FOR APPROVAL **PUBLIC** **OPEN SESSION**

TO: UTSC Academic Affairs Committee

SPONSOR: Prof. William Gough, Vice-Principal Academic and Dean
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PRESENTER: Prof. Mary Silcox, Vice-Dean Graduate & Postdoctoral Studies
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DATE: March 16, 2021 for March 23, 2021

AGENDA ITEM: 7

ITEM IDENTIFICATION:

Minor Modification: Graduate Curriculum Changes – Graduate Department of Physical and Environmental Sciences, UTSC

JURISDICTIONAL INFORMATION:

University of Toronto Scarborough Academic Affairs Committee (AAC) "is concerned with matters affecting the teaching, learning and research functions of the Campus" (*AAC Terms of Reference, Section 4*). Under section 5.6 of its terms of reference, the Committee is responsible for approval of "Major and minor modifications to existing degree programs." The AAC has responsibility for the approval of Major and Minor modifications to existing programs as defined by the University of Toronto Quality Assurance Process (*UTQAP, Section 3.1*).

GOVERNANCE PATH:

1. **UTSC Academic Affairs Committee [For Approval] (March 23, 2021)**

PREVIOUS ACTION TAKEN:

No previous action in governance has been taken on this item.

HIGHLIGHTS:

This package includes minor modifications to graduate curriculum, submitted by the Graduate Department of Physical and Environmental Sciences, which require governance approval. Minor modifications to curriculum are understood as those that do not have a significant impact on program or course learning outcomes. They require governance approval when they modestly change the nature of a program or course.

Changes are being made to:

1. Master of Environmental Science
    - EES1131H, which is an optional course in the Climate Change Impacts and Adaptation field will be jointly offered with a new undergraduate course, EESD31H3. Students who complete EESD31H3 prior to admission to the MEnvSc, who have achieved a minimum grade of 70%, will not be required to repeat EES1131H; instead, they must complete EES1134H and EES1136H to satisfy the requirements of the MEnvSc.
    - The admission requirements for the field in Conservation and Biodiversity includes that students must have an undergraduate degree in biology or a closely related field. This admission requirement has been modified to add that students must also have successfully completed an undergraduate conservation biology course. Students who have not successfully completed an undergraduate conservation biology course will be required to complete the undergraduate course, BIOC63H3 (Conservation Biology) as an extra (EXT) course in MEnvSc program
2. EES1131H
    - EESD31H3 has been added as an exclusion.

There has been wide consultation within the GDPES.

FINANCIAL IMPLICATIONS:

There are no net implications to the campus operating budget.

RECOMMENDATION:

Be It Resolved,

THAT the proposed Graduate Department of Physical and Environmental Sciences graduate curriculum changes for the 2021-22 academic year, as detailed in the respective curriculum reports, be approved.

DOCUMENTATION PROVIDED:

1. 2021-22 Curriculum Cycle: Graduate Minor Curriculum Modifications for Approval Report 1: Graduate Department of Physical and Environmental Sciences, dated March 8, 2021.
2. 2021-22 Curriculum Cycle: Graduate Minor Curriculum Modifications for Approval Report 2: Graduate Department of Physical and Environmental Sciences, dated March 8, 2021.

UNIVERSITY OF TORONTO SCARBOROUGH

2021-22 Curriculum Cycle
Graduate Minor Curriculum Modifications for Approval
Report 1: Graduate Department of Physical and Environmental Sciences
Program Changes
March 8, 2021

Master of Environmental Science

Summary

x	*Changing Admission Requirements*		*Renaming Field, Concentration or Emphasis*
x	*Changing Program Length or Requirements*		*Renaming of Program or Degree*
	Changing Timing of Program Requirements		*Creating a new Emphasis*
	Adding/Removing Option (i.e. part-time, flex-time)		*Changes to programs affecting a MOA*

Summary:

1. An optional course in the CCIA field of the MEnvSc, EES1131H, will be cross-listed with a new undergraduate course, EESD31H3 (proposal submitted). Students who complete EESD31H3, and achieve a minimum grade of 70%, will not be required to complete EES1131H; instead, they will be asked to replace EES1131H with another elective graduate course of the same credit weight (0.5 credit). The calendar description for the CCIA field has been revised to reflect this change.
2. The admission requirements for the field in Conservation and Biodiversity includes that students must have an undergraduate degree in biology or a closely related field. This admission requirement has been modified to add that students must also have successfully completed an undergraduate conservation biology course. Students who have not successfully completed an undergraduate conservation biology course will be required to complete the undergraduate course, BIOC63H3 (Conservation Biology) as an extra (EXT) course in MEnvSc program.

Effective Date of Change

September, 2021

Academic Rationale

1. EES1131H, which is an optional course in the CCIA field of the MEnvSc program, will now be jointly offered with a new undergraduate course, EESD31H3. Students who complete EESD31H3 prior to their admission to the MEnvSc, and who achieved a minimum grade of 70% in the course, should not have to repeat the same material in EES1131H; instead, these students should be able to replace it with 0.5 FCE in other graduate elective courses. This change does not compromise the rigour of the MEnvSc program.
2. The practice in the CB field, since it was first introduced, has been for students who have not successfully completed an undergraduate course in conservation biology to complete BIOC63H3 (Conservation Biology) as an extra (EXT) course; students are apprised of this requirement in their letters of offer. The changes to the admission requirements formalize and make this requirement clear to students.

Impact on Students

1. Students who have completed EESD31H3 as part of their undergraduate studies at UTSC will have slightly more flexibility in completing their program requirements for the MEnvSc. This change will only impact a small number of students, since most students in the CCIA field come from outside UTSC.
2. There is no impact on students. The change to the admission requirements formalizes, and makes clear, a practice that has been in place since the introduction of the CB field.

Consultation

1. This change has been discussed and approved by the DPES Chair and the DPES Graduate Committee. Consultation with several other DPES faculty with an interest in the course has also taken place. The proposal was approved by the DPES Teaching and Curriculum Committee on November 13, 2020.
2. The faculty and graduate Chair have consulted regarding this change. It has been approved by the DPES Graduate Committee: Dec 11, 2020.

Resources

None

Governance Approval

Unit Sign-Off (Committee name and meeting date)	**1. DPES Teaching and Curriculum Committee: November 13, 2020.** **2. DPES Graduate Committee: Dec 11, 2020.**
Dean's Office Sign-Off (Name and Date)	**Mary Silcox, Vice-Dean Graduate and Postdoctoral Studies: March 2, 2021**
UTSC Academic Affairs Committee	**March 23, 2021**

Appendix A: Calendar Entry

Master of Environmental Science
Program Description

The MEnvSc is a 12-month degree program committed to the development of well-trained practitioners in environmental science in all fields, primarily to meet the needs of industry, governments, and environmental policy/education organizations.

The MEnvSc offers three enrolment options — research, internship, and part-time studies — in each of the three fields. The three designated fields of study are:

- Climate Change Impacts and Adaptation: Students are trained in the science, data analysis, and rigorous assessment process for the impacts of climate change on a wide range of natural and human systems.
- Conservation and Biodiversity: A major focus is the application of ecological theory and principles to real-world conservation challenges.
- Terrestrial and Aquatic Systems: A major focus is understanding the flux of contaminants and excess nutrients through surface and sub-surface environments and the methods/solutions needed to remediate contaminated or damaged environmental systems.

In all three fields, students can opt for an internship or a research option after eight months of coursework. The Department of Physical and Environmental Sciences has the support of two dedicated internship coordinators who help students find and successfully complete an internship by providing them with professional skills training and in-class workshops on topics that include job search preparation and skills such as: environmental labour market, workplace expectations, professionalism, networking, and more. The MEnvSc program works closely with a broad employer base for internship opportunities. Research-stream MEnvSc students receive intensive and individualized academic and research support from mentors of their choice.

Full-time and part-time study options are available in all fields of study.

Field: Climate Change Impacts and Adaptation

Minimum Admission Requirements
- Applicants are admitted under the General Regulations of the School of Graduate Studies. Applicants must also satisfy the Graduate Department of Physical and Environmental Sciences' additional admission requirements stated below.
- Applicants whose primary language is not English and who graduated from a university where the language of instruction and examination was not English must demonstrate proficiency in English. See General Regulations section 4.3 for requirements.
- A minimum mid-B grade average in the last two years of the undergraduate program.

- Applicants must submit a written statement explaining their objectives for entering the program and the suitability of their background. Appropriate post-graduate work experiences will be considered as part of the admission application.
- A science or engineering undergraduate degree including at least two half courses or one full course in each of chemistry, physics, calculus, and biology.

Program Requirements

- Coursework consists of 5.5 full-course equivalents (FCEs) as follows:
  - EES 1100H *Advanced Seminar in Environmental Science* (0.5 FCE)
  - EES 1117H *Climate Change Impact Assessment* (0.5 FCE)
  - EES 1132H *Climate Data Analysis* (0.5 FCE).
    - Note: students who have completed EESD21H3 as part of their undergraduate degree, and achieved a minimum grade of 70%, should replace EES 1132H with another elective graduate course of the same credit weight (0.5 FCE).
  - EES 1133H *Climate Change Science and Modelling* (0.5 FCE)
  - Completion of two of the following three courses:
    - EES 1131H *Applied Climatology* (0.5 FCE)
      Note: students who have completed EESD31H3 as part of their undergraduate degree, and achieved a minimum grade of 70%, cannot complete EES 1131H as part of the MEnvSc, and should complete EES 1134H and EES 1136H.
    - EES 1134H *Climate Change Policy* (0.5 FCE)
    - EES 1136H *Climate Change Adaptation* (0.5 FCE)
  - Completion of either:
    - 0.5 FCE in elective courses (see course list) and 2.0 FCEs for the internship (EES 1116Y), or
    - 1.0 FCE in elective courses (see course list) and 1.5 FCEs for the research paper (EES 1101Y). Students planning to complete the research paper option must complete the prerequisite (EES 1114H).
- Students will choose either a research or internship option.
  - Research option: Each student is required to have a research supervisor. For full-time students, the intensive research necessary for the research paper will normally be completed in the final Summer session. The final research paper needs to be written in scientific journal format and will be presented and defended orally in front of an examination committee. The committee will include the supervisor and two other members of the graduate faculty.
  - Internship option: For full-time students, the internship in private industry, government, or a non-governmental organization (NGO) will normally be completed in the final Summer session. It will consist of a minimum of four consecutive months. Successful completion of the internship is based on an assessment completed by the student's work supervisor, the satisfactory completion of a written experience report, and the satisfactory completion and presentation of a poster highlighting the internship experience.

- A final grade below 70% in any course equates to an FZ, which is an insufficient grade. A MEnvSc student who receives more than one final grade of FZ (i.e., two or more) will be recommended for termination of registration from the MEnvSc program.

Program Length
3 sessions full-time (typical registration sequence: F/W/S);
6 sessions part-time

Time Limit
3 years full-time;
6 years part-time

Field: Conservation and Biodiversity

Minimum Admission Requirements
- Applicants are admitted under the General Regulations of the School of Graduate Studies. Applicants must also satisfy the Graduate Department of Physical and Environmental Sciences' additional admission requirements stated below.
- Applicants whose primary language is not English and who graduated from a university where the language of instruction and examination was not English must demonstrate proficiency in English. See General Regulations section 4.3 for requirements.
- A minimum mid-B grade average in the last two years of the undergraduate program.
- Applicants must submit a written statement explaining their objectives for entering the program and the suitability of their background. Appropriate post-graduate work experiences will be considered as part of the admission application.
- An undergraduate degree in biology or a closely related field, and successful completion of an undergraduate course in conservation biology. Students who have not successfully completed an undergraduate course in conservation biology will be required to complete an undergraduate course, BIOC63H3 (Conservation Biology, 0.5 FCE), as an extra (EXT) course.

Program Requirements
- Coursework consists of 5.5 full-course equivalents (FCEs) as follows:
  - EES 1100H *Advanced Seminar in Environmental Science* (0.5 FCE)
  - EES 3000H *Applied Conservation Biology* (0.5 FCE)
  - EES 3001H *Professional Scientific Literacy* (0.5 FCE)
  - EES 3002H *Conservation Policy* (0.5 FCE)
  - EES 3003H *Topics in Applied Biodiversity* (0.5 FCE)
  - Completion of either:
    - 1.0 FCE in elective courses (see the course list) and 2.0 FCEs for the internship (EES 1116Y) or
    - 1.5 FCEs in elective courses (see the course list) and 1.5 FCEs for the research paper (EES 1101Y).
- Students will choose either a research or internship option.

  - Research option: Each student is required to have a research supervisor. For full-time students, the intensive research necessary for the research paper will normally be completed in the final Summer session. The final research paper needs to be written in scientific journal format and will be presented and defended orally in front of an examination committee. The committee will include the supervisor and two other members of the graduate faculty.
  - Internship option: For full-time students, the internship in private industry, government, or a non-governmental organization (NGO) will normally be completed in the final Summer session. It will consist of a minimum of four consecutive months. Successful completion of the internship is based on an assessment completed by the student's work supervisor, the satisfactory completion of a written experience report, and the satisfactory completion and presentation of a poster highlighting the internship experience.
- A final grade below 70% in any course equates to an FZ, which is an insufficient grade. A MEnvSc student who receives more than one final grade of FZ (i.e., two or more) will be recommended for termination of registration from the MEnvSc program.

Program Length
3 sessions full-time (typical registration sequence: F/W/S);
6 sessions part-time

Time Limit
3 years full-time;
6 years part-time

Field: Terrestrial and Aquatic Systems

Minimum Admission Requirements
- Applicants are admitted under the General Regulations of the School of Graduate Studies. Applicants must also satisfy the Graduate Department of Physical and Environmental Sciences' additional admission requirements stated below.
- Applicants whose primary language is not English, and who graduated from a university where the language of instruction and examination was not English, must demonstrate proficiency in English. See General Regulations section 4.3 for requirements.
- A minimum mid-B grade average in the last two years of the undergraduate program.
- Applicants must submit a written statement explaining their objectives for entering the program and the suitability of their background. Appropriate post-graduate work experiences will be considered as part of the admission application.
- A science or engineering undergraduate degree including at least two half courses or one full course in each of chemistry, physics, calculus, and biology.

Program Requirements
- Coursework consists of 5.5 full-course equivalents (FCEs) as follows:

- EES 1100H *Advanced Seminar in Environmental Science* (0.5 FCE)
- Complete either:
  - 3.0 FCEs in elective courses (see the course list) and 2.0 FCEs for the internship (EES 1116Y) or
  - 3.5 FCEs in elective courses (see the course list) and 1.5 FCEs for the research paper (EES 1101Y). Students planning to complete the research paper option must complete the prerequisite EES 1114H.

- Students will choose either a research or internship option.
  - Research option: Each student is required to have a research supervisor. For full-time students, the intensive research necessary for the research paper will normally be completed in the final Summer session. The final research paper needs to be written in scientific journal format and will be presented and defended orally in front of an examination committee. The committee will include the supervisor and two other members of the graduate faculty.
  - Internship option: For full-time students, the internship in private industry, government, or a non-governmental organization (NGO) will normally be completed in the final Summer session. It will consist of a minimum of four consecutive months. Successful completion of the internship is based on an assessment completed by the student's work supervisor, the satisfactory completion of a written experience report, and the satisfactory completion and presentation of a poster highlighting the internship experience.
- A final grade below 70% in any course equates to an FZ, which is an insufficient grade. A MEnvSc student who receives more than one final grade of FZ (i.e., two or more) will be recommended for termination of registration from the MEnvSc program.

Program Length
3 sessions full-time (typical registration sequence: F/W/S);
6 sessions part-time

Time Limit
3 years full-time;
6 years part-time

Physical and Environmental Sciences: Environmental Science MEnvSc Courses
Please note that not all courses are offered every year.

EES 1100H	Advanced Seminar in Environmental Science
EES 1101Y	Research Paper in Environmental Science
EES 1102H	Analytical Chemistry for Geoscientists
EES 1104H	Microorganisms and the Environment
EES 1105H	Soil Contamination Chemistry
EES 1106H	Geological Evolution and Environmental History of North America

EES 1108H	Environmental Science Field Camp
EES 1109H	Advanced Techniques in Geographic Information Systems
EES 1111H	Freshwater Ecology and Biomonitoring
EES 1113H	Groundwater Hydrochemistry and Contaminant Transport
EES 1114H	Directed Readings in Environmental Science I
EES 1115H	Directed Readings in Environmental Science II
EES 1116Y	Internship
EES 1117H	Climate Change Impact Assessment
EES 1118H	Fundamentals of Ecological Modelling
EES 1119H	Quantitative Environmental Analysis
EES 1120H	Fluid Dynamics of Contaminant Transport
EES 1121H	Modelling the Fate of Organic Chemicals in the Environment
EES 1122H	Global Environmental Security and Sustainable Development
EES 1123H	Environmental Regulations
EES 1124H	Environmental Project Management
EES 1125H	Contaminated Site Remediation
EES 1126H	Hydrology and Watershed Management
EES 1127H	Applied Biogeochemistry and Geomicrobiology
EES 1128H	Biophysical Interactions in Managed Environments
EES 1129H	Brownfields Redevelopment
EES 1131H	Applied Climatology (exclusion: EESD31H3)
EES 1132H	Climate Data Analysis (exclusion: EESD21H3)
EES 1133H	Climate Change Science and Modelling
EES 1134H	Climate Change Policy
EES 1135H	Environmental Change and Human Health
EES 1136H	Climate Change Adaptation
EES 1137H	Quantitative Applications for Data Analysis
EES 1701H	Environmental Legislation and Policy
EES 1704H	Environmental Risk Assessment
EES 3000H	Applied Conservation Biology
EES 3001H	Professional Scientific Literacy
EES 3002H	Conservation Policy
EES 3003H	Topics in Applied Biodiversity
EES 3111H	Conservation Genetics
EES 3113H	Topics in Population and Community Ecology
EES 3114H	Topics in Urban and Rural Ecology
EES 4001H	Internship Training 1 (restricted to students enrolled in one of the approved combined degree programs with the MEnvSc)

EES 4003H	Academic Training 1 (restricted to students enrolled in one of the approved combined degree programs with the MEnvSc)

UNIVERSITY OF TORONTO SCARBOROUGH

2021-22 Curriculum Cycle
Graduate Minor Curriculum Modifications for Approval
Report 2: Graduate Department of Physical and Environmental Sciences
Course Changes
March 8, 2021

EES1131H: Applied Climatology

Description:
This course will introduce and discuss the basic topics and tools of applied climatology, and how its concepts can be used in everyday planning and operations(e.g. in transportation, agriculture, resource management, health and energy). The course involves the study of the application of climatic processes and the reciprocal interaction between climate and human activities. Students will also learn the methods of analyzing and interpreting meteorological and climatological data in a variety of applied contexts. Topics include:Solar Energy; Synoptic Climatology and Meteorology; Climate and Agriculture; Climate and Energy; Climate and Human Comfort; Urban Effects on Climate and Air Pollution .

Jointly offered with EESD31H3

~~Pollution.~~

Exclusions:
Previous:
New: EESD31H3

Rationale:
The course description has been modified to reflect that the course will now be cross-listed with a new D-level undergraduate courses (EESD31H3 - proposal submitted).

Consultation:
Approved by DPES Graduate Program Committee: Nov 16, 2020

Resources:
None