UNIVERSITY OF TORONTO
FACULTY OF APPLIED SCIENCE & ENGINEERING

Report No. 3736

MEMORANDUM

To: Executive Committee of Faculty Council (February 7, 2023)
Faculty Council (February 27, 2023)

From: Professor Evan Bentz
Chair, Undergraduate Curriculum Committee

Date: January 23, 2023

Re: Major Curriculum Changes for the 2023-2024 Academic Year

REPORT CLASSIFICATION

This is a major policy matter that will be considered by the Executive Committee for endorsing and forwarding to Faculty Council for vote as a regular motion (requiring a simple majority of members present and voting to carry).

SUMMARY

The Undergraduate Curriculum Committee is tasked with managing the curriculum change process for the Faculty. This report summarizes course changes proposed for the 2023-2024 academic year.

PROCESS AND CONSULTATION

These changes have been reviewed and approved by the Undergraduate Curriculum Committee, which is comprised of teaching staff representatives from the Faculty's departments and institutes; undergraduate student representatives; the Vice-Dean, Undergraduate; the Vice-Dean, First Year; the Director, First Year Curriculum; the Associate Dean, Cross-Disciplinary Programs; the Assistant Dean and Director, Diversity, Inclusion and Professionalism; and the Faculty Registrar. The Committee meets regularly to review and approve proposed changes to the undergraduate curriculum. The impact of these changes on students in the relevant programs has been considered.

RECOMMENDATION FOR FACULTY COUNCIL

THAT the proposed curriculum changes for the 2023-2024 academic year, as described in Report 3736, be approved.

PROPOSED CURRICULUM CHANGES

1. ELECTRICAL & COMPUTER ENGINEERING

1.1. Update Graduate Attributes for **ECE331H1F: Analog Electronics**

CURRENT GA: 3C

PROPOSED GA: 2D

- *Updated to match current content of course.*

1.2. Update Graduate Attributes for **ECE454H1F: Computer Systems Programming**

PROPOSED GA update: 2B, 3A, 4D, 5A, 5B

- *Updated to match current content of course.*

1.3. Update Graduate Attributes for **ECE367H1F: Matrix Algebra and Optimization**

PROPOSED GAs: 1A, 1C, 2C, 3B, 5A

- *Updated to match current content of course.*

1.4. Update Graduate Attributes for **ECE520H1F: Power Electronics**

PROPOSED GAs: 1C, 2A, 2C, 4D, 5B

- *Updated to match current content of course.*

1.5. Update Graduate Attributes for **ECE526H1F: Power Systems Protection & Automation**

PROPOSED GAs: 1C, 2B, 4D, 5B, 5C

- *Updated to match current content of course.*

Photonic Devices

1.6. Update Graduate Attributes for **ECE427J1F: Photonic Devices**

PROPOSED GA assignment: 1A, 1B, 1C, 5B, 7A

- *Updated to match current content of course.*

2. CHEMICAL ENGINEERING & APPLIED CHEMISTRY

2.1. Move **CHE223: Statistics** to the Fall semester and **CHE249: Engineering Economic Analysis** to the Winter semester

- *This would allow for the opportunity to create better alignment and more integration between CHE204: Laboratory I and CHE223 in the Fall semester.*

NOTE: This would change the second-year total contact hours from:

Fall 17/6/9; Winter 16/8/7

to

Fall 16/6/9; Winter 17/8/7

2.2. Update contact hours for **CHE299: Communication**

CURRENT contact hours: 0/0/2

PROPOSED contact hours: 1/0/1

- *CHE299 is currently taught through two activity-based tutorial hours each week focused on the development of communication skills, which are applied and assessed through deliverables tied to other core Chemical Engineering courses. This approach gives students an opportunity to practice and immediately apply communication principles within each tutorial while supervised by a sessional instructor from the Engineering Communication Program. The distribution of students across four tutorials taught by four instructors provides a small class environment that is best for active learning, however, it provides limited opportunity for consistent, direct instruction on communication principles.*

- *Over the last few years, the course coordinator has produced a series of lecturettes that students are asked to review in preparation for specific tutorials and assignments. These short online lecturettes are designed to provide consistent instruction of communication principles that prepare students for the active learning environment of the tutorial classroom. Views of these videos, unfortunately, are inconsistent. Because students view these as "additional resources" rather than core course content, they often opt out of watching instructional content that is critical to the course. Having a designated lecture hour in their timetable will acknowledge the required nature of these lecturettes.*

- *Overall, this change will result in more consistent communication instruction for 2nd year Chemical Engineering students and better scaffold their continued development of communication skills*.

NOTE: There would be no change to second-year contact hours.

2.3. Add courses to current Technical Elective list available to students in Chemical Engineering

APS360H1: Applied Fundamentals of Deep Learning
APS502H1: Financial Engineering
BME330H1: Patents in Biology and Medical Devices
BME412H1: Introduction to Biomolecular Engineering
BME530H1: Human Whole Body Biomechanics
BME595: Medical Imaging
CHM416H1: Separation Science
CHM456H1: Organic Materials Chemistry
CHM457H1: **Polymer Chemistry**
CIV220H1: Urban Engineering Ecology
CIV531H1: Transport Planning
ECE345H1: Algorithms and Data Structures
ECE368H1: Probabilistic Reasoning
ECE421H1: Introduction to Machine Learning
ECE446H1: Sensory Communication
HMB201H1: Introduction to Fundamental Genetics and its Applications
IMM250H1: The Immune System and Infectious Disease
MIE408H1: Thermal and Machine Design of Nuclear Power Reactors
MIE519H1: Advanced Manufacturing Technologies
MGY377H1: Microbiology I: Bacteria
MSE438H1: Computational Materials Design
MSE458H1: Nanotechnology in Alternate Energy Systems
PCL201H1: Introduction to Pharmacology and Pharmacokinetic Principles
PCL302H1: Pharmacodynamic Principles
PSL300H1: Human Physiology I

- *Over the last several years, the number of courses that students have been requesting approval for as technical electives has been growing. This is, in part, due to more students seeking to complete certificates and minors. The addition of the attached list of courses to those already listed in the calendar will make these previously-approved courses available as technical electives without the need for students to seek approval from our UG Office.*

2.4. Update course pre-requisites associated with CHE courses

2F
CHE204: Chemical Engineering and Applied Chemistry - Laboratory I - APS110 and CHE112
CHE208: Process Engineering - CHE112
CHE211: Fluid Mechanics - CIV100 and MAT187
CHE220: Applied Chemistry I - Inorganic Chemistry - CHE112
CHE221: Calculus III - MAT186 and MAT187
CHE249: Engineering Economic Analysis - MAT187 and CHE223
CHE299: Communication – none
2S

CHE205: Chemical Engineering and Applied Chemistry- Laboratory II - CHE204
CHE210: Heat and Mass Transfer - CHE211 and CHE221
CHE213: Applied Chemistry II - Organic Chemistry - APS110 and CHE112
CHE222: Process Dynamics: Modeling, Analysis and Simulation - CHE208, CHE221, MAT188
CHE223: Statistics - none
CHE230: Environmental Chemistry - CHE112

3F
CHE304: Chemical Engineering and Applied Chemistry- Laboratory III - CHE205, CHE208, CHE210
CHE323: Engineering Thermodynamics - CHE112 and CHE221
CHE324: Process Design - CHE208
CHE332: Reaction Kinetics - CHE210 and CHE222
CHE399: Professional Engineering Consultancy - CHE299

3S
CHE305: Chemical Engineering and Applied Chemistry- Laboratory IV - CHE304, CHE323, CHE324, CHE332
CHE311: Separation Processes - CHE208
CHE322: Process Control - CHE222 and APS106
CHE333: Chemical Reaction Engineering - CHE323, CHE324, CHE332
CHE334: Team Strategies for Engineering Design - CHE249, CHE324 and CHE332

Outside the CHE core courses
CHE353: Engineering Biology - none
CHE451: Petroleum Processing - none
CHE507: Data-based Modelling for Prediction and Control - CHE322

- *CHE currently has a very small number of courses with pre-requisites as compared to other programs. The attached list of pre-requisite courses addresses this issue.*

2.5. Remove **CHE298: Communication** from course calendar

- *This course has not been offered since 2014.*

3. CIVIL & MINERAL ENGINEERING

Mineral Program

3.1. Update scheduling and calendar description for **MIN120: Insight into Mineral Engineering**

CURRENT scheduling (LEC/PRA/TUT): 3/2/1
PROPOSED scheduling (LEC/PRA/TUT): 4/0/1

CURRENT calendar description: A comprehensive introduction into the global minerals industry using international regulatory requirements as a thematic structure. Engineering applications together with current and emerging issues are emphasized throughout. Principal topics include: mineral resources in the economy; land and mineral ownership; legal and environmental issues; mineral exploration; surface and sub-surface mine development and management; fundamentals of mineral processing; mineral industry finance. Graphics communication skills are developed in the associated laboratory sessions, and a visit to an operating mine is used to place the course material in context.

PROPOSED calendar description: A comprehensive introduction to the global minerals industry using international regulatory requirements as a thematic structure. Engineering applications together with current and emerging issues are emphasized throughout. Principal topics include: mineral resources in the economy; stakeholder concerns and responsible mining; mineral exploration; surface and sub-surface mine development and operation; fundamentals of mineral processing; mineral industry finance.

- *Teaching of MIN120 is more efficient if the course is scheduled with this timing versus the previously approved schedule. CEAB AU count is unchanged by this adjustment.*

4. CROSS-DISCIPLINARY PROGRAMS

4.1. Update course delivery of **APS360H1: Applied Fundamentals of Deep Learning for the summer term**

Previous (pre-COVID) summer course delivery: **APS360H1 Y**– In-person

PROPOSED course delivery for summer only: **APS360H1 Y** (May-August) - Online delivery

Fall and Winter will remain as APS360H1 F and APS360H1 S – In-person.

4.2. Update course delivery of **JRE300H1 F: Fundamentals of Accounting and Finance for the summer term**

Previous (pre-COVID) summer course delivery: **JRE300H1 F** – In-person

PROPOSED course delivery for summer only: **JRE300H1 F** (May-June) - Online delivery

Fall and Winter will remain as **JRE300H1 F** and **JRE300H1 S** – In-person

4.3 Update course delivery of **JRE410H1 F: Markets and Competitive Strategy for the summer term**

Previous (pre-COVID) summer course delivery: JRE410H1 F – In-person

PROPOSED course delivery for summer only: **JRE410H1 F (May-June) - Online delivery**

Fall and Winter will remain as JRE410H1 F and JRE410H1S – In-person