



ACADEMIC COUNCIL REPORT

SESSION:

Public

ACTION REQUESTED:

Decision
Discussion/Direction
Information

TO: **Academic Council**

DATE: **February 25, 2020**

PRESENTED BY: **Hossam Kishawy, Acting Dean FEAS**

SUBJECT: **Faculty of Engineering and Applied Science (FEAS) – Restructuring of Departments**

MANDATE:

- In accordance with Article 1.4 (b) of By-law Number 2, Academic Council will make recommendations to the Board on matters including the establishment of departments.
- FEAS is seeking Academic Council’s recommendation of the restructuring of Faculty departments for approval by the Board of Governors.

BACKGROUND/CONTEXT & RATIONALE:

- FEAS is currently structured with two departments, namely the Department of Automotive, Mechanical, and Manufacturing (AMME Department) and the Department of Electrical, Computer, and Software Engineering (ECSE Department).
- The AMME Department has four undergraduate programs: Automotive Engineering, Manufacturing Engineering, Mechanical Engineering, and Mechatronics Engineering. The ECSE Department has two undergraduate programs: Electrical Engineering and Software Engineering
- The departmental structure has allowed for better administration of the various programs. In addition, it has allowed the interdisciplinary activities of the Faculty to be more effective and organized.
- Since inception of the current departments, the FEAS has grown to a medium-sized engineering faculty comparative to other Canadian universities.
- As the Faculty continues to grow, the need has arisen for the creation of a new department to further improve the delivery of our programs and better balance the existing resources within the Faculty.

- The proposed new departmental structure will be:
 - Department of Automotive and Mechatronics Engineering which offers Automotive and Mechatronics Engineering;
 - Department of Electrical, Computer, and Software Engineering which offers Electrical and Software Engineering;
 - Department of Mechanical and Manufacturing which offers Mechanical and Manufacturing Engineering.

RESOURCES REQUIRED:

- There is no significant budgetary implication with the creation of a third Department. Only one Department Assistant will be needed which was submitted as part of the Faculty's strategic planning.

IMPLICATIONS:

- Since the initiation of the original department structure in 2012, the Faculty has grown in size to over 2,000 undergraduate students with a large portion enrolled in the Department of Automotive, Mechanical, and Manufacturing Engineering.
- With the focused growth in the AMME department and the introduction of the Mechatronics Engineering program, the number of accredited programs within a single department is a concern noted both internally within the Faculty and externally with the Canadian Engineering Accreditation Board as noted in a recent accreditation visit for our Automotive Engineering program.

ALIGNMENT WITH MISSION, VISION, VALUES & STRATEGIC PLAN:

- The FEAS Strategic Plan is an integral part of the Ontario Tech Integrated Academic Plan that is currently under development. Although the Integrated Academic Plan is not yet finalized at this time, a key aspect of FEAS's strategic plan is the creation of a third department to better balance the delivery of its programs and increase efficiency within the Faculty.

CONSULTATION:

- The Faculty of Engineering and Applied Science, Faculty Retreat September 4, 2019
- Engineering Faculty Council, November 4, 2019

NEXT STEPS:

1. Depending on the outcome of Academic Council's discussion, the proposal will be presented to the Board of Governors for approval on April 23, 2020.

MOTION FOR CONSIDERATION:

That pursuant to the recommendation of the FEAS Faculty Council, Academic Council hereby recommends the revised FEAS departmental structure, as presented, for approval by the Board of Governors.

SUPPORTING REFERENCE MATERIALS:

- FEAS, New Departments Proposal

Faculty of Engineering and Applied Science (FEAS)
A Proposal for Creation of a New Department

October 2019

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1. OVERVIEW OF THE FACULTY OF ENGINEERING AND APPLIED SCIENCE (FEAS)

1.1 VISION, MISSION, AND VALUES OF THE FACULTY

The mission of the Faculty of Engineering and Applied Science is to deliver the highest quality engineering education, through teaching and research excellence, state-of-the-art educational environment, and innovative programs, to provide our engineering graduates with the knowledge and skills needed to succeed and become leaders of tomorrow.

1.2 OBJECTIVES AND STRATEGIES

- Offer high-quality, accredited undergraduate and graduate programs in engineering and applied science and related fields that are market- and career-oriented, that prepare professionally competent and broadly educated students capable of addressing the demands of the new millennium, and that instill life-long learning abilities.
- Conduct high-calibre basic and applied research in engineering and applied science and related fields.
- Promote a vibrant and fulfilling student experience and foster student success through a student-centered focus that provides necessary supports.
- Utilize advanced and innovative teaching and learning methods and tools, including advanced information, computing, and communication technologies, within a technology-enriched learning environment to facilitate successful learning.
- Foster a collegial, respectful and productive environment that attracts and retains the best faculty, staff, and students, and creates a sense of spirit and loyalty.
- Provide university-level educational opportunities for college students through appropriate transition mechanisms.
- Engage in value-added activities that serve and address the needs of industry and the engineering profession, and advance and improve the economic, environmental, and social welfare of the region, province, and country.

1.3 FACULTY HISTORY

The Faculty of Engineering and Applied Science (FEAS) is one of the founding Faculties of Ontario Tech University. The programs were developed in close consultation with industry representatives and experienced faculty from other universities, with the objective of delivering the highest-quality educational experience that addressed both the needs of industry and the interests of the students.

Originally, the Faculty started as the School of Manufacturing Engineering, but soon thereafter became the Faculty of Engineering and Applied Science. The Faculty continues to build from this strong launch. The programs offered by the Faculty are unique and innovative – for example:

- Canada’s only degree programs in Automotive Engineering and Manufacturing Engineering;
- Broad programs in Mechanical and Electrical Engineering;
- One of the few Software Engineering programs in Ontario;
- One of the few Mechatronics Engineering programs in Ontario’ (new program with first graduation class in May 2020)
- Choice of specialized educational streams (specialization) in

- Electrical Engineering: Smart Grid;
- Mechanical Engineering: Energy Engineering;
- Software Engineering: Internet of Things;
- Five-year Engineering and Management variations for all engineering programs;
- Work-study experience for students through internships, work placement, and career opportunities with leading employers;
- Research opportunities for undergraduate students.

In 2012 the Faculty was restructured and formed into two departments, namely the Department of Automotive, Mechanical, and Manufacturing Engineering and the Department of Electrical, Computer, and Software Engineering.

Table 1 offers a snapshot of the roll-out of the programs offered by FEAS.

Table 1: Programs with Launch and Accreditation Dates

Program	Program Launch	Initial Program Accreditation	Current Program Accreditation Valid Until
Manufacturing	September 2003	June 2007	June 2022
Mechanical	September 2004	June 2008	June 2020
Automotive	September 2005	June 2009	June 2024
Electrical	September 2005	June 2009	June 2024
Software	September 2005	June 2009	June 2024
Mechatronics	September 2016	Expected June 2020	
Engineering and Management	Same as above for each respective program	Same as above for each respective program	
M.A.Sc./M.Eng. Mechanical Engineering	September 2006		
M.A.Sc./M.Eng. Electrical & Computer Engineering	September 2007		
M.A.Sc./M.Eng. Automotive Engineering	January 2008		
Ph.D. Mechanical Engineering	September 2008		

Ph.D. Electrical & Computer Engineering	September 2009		
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1.4 FACULTY FACTS

Since its inception, the Faculty has seen a strong growth in all areas. The Faculty has over 2,300 undergraduate and graduate students, 59 faculty members (including 4 lab instructors) and 18 staff. Table 2 provides a summary of the number of undergraduate and graduate students in various programs over the past three years.



Table 2: Count of Undergraduate and Graduate Students in the Faculty of Engineering and Applied Science

	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
Undergraduate	1007	1044	1168	1343	1498	1745	1877	1995	2059	2113
BEng & Mgt, Automotive	28	29	19	9	1	3	2	2	4	3
BEng & Mgt, Electrical	41	30	27	22	11	8	5	1	8	6
BEng & Mgt, Manufacturing	7	3	3	3	2	2				
BEng & Mgt, Mechanical	91	74	57	36	22	13	12	11	12	11
BEng & Mgt, Mechatronics										1
BEng & Mgt, Software	5	6	7	3	3			1	2	2
BEng, Automotive	147	154	172	180	205	228	222	223	236	244
BEng, Electrical	204	223	255	326	366	439	461	459	444	399
BEng, Manufacturing	28	31	34	51	65	77	60	67	58	55
BEng, Mechanical	389	400	488	570	668	785	875	860	790	774
BEng, Mechatronics								109	186	235
BEng, Software	67	94	106	143	155	190	240	262	319	383
Graduate	122	142	133	158	173	203	204	185	207	209
Grad Dipl in Engineering Mgt.							1	1		
MASc in Automotive Eng	12	9	11	13	12	9	11	10	10	10
MASc in Mechanical Engineering	39	40	30	31	35	33	27	32	34	44
MASc, Elect. & Computer Eng.	24	33	20	23	31	48	49	19	29	36
MEng in Automotive Engineering	2	2		1	2	2	9	8	10	9
MEng, Elect. & Computer Eng.	13	11	13	12	8	16	11	10	20	14
MEng, Mechanical Engineering	9	8	6	5	6	9	10	10	9	5
MEngM, Eng Management				7	12	14	12	17	21	16
PhD in Elect. & Computer Eng.	3	8	13	20	25	32	33	44	39	33
PhD in Mechanical Engineering	20	31	40	46	42	40	41	34	35	42
Grand Total	1129	1186	1301	1501	1671	1948	2081	2180	2266	2322

FEAS conducts leading-edge, value-added research in focused strategic areas. Faculty members have a broad array of expertise and experience in teaching, research and graduate student supervision. Their research activities attract funding through grants and other support from a range of sources, including industry, government agencies, and other organizations. These include the Natural Sciences and Engineering Research Council of Canada (NSERC), Canada Foundation for Innovation (CFI), and the Canada Research Chairs (CRC) Program. External research funding has grown rapidly in FEAS to approximately \$3 million per year in 2018. It must be stated here that these numbers do

not include new approved CRD's of around one million dollars. Table 3 illustrates the FEAS's contribution to the overall research funding at Ontario Tech.

Table 3: Faculty of Engineering and Applied Science Compared to Other Faculties

	Currency	2018	2019
External to UOIT	CAD	\$7,500	\$207,204
Faculty of Business and Information Technology	CAD	\$512,204	\$948,991
Faculty of Education	CAD	\$922,902	\$593,416
Faculty of Energy Systems and Nuclear Science	CAD	\$1,047,200	\$924,471
Faculty of Engineering and Applied Science	CAD	\$2,973,693	\$2,834,109
Faculty of Health Science	CAD	\$1,127,150	\$1,690,470
Faculty of Science	CAD	\$1,906,458	\$1,933,163
Faculty of Science	USD	-	\$14,433
Faculty of Social Science and Humanities	CAD	\$572,442	\$317,559
Faculty of Social Science and Humanities	USD	-	\$5,114
Institutional	CAD	\$2,420,101	\$5,042,155
UOIT Staff	CAD	-	\$59,622
Total	CAD	\$11,494,650	\$14,551,159
	USD		\$19,547

1.5 FACULTY STRATEGIC PLAN

The FEAS Strategic Plan is an integral part of the Ontario Tech Strategic Plan that is currently under development. Although the Ontario Tech Strategic Plan is not yet finalized at this time, a key aspect of FEAS's strategic plan is the creation of a third program to better balance the delivery of its programs and increase efficiency within the Faculty.

The rationale for the creation of a third department is outlined in the next two sections.

2. CURRENT DEPARTMENTAL STRUCTURE

The FEAS is currently divided into two departments, namely the Department of Automotive, Mechanical, and Manufacturing Engineering (AMME Department) and the Department of Electrical, Computer, and Software Engineering (ECSE Department). The AMME Department has four undergraduate programs: Automotive Engineering, Manufacturing Engineering, Mechanical Engineering, and Mechatronics Engineering. The ECSE Department has two undergraduate programs: Electrical Engineering and Software Engineering.

The formation of departments has allowed for better administration of the various programs. In addition, it allowed the interdisciplinary activities of the Faculty to be more effective and organized. Each Department identified its areas of strength and areas where collaboration is needed and through the Dean's Office collaboration is happening and the Faculty has grown to a size that has made FEAS a medium size-engineering faculty when compared with other universities across Canada. The Faculty has succeeded to place itself on the map and is recognized as one of the best engineering faculties in Canada. The most recent Shanghai ranking has placed the two departments among the top engineering schools in Ontario and across Canada.

As the Faculty continues to grow, the need has arisen for the creation of a new department to further improve the delivery of our programs and better balance the existing resources within the Faculty. In preparation for the upcoming accreditation visit and following our strategic planning, a third department will be created to house the growing Mechatronics Engineering program.

3. PROPOSED DEPARTMENTAL RESTRUCTURING

Since the initiation of the departmental structure in 2012, the Faculty has grown in size to over 2,000 undergraduate students with a large portion enrolled in the Department of Automotive, Mechanical, and Manufacturing Engineering. The AMME Department has 30 (29 + 1 hire) TTT and three limited term faculty who serve four undergraduate programs and five graduate programs. Since opening the Mechatronics Engineering program, the Department has grown in size that suggests separating the Automotive Engineering and Mechatronics Engineering program into a new department before the accreditation visit in February 2020 would be desirable. The large number of accredited programs in the same department was raised during the Automotive Engineering accreditation visit and the accreditation team was satisfied with our plans to wait for the restructuring until the Mechatronics Engineering program was fully developed and ready for its accreditation visit. This will provide a solid ground for the program assessment, particularly, the new department will house two interdisciplinary programs Automotive Engineering and Mechatronics Engineering which have clear synergies.

The new departmental structure will be:

- Department of Automotive and Mechatronics Engineering which offers Automotive and Mechatronics Engineering;
- Department of Electrical, Computer, and Software Engineering which offers Electrical and Software Engineering;
- Department of Mechanical and Manufacturing which offers Mechanical and Manufacturing Engineering.

The new department will have 10 Tenured/Tenure-Track (TTT) faculty: Dr. Moustafa El-Gindy, Dr. Yuping He, Dr. Greg Rohrauer, Dr. Xianke Lin, Dr. Dipal Patel, Dr. Scott Nokleby, Dr. Carlos Rossa, Dr. Haoxiang Lang, Dr. Jaho Seo, and an additional TTT hiring in progress. There are also two Teaching Faculty (TF): Dr. Nasim Moallemi and Dr. Sima Kouhi.

The creation of the third department will provide a good balance of students among departments and will allow each Department Chair to deal with only two programs and a manageable number of students (see Table 4).

Table 4: Faculty and Student Numbers by Department

Department	Number of Students	Number of Faculty Members
Automotive and Mechatronics Engineering	535	11
Electrical, Computer, and Software Engineering	790	24
Mechanical and Manufacturing Engineering	840	18

It must be noted that there is no significant budgetary implication with the creation of a third Department. Only one Department Assistant will be needed which was submitted as part of the Faculty's strategic planning.