UNIVERSITY OF TORONTO
FACULTY OF APPLIED SCIENCE & ENGINEERING

2017-2022 ACADEMIC PLANNING FRAMEWORK

Context

The Faculty of Applied Science and Engineering continues to be the top-ranked engineering school in Canada and one of the world's best. With the Faculty's comprehensive self-study and external review complete, we look to formalize our goals, and accompanying actions, for the next five years of academic planning. In support of our continued pursuit of excellence, we will continue to actively measure and asses our progress, as well as review all aspects of the Faculty to ensure we are the global leader in engineering education, student experience and research. Some of the initiatives to consider in the academic planning process include:

- **Faculty of Applied Science and Engineering Annual Report 2017: Performance Indicators**
  The report, first published in 2009, tracks the progress toward the goals laid out in the Faculty's Academic Plan. Each publication is a data-rich, systematic examination the educational programs, research and co-curricular initiatives. A breadth of information is provided, including information on admissions, enrolment, research funding, awards, world rankings, advancement, communications, resources, diversity, international initiatives and cross-faculty education and experiential learning. Through concrete metrics and statistics, the Annual Report provide as comprehensive picture of Faculty initiatives and program development over the past year, in addition to a comparison of progress over the past ten years.

- **Faculty Self-Study for External Review**
  A part of the larger U of T academic planning and accountability process, the Self-Study is a broad-based and truly reflective report that allowed for a critical analysis of the Faculty and its strengths and challenges. The Self-Study was published in January 2017 and reports on the status and progress within the Faculty and identifies future opportunities.

- **Decanal Task Force on Mental Health**
  The task force was created in July 2015 to examine the existing metal health support systems for the Faculty's students. Within the task force, an assessment was conducted of the Faculty's current performance and initiatives in relation to each of the strategic priorities within the University of Toronto's Student Mental Health Strategy and Framework (released in October 2014). The final report was issued January 2017.

- **Dean's Task Force on Academic Advising**
  The task force was struck in the fall of 2015, as part of the 2011-2016 Academic Plan which identified the need to review student counselling as an action item within the strategic theme of *Student Experience*. The task force was asked to review academic and student advising and to make key recommendations for future direction. The final report was issued August 2016.

- **Core Curriculum Review Task Force**
  In 2013, a decanal task force was struck to formally review the content and delivery of the Faculty of Applied Science & Engineering first-year (core) curriculum for the Core 8 and General First Year (TrackOne) programs from the perspective of students, faculty and external evaluators. It compared these offerings to best practices and recommended changes to meet the evolving foundational education needs of our programs. The final report was published in December 2014.

- **Engineering Strategies and Practice I and II Review Committee**
  In the fall of 2016 a Faculty-level committee was created to review the cornerstone sequence of Engineering Strategies and Practice I and II within the Core 8 and General First Year (TrackOne) programs. This review was in response to one of the recommendations of the Core Curriculum Review Task Force. The final report was issued June 2017.

- **Faculty of Applied Science & Engineering Maker Space Report**
  The Faculty is committed to developing the next generation of makers, innovators, and engineering leaders, and to ensuring that the required facilities exist to do so. Published in May 2017, the report is part of the process of developing a strategy for supporting design courses and other student activities by identifying what equipment and facilities are available, what we need to complement existing resources, and address supervision and safety.

- **Innovation in Teaching and Learning**
  The Faculty remains committed to education innovation to ensure best practices and new technologies and methods in teaching and learning. Within the 2017-2022 Academic Plan, the following will be highlighted:
  - EDU-A ISTE^{2}P;
  - TEAL Fellows Program;
  - Hart Teaching Innovation Professorships;
  - Engineering Instructional Innovation Program.

- **Bibliometrics Working Group Report**

  Published in March 2017, this working group was established to determine how bibliometrics could be effectively deployed within the Faculty.

- **U of T Robotics Strategic Planning Committee: Final Report**

  Published in July 2017, this committee was tasked to look at making U of T the top robotics school in Canada and top five in the world.

- **Information Security & Protection of Digital Assets**
  Under the scope of this report is the Faculty's IT plan, coordinated by Alex Tichine.

Additional working groups and committees that will be publishing their findings soon are:

- **Indigenous Initiatives;**

- **Strategic Facility Plan;**

- **PEY Self-Study/EngSoc report;**

- **Research Committee;**

- **Graduate Studies Committee.**

At the time of the 2011-2016 Academic Plan, the University had launched its long-term strategic initiative, ***Towards 2030:*** http://www.towards2030.utoronto.ca (published in 2008). In September 2011, an initiative was started to assess the University's progress of the ***Towards 2030*** goals and examine new and continuing challenges and opportunities for the future. The broader University of Toronto community engaged in an extensive consultation process resulting in the publication of *Towards 2030: The View from 2012*. The two documents are:

1. *Towards 2030: The View from 2012 – A Framework* which highlights the achievements to date and the new and continuing challenges.

2. *Towards 2030: The View from 2012 – An Assessment of the University of Toronto's Progress Since Towards 2030* provides a more detailed and sustained analysis of the 2012 context and our progress to date in the areas outlined by *Towards 2030.*

In addition, in October 2015 President Gertler articulated the **Three Priorities** for the University of Toronto:

1. Leverage our urban location(s) more fully, for the mutual benefit of University and City;

2. Strengthen and deepen key international partnerships by means of a well-defined strategic focus;

3. Re-imagine and reinvent undergraduate education.

Faculty-Wide Academic Planning Process

The 2017 – 2022 Academic Planning Framework intends to:

- Facilitate cross-Faculty discussions in the academic planning process;

- Ensuring a cohesive strategy across all units;

- Surface our most important foci and consider how these evolve to keep our research, teaching and work relevant;

- Galvanize us as a community dedicated to the highest standards of engineering research, teaching and student experience.

Reoccurring themes in each chapter of the Academic Plan 2017 – 2022 will be the Faculty's *Culture of Excellence, International* and *Diversity*. A summary matrix, or visual representation, could be included in the introductory section highlighting these three areas across the Academic Plan and show the relationship, or cross-themes, between the different areas. For example:

Theme	Chapter	Goal	Actions
Culture of Excellence			
International			
Diversity			

The chapters of the Academic Plan 2017 – 2022 include:

1. **Table of Contents, Executive Summary and Preamble**

2. **Transformative/Transformational Teaching and Learning** ** *Both Undergraduate and Graduate*

3. **Student Experience** ** *Both Undergraduate and Graduate*

4. **Innovative Research and Entrepreneurship**

5. **Influence, Collaborations and Partnerships**

6. **Organization and Strategic Resources**

7. **Closing Thoughts**

8. **Appendices**

CHAPTER 2: Transformative/Transformational Teaching and Learning

People/groups involved:

- Vice-Dean, First Year + First Year Office
- Vice-Dean, Undergraduate + Associate Chairs, Undergraduate
- Vice-Dean, Graduate Studies + Associate Chairs/Directors, Graduate
- Associate Dean, Cross-Disciplinary Programs
- EDU:A working group
- Engineering Career Centre
- Registrar

Reference documents:

- Faculty Self-Study
- Core Curriculum Review
- ESP Review
- FASE Maker Space Report
- EDU:A proposal (ISTE^{2}P)
- PEY Self-Study/EngSoc report
- Hart Teaching Innovation Professorships Proposals, EIIP proposals, TEAL proposals
- Graduate strategic plan (under development)

Elements:

- Several areas were identified for inclusion in this section (priorities to be outlined in relation to goals):
  - ➢ High quality education
  - ➢ Flexibility
  - ➢ TA training and development – on-line components including cultural awareness (Indigenous) and mental health
  - ➢ Building professional competencies
  - ➢ Innovative teaching and active learning methods
  - ➢ Learning to learn
  - ➢ Student recruitment – high caliber, diverse, women, Indigenous
  - ➢ Internships for both undergrads and grad students
  - ➢ Hands on, experiential learning
  - ➢ Leadership in outreach to feeder schools to train teachers
  - ➢ Leadership in pedagogy

- ➢ Continuous improvement and assessment - accreditation
- ➢ Big experiences
- ➢ Leveraging technology and instructional space
- ➢ Professional development (including specific professional development for PhD students/pilot for grads)
- ➢ Mandate to train researchers in engineering – starting at the undergraduate, then graduate level (educating students on how to properly define research questions, design studies, analyze data and draw conclusions)

Draft Goals:

1. Establish U of T Engineering as a leader in pedagogical development and teaching innovation.
2. Continue to develop opportunities for experiential learning and professional development for undergraduate and graduate students
3. Further integrate active learning principles into curriculum delivery to encourage lifelong learning.
4. Prepare students with the technical and transdisciplinary competencies necessary for them to identify, learn, and apply these along with engineering practices to resolve global challenges, create new technologies and contribute to the prosperity of society
5. Leverage the Centre for Engineering Innovation & Entrepreneurship's state-of-the-art facilities, as well as instructional technology tools, to further engage students in the learning experience.
6. Continue to attract and retain diverse, outstanding students from a wide range of backgrounds.
7. Ensure U of T Engineering as a leader in the promotion and development of research integrity.

CHAPTER 3: Student Experience

People/groups involved:

- Vice-Dean, First Year + First Year Office
- Vice-Dean, Undergraduate + Associate Chairs, Undergraduate
- Vice-Dean, Graduate Studies + Associate Chairs/Directors, Graduate
- Associate Dean, Cross-Disciplinary Programs
- Engineering Career Centre
- Registrar

Reference documents:

- Faculty Self-Study
- Self-Study, Cross-Disciplinary Programs Office, 2009-2016
- Dean's Task Force on Academic Advising – Final Report
- Decanal Task Force on Mental Health – Final Report
- PEY Self-Study/EngSoc report
- Indigenous Initiatives – Blueprint for action (in progress)
- FASE Maker Space Report (e.g. to promote independent and entrepreneurial projects)
- Strategic Facility Plan
- Graduate Strategic Plan (in progress)

Elements:

- Several areas were identified for inclusion in this section (priorities to be outlined in relation to goals):
  - ➢ Training for academic advisors
  - ➢ New academic advising portal to improve service
  - ➢ Visibility and creation of mental health supports for both undergrads and grads
  - ➢ Co-curricular opportunities – Hatchery, ILead
  - ➢ International exchanges and internships
  - ➢ Professional development opportunities
  - ➢ Undergraduate research – practical experience (educating students in the research process is in Chapter 2)
  - ➢ Quality of student experience for MEng students
  - ➢ Guided Engineering Academic Review Sessions (GEAR) expansion
  - ➢ PEY improvements
  - ➢ Proposed Student Success Centre – "one stop" place to answer questions and get assistance
  - ➢ Embrace more comprehensive use of modern computer and software tools (e.g. modeling software) in the curriculum

Draft Goals:

1. Improve the quality and delivery of academic advising services and tools
2. Leverage and create resources to promote good mental health as well as assist students in crisis
3. Enhance programs and co-curricular opportunities to further students' professional development, and build on the pilot professional development program for graduates (i.e. professional development for PhD students)
4. Promote and support opportunities for students to engage in international exchanges, research, and internship placements
5. Recognize students' successes and encourage participation in co-and-extra-curricular activities
6. Ensure that infrastructure (space + IT) supports are in place to facilitate collaboration and innovation of student teams

CHAPTER 4: Innovative Research and Entrepreneurship

People/groups involved:

- Vice-Dean, Research
- Executive Director/Entrepreneurship Hatchery Advisory Board
- Associate Chairs/Directors, Research
- Director of Corporate, Government & International Partnerships
- Director of Foundation & Corporate Partnerships
- Academic Planning Focus Groups for Research

Reference documents:

- Faculty Self-Study and departmental Self-Study research consultations
- Research Strategic Plan (Focus Group Reports – the four themes are noted below)
- Big Ideas: Water, Sustainability, Robotics
- Research Academic Planning Steering Committee Report on Draft Goals

- U of T Robotics Strategic Planning Committee Final Report
- International Strategic Plan 2017-2022 (Vice-President, International)
- Bibliometrics Working Group Report (i.e. research output)
- FASE Maker Space Report (e.g. to promote independent and entrepreneurial projects)
- Information Security and Protection of Digital Assets
- University of Toronto Guidelines for Extra-Departmental Units
- Linkages to Chapter 2: Transformative/Transformational Teaching and Learning and Chapter 3: Student Experience (e.g. undergraduate research opportunities, Hatchery LaunchLab)

Research Themes (under review by Focus Groups):

- Advanced Materials and Manufacturing
- Data Science and Intelligent Systems
- Engineering and Human Health
- Sustainability

Elements:

Mandate - We will continue to develop a compelling research vision with the mandate enhance our impact by leading research benefiting the Province, Canada and global society through multidisciplinarity, collaboration and innovation.

Research Excellence

- Expanding our support of transformative research that inspires innovation
  - ➤ Encourage cross-disciplinary multi-PI collaborative research
  - ➤ Increase research funding and develop new funding sources for cross-disciplinary research
  - ➤ Increase the number of Canada Research Chairs, Industrial Research Chairs and Endowed/Limited Term Chairs
  - ➤ Expanding our collaboration with the Faculty of Medicine and reaching out to other faculties; e.g. A&S, Law, et cetera
- Increasing our (national) footprint by multi-institutional research collaborations in strategic areas to address local and global needs
  - ➤ Super Cluster initiative
  - ➤ Toronto-Waterloo corridor
  - ➤ NCE
  - ➤ NSERC SNG
- Expand our mentorship programs for early researchers
- Increase the Faculty's impact through advocacy and support to government, funding agencies, and industry; further raise the profile of the Faculty by actively participating in and providing leadership to professional societies, editorial boards and external research committees
- Create a vibrant ecosystem of centres and institutes focusing on key priority areas
  - ➤ Develop a streamlined review process for the centres and institutes
  - Enhance support for key centres and institutes to achieve FASE strategic research priorities
  - Develop working models for the administration of centers and institutes, including funding their operations, leadership and annual reporting

International Outreach

- Enhance our impact through international research cooperation that addresses global challenges
  - ➢ Increase international industry partners
  - ➢ Develop formal linkages and strategic alliances with other universities
- Refine and improve MOUs within the Faculty, with consideration of:
- Increasing our leadership and participation in internationally funded projects
- Develop/expand faculty and student international mobility programs
  - ➢ Establish *[Named Opportunities]* for Visiting Professors
  - ➢ Increase our HQP international exchange capacity to train the next generation of global leaders (in coordination with VDG, VPI)

Industry and Entrepreneurship

- Enhance our research impact via the translation of basic discovery to application through increased industry partnerships and support for entrepreneurship initiatives
  - ➢ Increase corporate funding
  - ➢ Increase the number of NSERC IRCs
  - ➢ International industry consortia similar to P&PC (two new consortia)
  - ➢ Increase our support of entrepreneurship opportunities for students and faculty
  - ➢ Work with IPO and MaRS to increase translation of our research outcomes to application (licences, start-ups, et cetera)

Infrastructure and Space

- Develop a forward-looking plan for our research space and infrastructure needs, both quality and quantity
- Develop a sustainable model for the operation of major research infrastructure in FASE
- Provide a clear sense how much progress in infrastructure upgrades have been complete in the past five years, are on-going, with still more to come

Draft Goals:

Research Excellence

- Increase our support of transformative cross-disciplinary collaborative research that inspires innovation
- Lead multi-institutional research collaborations in strategic areas to address local and global needs
- Increase the Faculty's impact through advocacy and support to government, funding agencies, and industry; further raise the profile of the Faculty by actively participating in and providing leadership to professional societies, editorial boards and external research committees
- Create a vibrant ecosystem of centres/institutes focusing on key priority areas
- Expand our mentorship programs for early career researchers
- Improve the Faculty of Applied Science & Engineering's standing in key international rankings

International Outreach

- Enhance our impact through international institutional and industry research cooperation that address global challenges
- Increase our leadership and participation in internationally funded projects

- Develop/ expand faculty international mobility programs (e.g. [Named Opportunities] for Visiting Professors) and HQP international exchange capacity to train next generation global leaders

Industry and Entrepreneurship

- Strengthen our research impact via the translation of basic discovery to application through increased industry partnerships and support for entrepreneurship initiatives

Infrastructure and Space

- Create a forward-looking plan for our research space and infrastructure renewal, both quality and quantity
- Devise and implement a sustainable model for research support and for the operation of major research infrastructure in FASE

CHAPTER 5: Influence, Collaborations and Partnerships

People/groups involved:

- Vice-Dean, First Year + First Year Office
- Vice-Dean, Research
- Vice-Dean, Undergraduate + Associate Chairs, Undergraduate
- Vice-Dean, Graduate Studies + Associate Chairs/Directors, Graduate
- Associate Dean, Cross-Disciplinary Programs
- Director of Corporate, Government & International Partnerships
- Director of Foundation & Corporate Partnerships
- Engineering Career Centre
- Advancement
- Alumni Relations
- Engineering Outreach Office
- Registrar's Office

Reference documents:

- Faculty Self-Study and applicable self-study consultations (i.e. alumni)
- Research Strategic Plan
- Big Ideas: Water, Sustainability, Robotics
- Indigenous Initiatives – Blueprint for action (in progress)
- PEY Self-Study/EngSoc report
- Graduate Strategic Plan (in progress)
- International Strategic Plan 2017-2022 (Vice-President, International)

Elements:

This chapter will have linkages to Chapter 4: Innovative Research and Entrepreneurship.

- Strengthen relationships with alumni
- Enrich professional and personal networks for alumni, graduate and undergraduate students
- Improve and expand partnerships with other U of T Faculties
- Strengthen and deepen key international partnerships by means of a well-defined strategic focus [*Three Priorities*]
- Leverage our urban location(s) more fully, for the mutual benefit of University and City [*Three Priorities*];
- FASE community building - Engineering Strategies and Practice projects, support of student clubs, volunteerism, pre-university outreach, Sky Garden
- International exchanges and internships
- Outreach (pre-high school and pre-university)
- Student recruitment (undergraduate and graduate)
- Student outreach – connecting current students with prospective students and providing leadership opportunities
- Engineering influence – bringing FASE's expertise "outside" to government, the media and policy or standards development
- Increasing FASE's visibility (journals/publications, conferences, knowledge exchange, professional associations)

Draft Goals:

1. Inspire education and learning in science, technology, engineering and math (STEM) for K-12, while enhancing the student experience for undergraduate and graduate students
2. Create connections within our community to improve the City and the University
3. Strengthen the relationship with alumni and increase interactions between alumni and current students
4. Create new cross-disciplinary collaborations with other University of Toronto Faculties
5. Develop strategic partnerships with key institutions and industry (local, national and international)
6. Foster a sense of community with alumni and donors who volunteer and provide philanthropic support to the Faculty
7. Increase the Faculty's impact through advocacy and support to government, funding agencies, and industry; further raise the profile of the Faculty by actively participating in and providing leadership to professional societies, editorial boards and external research committees [Research Chapter]
8. Monitor and measure the impact of the Faculty's outreach, collaboration and partnerships

Chapter 6: Organization and Strategic Resources

People/groups involved:

- Human Resources
- Finance
- Engineering Strategic Communications
- Facilities
- Advancement
- Vice-Deans, Research, Undergraduate, Graduate and Associate Dean, Cross-Disciplinary Programs

Reference documents:

- Faculty Self-Study and applicable self-study consultations (i.e. staff and alumni)

- Research Strategic Plan
- Big Ideas: Water, Sustainability, Robotics
- Graduate Strategic Plan (in progress)
- FASE Maker Space Report (e.g. to promote independent and entrepreneurial projects)
- Strategic Facility Plan
- Information Security and Protection of Digital Assets

Elements:

- Philanthropy
- Faculty complement plan
- Staff plan
- Professional development of staff
- Creating new and improving the utilization and flexibility of space and infrastructure to meet research, educational and co-curricular goals
- Budget plan
- IT Digital Transformation Strategy
- Engineering Library

Draft Goals:

1. Identify opportunities for staff development – those external to the University as well as internal mentoring and training initiatives
2. Emphasize diversity and cross-disciplinary strategic research themes when recruiting faculty hires
3. Continue to enhance teaching and design facilities, improve laboratory and research space and provide co-curricular space that fits the needs of undergraduate and graduate students
4. Increase philanthropic support by strengthening the community of faculty, staff, students and alumni
5. Continue to increase the quality of our communications and key messaging, and increase the Faculty's visibility to target audiences
6. Create a base-level of IT services across the Faculty and enhance professional development for staff and faculty in the use of new technologies
7. Ensure operating budgets, capital plans, and fundraising continues to align with the academic mission.
8. Support financial sustainability through new and diversified sources of revenues and ensuring there are effective internal controls, sufficient transparency, and appropriate "checks and balances" to prevent excessive financial commitments and overspending.
9. Prepare operating and capital budgets that reflect complete program and operating costs and sources of funding, and regularly review these to ensure that planned uses of resources do not exceed the funds available and have a state of preparedness to seize opportunities for funding of capital projects (e.g. CFI, Post-Secondary Strategic Infrastructure Fund)
10. Manage operational (including legal) risk by actively guarding against the risk of loss resulting from inadequate or failed internal processes and systems; human factors; or external events.