

# UNDERGRADUATE ACADEMIC PLAN

## Structure and Definitions

Smith Engineering offers degree programs in ten academic plans. Plans nominally of four years' duration lead to the degree of Bachelor of Applied Science in Engineering. Five-year plans, which include an Internship, lead to the degree of Bachelor of Applied Science in Engineering with Professional Internship. The codes for these plans and the prefix used throughout this Calendar for the courses in those disciplines are given below. **The First Year is common to all academic plans.**

Program	Program Code	Course Prefix
Chemical Engineering	CHEE	CHEE
Civil Engineering	CIVL	CIVL
Computer Engineering	CMPE	SOFT, CMPE or ELEC
Electrical Engineering	ELEC	ELEC
Engineering Chemistry	ENCH	ENCH
Engineering Physics	ENPH	ENPH
Geological Engineering	GEOE	GEOE
Mathematics and Engineering	MTHE	MTHE
Mechanical Engineering	MECH	MECH
Mechatronics and Robotics Engineering	MREN	MREN
Mining Engineering	MINE	MINE
Faculty Courses		APSC
Multi-department Courses		MDEP

There are five major components to each of these academic plans:

- Mathematics:** Elements of algebra, calculus, differential equations, probability, statistics and numerical analysis;
- Natural Science:** Elements of Physics and Chemistry, and in some plans, elements of Earth and Life Sciences;
- Complimentary Studies:** Topics in Engineering Economics, Communications, Management, Humanities and Social Sciences, Linkage and Professional Issues, and Performance Arts and Languages. Engineering Sciences and Engineering Design constitute about half of the plan

in each case, with the other components approximately equal to each other in weight.

- Engineering Science:** Extension of Mathematics and Basic Sciences toward creative applications; and
- Engineering Design:** The application of Mathematics, Science, and Engineering Science to meet specific needs.

## Program Accreditation and Licensing

The licensing of engineers in Canada is a provincial and territorial matter. Bodies such as Professional Engineers Ontario (PEO) are established by statute to govern the profession. The Canadian Council of Professional Engineers (CCPE) is the national federation of these governing bodies. A standing committee of CCPE, the Canadian Engineering Accreditation Board (CEAB), is responsible for identifying those educational programs that meet the academic standards required for membership in the profession. From time to time Smith Engineering submits its academic plans to the CEAB for review. All of the academic plans in Smith Engineering are accredited by the CEAB.

**Note:** Effective May 1, 2011, the Faculty of Engineering and Applied Science moved each course weight from accreditation units (AU) to credit units. This means, for example, that instead of a weighting of 36 AU, a course will now count as 3 credits. In order to determine the new credit weighting for each course, the AU was divided by 12 and, if needed, rounded to the nearest quarter (0.25, 0.50 or 0.75).

## Academic Plan and Course Symbols and Codes

Plans are identified by a four-letter code (see table above). Courses are identified by:- a four letter code and a three digit number (the first of which identifies the year of the plan in which the course would normally be taken - i.e. 174 is a year one course); - a title; - a letter or letters indicating the term (F=Fall, W=Winter, FW=Fall **and** Winter, F/W=Fall **or** Winter, S=Summer, N/O=Not Offered);- a series of numbers indicating the units assigned to lectures (1 credit = one 50 minute lecture) and to laboratory assignments, tutorial, and significant project work (0.5 credits = one hour).

For example, the codes for a typical entry are:

- APSC 174 Introduction To Linear Algebra W | 3.3

*This is a course normally taken in the first year. It is offered in the Winter term, will have 36 fifty-minute lectures (3 lectures per week); no lab; twelve hours in tutorials (one hour per week). The final number is the sum of the accreditation units, and represents*



*the weight of the course.* A section on Course Descriptions appears elsewhere in this Calendar.

## Requirements for Graduation

The minimum number of Accreditation Units required for graduation is stipulated for each of the academic plans in Smith Engineering. These minimum form part of the curriculum of each plan as described later in the Degree Program section of this Calendar. The minimum number varies from plan to plan, but in the current year all are greater than 1850 AU.

## Minimum Requirements for CEAB Accreditation

The Canadian Engineering Accreditation Board (CEAB) requires all that all graduates from accredited engineering programs have Academic Units (AUs) at the time of graduation which meet ALL the following conditions 1-3:

1. Minimum AUs in the following five categories:

Category	Academic Units	Category Description
M	195AU	Mathematics
NS	195AU	Natural Science
CS	225AU	Complementary Studies
ES	225AU	Engineering Science
ED	225AU	Engineering Design

2. The sum of the AUs in these five categories shown above must be at least **1850 AUs**.
3. Two sums of categories must also meet minimum requirements as shown below e.g. the sum of AUs in Mathematics and Natural Sciences must be at least 420 AU, and the sum of AUs in Engineering Science and Engineering Design must be at least 900 AU:

Category	Academic Units	Category Description
M+NS	420AU	Mathematics(195 AUs or more) + Natural Science (195 AUs or more)
ES+ED	900AU	Engineering Science (225 AUs or more) + Engineering Design (225 AUs or more)

4. Within the broad five categories, it is expected that time will be spent on such topics as safety procedures, public and worker safety, ethics, equity, and concepts of sustainable development and of environmental stewardship.  
The number of AUs in each of the five categories is listed at the end of each course description in the calendar (provide a link to the calendar). The AUs are listed in the format of (M/NS/CS/ES/ED). For example:

MECH 230 Applied Thermodynamics I | F | 3.5

**An introductory course in thermodynamics. Topics include: properties and behaviour of pure substances, concepts of heat, work and energy, the First and Second Laws of Thermodynamics, and the analysis of a variety of power and refrigeration cycles.**

**(Lec: 3, Lab: 0, Tut: 0.5)**

**Offering Term: F**

**CEAB Units:**

**Mathematics 0**

**Natural Sciences 30**

**Complementary Studies 0**

**Engineering Science 12**

**Engineering Design 0**

*This course involves three lectures hours and one tutorial hour per week for the twelve weeks of the Fall term and therefore is assigned a weight of 3.5 credits which equates to 42 (AU) accreditation units. Of these, 30 units deal with topics in the Natural Sciences, and 12 are in Engineering Science. The course contains no Mathematics per se, no Complementary Studies, and no Engineering Design.*

## Dual Degrees

Dual degrees are offered by the Faculty of Arts and Science can be taken concurrently with a degree in Smith Engineering. Students must apply for admission through the Admission Services Office after one year at Queen's. To be accepted into a Dual Degree program in Smith Engineering, you must have a minimum cumulative GPA of 2.60 or higher. The application deadline for summer term entry is **1 April**, fall term entry is **1 June** and for winter term entry is **1 December**. Candidates must have completed at least one year of study in their current academic plan and must be in good academic standing. Dual Degree programs will normally take at least one extra years of study, although some combinations of programs will be longer. Usually the path to be followed is intricate and requires the advisement of the Dual Degree Coordinator in Smith Engineering. Dual Degree students share 60.0 units from their Engineering degree with their Arts and Science degree. Students must register in additional courses required for their 2nd degree



and these additional courses must all be completed at Queen's. Fees for courses registered under the Arts and Science degree will be assessed according to the Faculty of Arts and Science. Further information can be found at <https://smithengineering.queensu.ca/student-experience/dual-degrees.html>

## Queen's University Internship Program (QUIP)

The Professional Internship Program allows qualified students the opportunity to pursue career related positions for 12 or 16 months after completion of their second or third year of study at Queen's. (This program is available to students in all programs in the Faculty.)

Job openings under this program are posted online by Career Services. A student will have access once they register in the Internship Program.

In addition to the industrial experience for which the intern earns a salary, the Program includes prior workshops on resume preparation, interviewing, work performance, and employer expectations. Successful completion of the program requires submission of a formal report or presentation, and a satisfactory assessment of the intern's performance by the Employer. Up to twelve months of the work may meet the criteria for professional work experience required for licensure as a Professional Engineer in Canada.

The 12-month program requires registration in three courses, and the 16-month program requires registration in four courses - each course is 1-term in duration. These are: APSC 301 Professional Internship, APSC 302 Professional Internship, APSC 303 Professional Internship, and APSC 304 Professional Internship. There is a special academic fee for these courses. (See the section on Fees in this Calendar.)

Details on the Internship Program can be obtained from the Career Services Office in Gordon Hall, and from their website at <http://careers.queensu.ca/>. The Smith Engineering Internship Coordinator is Chelsea Elliott, [sweetmng@queensu.ca](mailto:sweetmng@queensu.ca) ([elliottc@queensu.ca](mailto:elliottc@queensu.ca)).

## University Exchange Programs

Smith Engineering offers student exchanges with other universities around the world. An exchange student can spend up to one year (one or two terms) at the host university in a program approved by the Department and the Operations Committee. In most instances the student can satisfy the requirements for graduation from Queen's in the usual four-year time frame. Details on these programs and a list of the host institutions can be found at <https://smithengineering.queensu.ca/current-students/outgoing-exchange.html>. Details on the IAESTE program can be obtained from the Queen's University International Centre, Mitchell Hall, 208 (2nd floor).

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## Non-academic Student Services and Resources

Information on the services and resources available to students at Queen's, such as housing, medical services, and student activities, can be found on the Division of Student Affairs web page at <https://www.queensu.ca/studentaffairs/>, or the Faculty general web address at <https://smithengineering.queensu.ca/>. The services of the Engineering Society are listed at <http://engsoc.queensu.ca>.