dropped automatically from the course. Students should contact the Department by March of the academic year preceding the course to find out more details about the specific field trip plans.</p>

Unit	Course Experience	Code	Calendar Title & Description
		ERS499Y5	<p>Research Opportunity Program</p> <p>This course provides a richly rewarding opportunity for a fourth or higher year students to work on the research project of a professor in Earth Science in return for 499Y5 course credit. Students enrolled have an opportunity to become involved in original research, enhance their research skills and share in the excitement and discovery of acquiring new knowledge. Participating faculty members post their project description for the following summer and fall/winter session on the ROP website in mid-February and students are invited to apply at that time. See Experiential and International Opportunities for more details.</p>
		JCB487Y5	<p>Advanced Interdisciplinary Research Laboratory</p> <p>Students will work together as members of a multidisciplinary team toward the completion of an interdisciplinary experimental or theoretical research project. Teams will be comprised of at least three students, with representation from at least three areas of specialization, namely, astronomy, biology, chemistry, earth sciences or physics. The interdisciplinary projects will be based on current trends in research and student teams will work to complete their projects with guidance provided by a team of faculty advisors from the Biology Department and the Department of Chemical and Physical Sciences. In addition to the rigorous development of research skills, the course will also provide students with training and practical experience in project management techniques and teamwork skills development. JCB487Y5 requires submitting an application to the department before the end of June for Fall enrolment. Application forms may be found at http://uoft.me/cpsforms. Application should be submitted to the CPS Undergraduate Assistant. Registration on ACORN is also required.</p>
		PHY299Y5	<p>Research Opportunity Program</p> <p>This course provides a rewarding opportunity for students in their second year to work in the research project of a professor in return for 299Y course credit. Students enrolled have an opportunity to become involved in original research, learn research methods and share in the excitement and discovery of acquiring new knowledge. Participating faculty members post their project descriptions for the following summer and fall/winter sessions in early February and students are invited to apply in early March. See Experiential and International Opportunities for more details.</p>
		PHY399Y5	<p>Research Opportunity Program</p> <p>This course provides third-year undergraduate students (after completion of at least 8 to 10 credits) who have developed some knowledge of Physics and its research methods, an opportunity to work in the research project of a professor in return for course credit. Students enrolled have the opportunity to become involved in original research, enhance their research skills and share in the excitement of acquiring new knowledge and in the discovery process of science. Participating faculty members post their project descriptions for the following summer and fall/winter sessions in early February and students are invited to apply in early March. See Experiential and International Opportunities for more details.</p>
Geography, Geomatics and Environment (UTM), Department of			
	Partnership-Based Experience		
		GGR442H5	<p>GIS Capstone Project</p> <p>Students apply prerequisite knowledge and techniques to real-world GIS projects requested by external clients. Through background research, proposal, data management, and implementation, students develop GIS professional competencies, which will be demonstrated through collaboration, presentations and reports.</p>

Unit	Course Experience	Code	Calendar Title & Description
		JEG400Y5	<p>Geography / Environment Science Internship</p> <p>Through a part-time, unpaid work placement, students apply the natural science based environmental science/physical geography expertise gained through previous course work. Placements are made at local conservation authorities, municipalities, environmental consulting companies, corporations, provincial or federal agencies, and other organizations. Students must submit an application online. Instructions for the application can be found on the Geography Department home page.</p>
University-Based Experience			
		ENV496H5	<p>Restoration Ecology II</p> <p>The follow-up course to Restoration Ecology I, ENV496 will build on its theoretical foundations to focus on student involvement in a variety of restoration projects planned or underway by Credit Valley Conservation and other groups in Mississauga and the greater Credit Valley watershed. The emphasis here is on planning and implementation of restoration projects; good scientific design; understanding policies and procedures; identifying and working with stakeholders, etc. Occasional field exercises may be scheduled during regular class meeting times.</p>
		ENV497H5	<p>Environmental Research Project</p> <p>This independent project course is designed to give students experience in the definition and execution of a one-term research study on an environmental topic, under the guidance of a member of the faculty. Students who wish to pursue this option with a specific faculty member or who have an idea for a research project should approach the faculty member early - before the start of the academic term - to negotiate the terms of the project.</p>
		JEG417Y5	<p>Honours Thesis</p> <p>This course is designed to give students experience in the design and execution of an independent senior thesis under the supervision of a faculty member. In order to register in the course, students must obtain approval from a supervisor, complete an application form and submit the form to the Department of Geography. Please refer to the Department of Geography website for details: https://utm.utoronto.ca/geography/field-internship-and-thesis-courses. This course may fulfill field day components. Please consult with your supervisor.</p>
Mathematical and Computational Sciences (UTM), Department of			
University-Based Experience			
		CSC392H5	<p>Computer Science Implementation Project</p> <p>This course involves a significant implementation project in any area of Computer Science. The project may be undertaken individually or in small groups. The project is offered by arrangement with a Computer Science faculty member.</p>
		CSC393H5	<p>Computer Science Expository Work</p> <p>This course involves a significant literature search and expository work in any area of Computer Science. This work must be undertaken individually. It is offered by arrangement with a Computer Science faculty member.</p>
		CSC492H5	<p>Computer Science Implementation Project</p> <p>This course involves a significant implementation project in any area of Computer Science. The project may be undertaken individually or in small groups. The project is offered by arrangement with a Computer Science faculty member.</p>
		CSC493H5	<p>Computer Science Expository Work</p> <p>This course involves a significant literature search and expository work in any area of Computer Science. This work must be undertaken individually. It is offered by arrangement with a Computer Science faculty member.</p>

Unit	Course Experience	Code	Calendar Title & Description
		MAT397H5	<p>Further Studies in Mathematics</p> <p>Students explore a topic in mathematics under the supervision of a faculty member. Interested students must consult with mathematics faculty at least two months prior to registration, to determine the topic and scope.</p>
		MAT398H5	<p>Further Studies in Mathematics</p> <p>Students explore a topic in mathematics under the supervision of a faculty member. Interested students must consult with mathematics faculty at least two months prior to registration, to determine the topic and scope.</p>
		MAT492H5	<p>Senior Thesis</p> <p>An exposition on a topic in mathematics written under the supervision of a faculty member. Open to students in Mathematical Sciences Specialist program.</p>
		MAT497H5	<p>Further Studies in Mathematics</p> <p>Students explore a topic in mathematics under the supervision of a faculty member. Interested students must consult with mathematics faculty at least two months prior to registration, to determine the topic and scope.</p>
		MAT498H5	<p>Further Studies in Mathematics</p> <p>Students explore a topic in mathematics under the supervision of a faculty member. Interested students must consult with mathematics faculty at least two months prior to registration, to determine the topic and scope.</p>
		STA378H5	<p>Research Project</p> <p>Research project. The project topic will vary from year to year. Interested students must consult with statistics faculty, at least two months prior to registration, to determine the project's topic and scope. Enrolment by permission of instructor only.</p>
		STA398H5	<p>Research Project</p> <p>The project topic will vary from year to year. Interested students must consult with statistics faculty, at least two months prior to registration, to determine the project's topic and scope. Enrolment by permission of instructor only.</p>
		STA478H5	<p>Statistics Research Project</p> <p>Research project. The project topic will vary from year to year. Interested students must consult with statistics faculty, at least two months prior to registration, to determine the project's topic and scope. Enrolment by permission of instructor only.</p>
		STA498H5	<p>Research Project</p> <p>The project topic will vary from year to year. Interested students must consult with statistics faculty, at least two months prior to registration, to determine the project's topic and scope. Enrolment by permission of instructor only.</p>

Unit	Course Experience	Code	Calendar Title & Description
Psychology (UTM), Department of			
Partnership-Based Experience			
	PSY442Y5	Practicum in Exceptionality in Human Learning	Seminar and practicum on issues relating to the life-long development of individuals with disabilities. Seminar at UTM; practicum involves supervised placements in schools or social service agencies (80 hours). Course is required for students enrolled in the Exceptionality in Human Learning Specialist program and is available to Psychology Specialists, Majors and Minors on a competitive basis. Course fulfills the 400-level seminar requirement for the Psychology Specialist Program. Admission by academic merit. Interested students should submit an application to the Psychology office by mid-April. Application procedures: http://www.utm.utoronto.ca/psychology/undergraduate-studies/course-information/courses-requiring-application .
University-Based Experience			
	PSY299H5	Research Opportunity Program	This course provides a richly rewarding opportunity for students in their second year to participate in the research project of a professor in return for 299H course credit. Students enrolled have an opportunity to become involved in original research, learn research methods and share in the excitement and discovery of acquiring new knowledge. Participating faculty members post their project descriptions for the following summer and fall/winter sessions in early February and students are invited to apply in early March. See Experiential and International Opportunities for more details.
	PSY399H5	Research Opportunity Program	This course provides third year undergraduate students who have developed an understanding of psychological research methods with an opportunity to participate in the research program of a faculty member in return for course credit. Enrolled students will have the opportunity to become involved in original research, enhance their research skills and share in the excitement of acquiring new knowledge and in the discovery process of science. Participating faculty members post their project descriptions for the following summer and fall/winter sessions in early February and students are invited to apply in early March. See Experiential and International Opportunities for more details.
	PSY400Y5	Thesis	Independent research supervised by individual faculty members. Seminars on general topics relevant to the conduct of independent research, student research proposals, and the presentation of findings. To register in the course, students must obtain approval from a faculty supervisor, and apply for and obtain approval from Department of Psychology (see the Psychology department website for details). Advanced-level students who do not meet the stated course prerequisites but who possess relevant research experience may be admitted at the discretion of the course instructor. In addition to the seminar component, students complete at least 72 hours of research in the laboratory of their supervisor. Note: Entry to the course is competitive. Satisfaction of minimum requirements does not guarantee admission to the course.
	PSY403H5	Individual Project	Independent research on a specific aspect of human or animal behaviour. Students arrange for a Faculty supervisor during the preceding term.
	PSY404H5	Individual Project	Independent research on a specific aspect of human or animal behaviour. Students arrange for a Faculty supervisor during the preceding term.
	PSY405H5	Individual Project	Independent research on a specific aspect of human or animal behaviour. Students arrange for a Faculty supervisor during the preceding term.

Unit	Course Experience	Code	Calendar Title & Description
		PSY406H5	Individual Project
			Independent research on a specific aspect of human or animal behaviour. Students arrange for a Faculty supervisor during the preceding term.