Faculté de génie

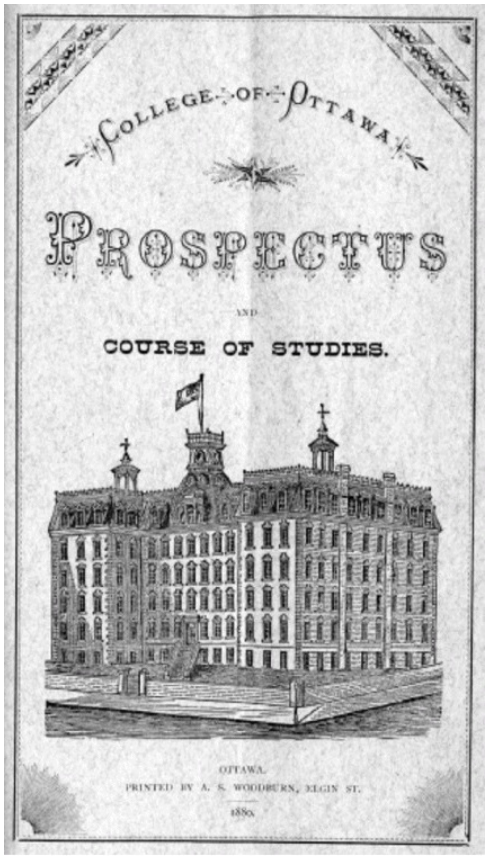
Faculty of Engineering

uOttawa

L'Université canadienne
Canada's university

Engineering at the University of Ottawa 1873 - 2011

William Hallett
Department of Mechanical Engineering



© 2011 William L.H. Hallett
Copyright for all illustrations is held by the University of Ottawa
unless otherwise indicated.

Foreword

This is a history of engineering programs at the University of Ottawa from their start in the 1870's until now. The present Faculty of Engineering started on 1 July 1986, but it continues programs that have been offered continuously since 1946, and one (Civil Engineering) that existed sporadically in the late 19th century. No detailed history of Engineering at the University of Ottawa has appeared before, and the 25th anniversary, which is also the 65th anniversary of the 1946 re-start of engineering, seemed an appropriate time to write one. What follows is an attempt to set out the key events, dates and people, backed up wherever possible with references to original sources (calendars, minutes of Senate, original correspondence) to ensure accuracy. Inevitably some errors of fact will have crept in, and I would appreciate receiving corrections or additions from readers which can be incorporated in a future, improved edition.

In preparing this I have spent many enjoyable hours in the University Archives. I would like to express my heartfelt thanks to archivist Jacinthe Duval, who has been extremely resourceful in locating relevant information. I am also indebted to her and to Michel Prévost, recently retired chief archivist and acknowledged expert on University of Ottawa history, for reading the draft of this work and checking it for accuracy. My thanks also to the Archives of Université Laval for providing information on Louis Cloutier, the first Director of the engineering programs started in 1946.

- William Hallett
Ottawa, June 2011

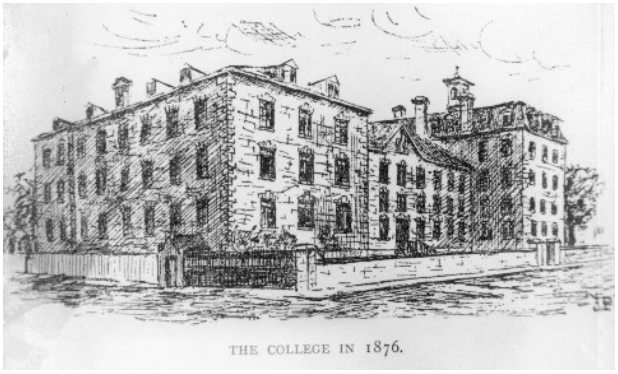
Note: numbers in square brackets (*e.g.* [4]) refer to references at the end. In figure captions, the numbers beginning with AUO-... give the University of Ottawa Archives reference numbers for the figures. Copyright for all images so designated is held by the University.

Table of Contents

1. The First Engineering Program - the 19th Century

1.1 Outline of Events

Engineering at the University of Ottawa began in 1873 [1] with the startup of a Civil Engineering program of three years duration. The institution at that time was still called the College of Ottawa, for it had yet to receive its pontifical University charter, although it had been endowed with the degree-granting powers of a University by the Legislature of the Province of Canada on 15 August 1866 [2]. Like many universities at that time, it was a church institution, and was operated by the Oblates of Mary Immaculate, the Roman Catholic missionary order which founded it in 1848 and ran it until it became publicly funded in 1965. The Civil Engineering "Course", as it was called, began the year before a complete new program of studies was introduced in 1874 by the then Superior of the College, Rev. Joseph-Henri Tabaret [2], as evidenced by correspondence noting that it was already in existence by mid-1874 [3]. The first Prospectus (*i.e.* Calendar) of the College that has been preserved, that of 1874, lists only three programs of study: a Commercial Course, a Classical Course, and Civil Engineering [4]. Of these, only the Classical Course led to a university degree designated as such - a BA - and then only after seven years of study; the Civil Engineering Course led to a "certificate in attestation of the branches studied" [4] rather than a degree.



The College of Ottawa in 1876. Corner of Wilbrod and Cumberland, looking southwest. AUO-PHO-NB-38A-1-75.

Apart from the obvious importance of civil engineering in late 19th century Canada, the impetus for the program was Fr Tabaret's strong views on the importance of education in science and mathematics. This is reflected also in the structure of the Classical Course, which included substantial science and mathematics content, including calculus! [4] - as unusual for an arts program then as it would be today. Further insight into the motivations behind the Civil Engineering Course is found in notes made in 1876 by Rev. Louis Soullier, visitor-general for the Oblates:

> Le génie civil, dont l'utilité a été contestée par quelques uns, est au contraire une véritable nécessité et un service rendu à la religion et au pays qui ne tarderont pas à être reconnus, puisqu'il ouvre à des jeunes catholiques une carrière réservée jusque là aux Anglais et Américains protestants [3].

The Civil Engineering program continued to be offered without change until 1880, when the Prospectus listing was replaced with a notice that "the Course is suspended until its importance becomes better understood [5]". The real issue was evidently resources and student numbers, as the 1880 Prospectus further states that

> The Fathers of the College [*i.e.* the Oblates] will be happy to open anew the Course of Civil Engineering when their efforts shall be duly encouraged. They will then be able to meet the expense of a Civil Engineering Course, for which costly apparatus, and Professors of no ordinary ability are required.
> These requisites have hitherto been procured for the students, with excellent results in training and proficiency;

> but the number of students is by no means adequate to the outlay, for which the College receives no Government aid, no munificent donation, such as the devoted friends of education often give to encourage educational undertakings of great, widespread and lasting utility. [5]

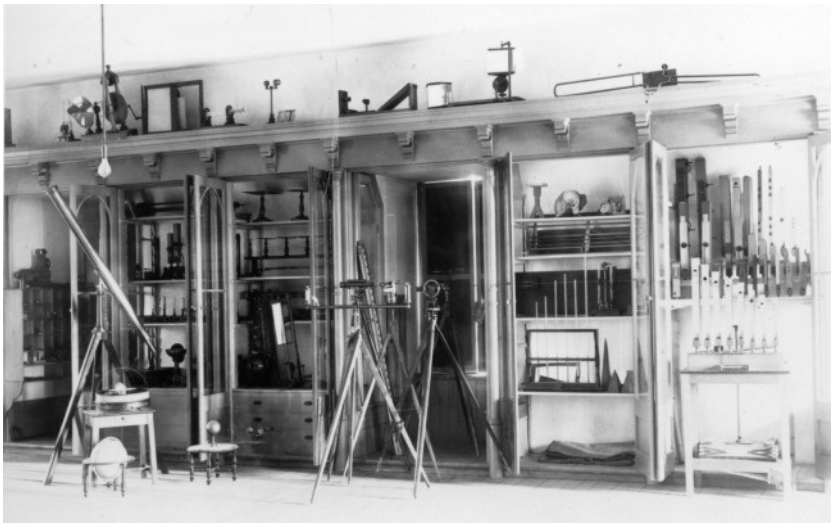
The Civil Engineering Course re-started in 1885, again as a three year program, but now leading to a university degree. In the previous year the College's charter had been amended by the Province to extend its degree-granting powers, so that the Prospectus now advertised the right to grant degrees in Civil Engineering, Mechanical Engineering and Mining Engineering [6]. Both Bachelor's and Master's degrees for all three branches are referred to in the examination and graduation regulations, but there is no detailed syllabus in the Prospectus or any other evidence that any program except the Bachelor's in Civil Engineering was ever offered until Engineering started anew in 1946. Qualifications for the Master's, incidentally, were a Bachelor's degree, a minimum of three years of work experience, and examinations in the area of the candidate's work [6]; no formal course work program seems to have been envisualized. This second start to the Civil Engineering program seems again to have been shaky, for in 1888 the Prospectus showed only the first year of the program. In 1889, the year the College was formally granted a pontifical charter as a University, two years of the program were shown again, but in 1892 it disappeared entirely, not to return until 1946. However, the Foreword to the Prospectus continued to mention the power to grant degrees in all three engineering branches until 1906. In 1904 the provincial government granted the University $10 000 to replace instruments lost in the 1903 fire [3]. This presented an opportunity to re-establish engineering, and accordingly the 1905-06 Calendar announced the intention to launch programs in mining, civil and electrical engineering, but this notice disappeared the next year and nothing further came of this proposal [3].

The enrolment in Civil Engineering was small: 9 students in 1875, 10 in 1878, and in 1890 7 students in first year and 5 in second [3]. The early Prospectuses include lists of all graduates and prizes, and from these it appears that no degree in Civil Engineering was ever actually awarded. They also give lists of prizes awarded to Civil Engineering students for 1888 - 1890, which reveal that there were at least 14 students in this period, 6 of them with francophone names, and that at least 3 of them completed the second year. No engineering prize listings appear for 1891 or thereafter.

The Prospectuses give little insight into the degree of bilingualism in the early curriculum. One Prospectus, that of 1876, was issued in French as well as English, but this appears to have been the only such one printed prior to 1902 [2]. The 1876 French Prospectus presents all course descriptions in French, giving the impression of a completely bilingual program. However, with Fr Tabaret's new program of 1874 came the decision to hold almost all instruction in English, and this continued for the remainder of the 19th century [2, 7]. Prior to this, instruction at the College had been truly bilingual: French and English speakers were mixed in one class, and languages of instruction were alternated, with French being used in the morning and English in the afternoon [2]. The main reason for the new policy was the desire of the College to attract English-speaking Catholics, mostly Irish, who were being drawn to English-speaking Protestant or non-denominational schools and colleges because they were not prepared to attain the degree of fluency in French required for the College's mode of instruction. The advantage claimed for Francophones with this change is stated by the 1876 French Prospectus (but not by the English one) with these words:

> Tout en donnant le plus grand soin à l'étude du français et en faisant faire de cette langue une étude aussi sérieuse que possible, la position du Collége [*sic* - not Collège] exige que l'enseignement des autres sciences se fasse en anglais. Si d'un côté, c'est pour les Canadiens la source d'un petit surcroit [*sic*]de travail, c'est d'un autre côté un grand avantage pour eux, puisqu'ils se familiarisent ainsi avec la connaissance de cette langue, dès maintenant indispensable dans le pays. [8]

This was a general statement for all of the programs in the Prospectus, and the context shows that "autres sciences" meant anything except the study of the French language. A further sign of this is that one of the pre-requisites in the French Prospectus for entering the program was "grammaire anglaise" - French grammar is not mentioned [8]. However, all students were required to take a course in French.



Laboratory equipment ca. 1888. In the middle can be seen surveying instruments for Civil Engineering. AUO-PHO-NB-38AH-2-21.

1.2 Program Content

The contents of the early Civil Engineering program reflected the practice of the profession at that time, heavily focussed on surveying and large public works. The 1870's course, of three years duration, included mathematics up to introductory calculus, surveying, mechanics, geology, metallurgy, thermodynamics and a number of practical courses on bridges, canals, railways and harbours. The program also included what we now call "complementary studies": moral philosophy, society and political economy. As a Church institution, the College of Ottawa also required religious instruction in all programs, although it is not explicitly listed in the program descriptions. Judging by the science and mathematics covered, the level of a graduate from the 1870's program would correspond roughly to the first semester of our second year, while the entering standard appears to be at about our Grade 10 or 11 level. The 1885 program had a changed syllabus, with a stronger emphasis on mechanics, structures, materials and sciences but less mathematics (and apparently no calculus at first, but this was re-introduced in 1889). Some further program changes occur in the late 1880's. No detailed course descriptions have survived, but the course titles suggest that the new program was at a higher academic level than the 1870's one.

The College also introduced what we would call internships or perhaps even an early form of co-operative education program:

> The students of the Civil Engineering Course constantly practice what they learn, and for this purpose are well supplied with instruments of the best kind [this refers almost certainly to surveying instruments]. May and June being the favorable time for practice, these months are specially devoted thereto. During the said months, leave of absence is given to the students of the 2nd and 3rd year, to practice with professional men, on surveys or other works connected with their studies; but, on their return, they are examined as to the progress made while thus engaged. [9]

Little information is available on the teaching staff. In 1874 the instructor designated for Civil Engineering was Rev. Louis-Philibert Paquin O.M.I. [3]. The Prospectus of 1878 is the first one to list the staff, and designates two of the college's 18 professors as Civil Engineering: Fr Paquin again, and Rev. Jean-Baptiste Balland, O.M.I. Owing to the small size of the staff, these people had to be extremely versatile, as an 1875 letter from Rev. Antoine Paillier, the then Superior of the College, demonstrates:

> Le R.P. Paquin professe, le matin, le génie civil, c'est-à-dire l'arpentage et tout ce qui a rapport aux ponts et chaussées, mines et chemins de fer, canaux, etc.; puis l'après-midi, l'éponge à la main et la craie de l'autre, il devient professeur d'arithmétique et d'algèbre; un peu après, il s'affuble d'un grand tablier, et le voilà qui compose, décompose, recompose, et fait revivre les merveilles des alchimistes du moyen âge. [3]

Rev. J.-B. Balland, O.M.I., professor for Civil Engineering. U. of O. Archives. From [68].

In the same spirit, Fr Balland is listed separately as Professor of Music [9]! The re-started program at first does not list any Civil Engineering instructors, but in 1890 Fr Balland re-appears as the Professor for Civil Engineering (under the listing for the Faculty of Arts!), while in 1891 this designation changes to Rev. W. Murphy O.M.I., MA (later a Rector of the University). When the program disappeared the next year, Fr Murphy was transformed into a professor of Astronomy and Mathematics. Almost all of the instructors listed were priests and members of the Oblates; many of these, including the Superior, Fr Tabaret, were from France rather than Canadian [2]. Given the small number of instructors and the apparent lack of practicing civil engineers among their number, it is probable that the third year of the program was never actually taught [3].

The early prospectuses state that the "university method" of teaching was followed, in which each professor taught his specialty, in contrast to "the system previously followed, in which the professors had each the sole and entire charge of a class" [9], and go on to extol the virtues of this system in enthusiastic prose:

> The professor is not distracted from his favorite study by others, for which he has no taste and which he could but teach superficially or imperfectly, and the student is delighted to find each of his professors brimful of his subject, an enthusiast, so to speak, thereon... The shortcomings of one professor, if such there be, are remedied by the redeeming qualities of another, and the student, if persistently inactive or idle with the former, will frequently make up for time by redoubled application when with the other. [9]

This is good advice for teaching load assignment even today!

1.3 Student Life

The life of a 19th century student at the University of Ottawa was circumscribed and regulated to a degree that is scarcely imaginable today. Smoking, profanity and "irreligious or otherwise pernicious works" were prohibited, grade reports were forwarded to parents, incoming or outgoing letters could be opened by the Rector, who also had the power of censorship of any written works introduced into the College, and students were told not to lend or borrow personal effects. The underlying philosophy was expressed in these words from the 1874 Prospectus:

> The observance of discipline and good order, being indispensable to ensure the success of the students in their studies, exact observance of the rules of the College is enforced. Moral influence is had recourse to especially, as an incentive to the duties prescribed.
> Care is taken to form in the minds of the students throughout their entire course, such high and becoming notions of their holy faith, as may befit them to become good Christian members of society. [4]

However, in the context of the times, when universities generally were expected to act *in loco parentis*, it is doubtful if the early students found these regulations unduly restrictive; nor would the explicitly Catholic character of the institution have been unusual in an age when many universities and colleges were associated with churches (Anglican, Methodist, Presbyterian and Baptist as well as Roman Catholic) and included regular chapel services in their programs.

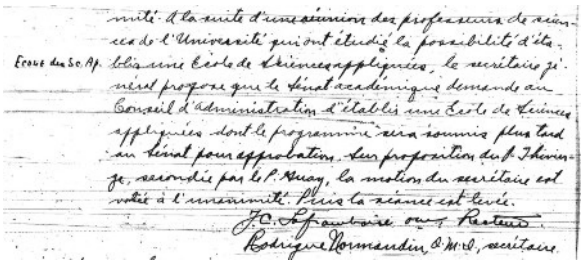
The academic year ran from the beginning of September to the end of June, and comprised two five-month semesters. There were no vacations for Christmas and Easter, and examinations were held at the end of January and June [4]. Tuition and board (including washing, bedding and medical services) were $80- per term in 1874; day students were only charged $12.50 [4]. Piano lessons could be had for $12.50, with an extra $5- charge if one actually wanted to use the piano. Exact specifications were given of the clothing and other items that students would require, right down to cutlery and 6 dinner napkins.

The College was at this time housed in a large building on the south side of Wilbrod Street west of Cumberland, where the Tabaret Hall parking lot is now. This had originally been erected in 1863, then substantially enlarged and modified in 1875 and again in 1884. It was completely destroyed in the fire of 1903. Describing the amenities, the 1885 Prospectus announced that "The fitting up of the College with the *incandescent electric light* has already commenced. The College of Ottawa is the first in America to utilize this beautiful light .... the students are not exposed to have their eyes fatigued by the flickering of gas light." [6]. Curiously, the steel engraving which appears on the covers of the late 1870's propectuses and in *Canadian Illustrated News* for 1879 [7] shows a building quite different from the actual College in many respects!

2. 1946 - A Fresh Start

2.1 The School of Applied Science

After more than a half-century of inactivity, engineering programs were re-started in 1946, and from this point on engineering has been offered continuously at the University of Ottawa. On 20 June 1946 the University Senate moved to create the School of Applied Science. From the hand-written minutes of Senate, taken by the Secretary (and later Rector), Fr Rodrigue Normandin:


Minutes of Senate meeting of 20 June 1946.

> À la suite d'une réunion des professeurs de sciences de l'Université qui ont étudié la possibilité d'établir une École de sciences appliquées, le secrétaire général propose que le Sénat académique demande au Conseil d'administration d'établir une École de sciences appliquées dont le programme sera soumis plus tard au Sénat pour approbation. Sur proposition du P. Thivierge, secondée par le P. Guay, la motion du secrétaire est votée à l'unanimité. [10]

The "professeurs de sciences" would have been in the Faculty of Arts, which at that time was offering a general science degree as well as master's and doctorates in Chemistry and Mathematics [1]. The thinking behind this decision is reflected in the Foreword to the first Calendar of the School of Applied Science, issued for the academic year 1947-48:

> Despite its century-old existence, the University of Ottawa, because of financial limitations, has never been able to offer its students the opportunity of preparing, within its walls, for a scientific career. The time has now come when a beginning can be made in the field of Engineering. [11]

As in the 1870's, an underlying motive was the desire to retain Catholic students who would otherwise be attracted to secular institutions such as the newly formed (1945) Carleton College [1]. The formal approval of the program by Senate followed on 20 March 1947; however, at this point the program had already been in operation as of Fall 1946, for the first Calendar preserves on its last page the names of the 43 students enrolled in 1946-47 [11].


Louis Cloutier, Laval engineering professor and first Director of the School of Applied Science. Archives de l'Université Laval, U5 19/92/2, 7320 (N/00122).

The founding of the School was instigated by Mgr Alexandre Vachon, Archbishop of Ottawa and Chancellor of the University, who earlier in his career had been a chemist at Université Laval, becoming first Dean of the Faculty of Science and then Rector at that institution before moving to Ottawa. He was assisted by his friend and former colleague Adrien Pouliot, second Dean of Science at Laval [1], and by Louis Cloutier, an engineer and secretary of the Faculty of Science at Laval, both of whom were present at the meeting of science professors referred to above [12]. As a consequence of this connection, Dr Cloutier

became the first Director of the School while continuing his duties at Laval, a service recognized by an honorary D. Sc. from Ottawa in 1954 [13]. Several of the first instructors also came from Laval [1], including Jean Duprat, a Laval professor responsible for surveying and mathematics, and Christian Lapointe, a National Research Council researcher and former Laval physics professor [12]. The 21 instructors listed in the first Calendar include 6 with identifiable engineering degrees (B.A.Sc., most of those from Laval) and 6 Oblates, but only 2 professors with doctorates apart from the Director [11].

Initially, the newly formed School offered only the first two years of engineering programs: a common first year, and a second year with two "sections" or streams, one in Civil, Mechanical and Electrical Engineering, and the other in Geological, Mining, and Metallurgical Engineering. Students had to complete their degrees elsewhere, and the 1947-48 Calendar states that special arrangements had been made with McGill and Laval. This official recognition was soon extended to include Toronto, Queen's and École Polytechnique [14], and Senate minutes of 11 March 1947 note that an English course was added to the curriculum to satisfy the requirements of Queen's. The first Calendar promised that "Third and Fourth Year Courses will be offered as soon as circumstances will permit" [11]. Despite the lack of a full program, in 1948 the Engineering Institute of Canada recognized the University as an "Accredited Engineering Institution, whose students are accepted for membership in this organization" [14].

For the first two years of its existence the School of Applied Science, in keeping with its name, was purely an engineering institution, so that in a very real sense 1946 can be claimed as the first founding of the Faculty of Engineering. However, this changed in 1948, when programs in Chemistry and in Physics/Mathematics were added. In the same year, the engineering programs were diversified, and the 1948-49 Calendar now listed separate programs in Chemical Engineering (for the first time), Electrical Engineering, Civil and Mechanical Engineering (combined), Mining Engineering, Metallurgical Engineering, and Geological Engineering. The contents of these individual programs were, however, almost identical to the combined programs of the previous year. Architecture was added to the mix in 1950-51, but was dropped again in 1957. At this point all programs were still restricted to the first two years.

2.2 Program Content

The new programs were closer in content to a Civil or Mechanical Engineering program of today than was the 19th century one, but contained much less mathematics and a broader range of engineering and applied science subjects. Courses in such diverse areas as mechanics, materials , drafting, geology, and surveying were included in all branches (even for aspiring electrical engineers!), and course descriptions indicate wide use of graphical methods for problem solution. The level of the more advanced courses corresponds roughly to our present-day second year. The surveying courses evidently demanded a certain degree of fortitude, for the 1948 French calendar specifies that "Pendant la période des travaux d'arpentage, les étudiants doivent se présenter tous les jours, quelle que soit la température. Celui qui s'absentera sans raison grave sera passible d'une déduction de 30% des points..." [15]. The English calendar, curiously, does not contain this stern

warning. Classes were initially given in the Science Building on Wilbrod St, today known as Academic Hall [11].

The first Calendar and all subsequent ones were available in both languages, with all courses being listed in French as well as English. As in the 1870's, however, it appears that most or all of the program was initially delivered in English [1], although the Senate in 1947 expressed the wish that parallel courses in French might be set up for some subjects in the future [16]. Virtually all the textbooks listed with the detailed course descriptions were in English, and instructors' names given in the French course descriptions includes individuals known to the writer as not speaking French fluently. Unlike the current system, course codes were the same regardless of language. It appears that the existence of French course descriptions did not necessarily mean that the course was actually available in French.

The Science Building (now Academic Hall), first home of the School of Applied Science. Built 1901, photo ca. 1931. AUO-PHO-NB-38A-2-300.

As to language requirements in the program, the 1947 Calendars in both languages specify a course in English, but not French, in the first year, and the textbooks for this course included Shakespeare's *Twelfth Night* [11, 15], clearly demanding a high level of fluency. Only the pre-engineering year, offered for students entering without Ontario Grade 13 or equivalent, required both English and French of all students, the French-speaking students taking English and "special French" [11] in the words of the English calendar. Senate minutes of 15 February 1949 note that a course in "French" (the English word is used in the minutes, which are otherwise all in French) had been introduced for Franco-ontarian students. The first real second language requirement was introduced in the major program revision which took place following the founding of the School of Pure and Applied Science in 1953, with both French and English courses being specified in the first and second years of all programs [17].

2.3 Student Life in the 1940's

Judging by regulations in the Calendar, students in the revived engineering program enjoyed considerably more freedom than their 19th century counterparts. However, this was still a Church institution with high moral standards, and the Calendar notes that:

> Students whose conduct or lack of application is deemed prejudicial to the University or whose influence is judged detrimental may be dismissed at any time by the University authorities.
> Disregard of University regulations, gambling, the use of intoxicating liquors or of profane or obscene language shall not be tolerated. [11]

The Catholic character of the University is also evidenced by the academic calendar, which includes a number of religious festivals, including the Feast of the Immaculate Conception (8 December), the patronal festival of the Oblates who ran the University and by extension therefore also the patronal festival of the University. Religious instruction was no longer specified as a part of the 1946 program, except as part of the pre-science year offered to students who entered without Ontario Senior Matriculation (Grade 13) [11]; however, it was re-introduced in all years of all programs after 1953 [17], in keeping with the University policy that all degree programs should include some religious education. Calendars until the late 1960's included the regulation that "tie and jacket must be worn in the classroom" [18]; to put this into perspective, one must remember that some universities at this time still required the wearing of academic gowns on campus. Students could also be fined $1 for each lecture missed without valid excuse.

Registration for courses, ca. 1958. Jacket and tie were compulsory in the lecture hall until the late 1960's. AUO-PHO-NB-32-271.

A laboratory class in the "barracks", ca. 1960. AUO-PHO-NB-32-39.

The academic year was now similar to present-day practice: lectures started in early September and continued till late April, with an extended recess for Christmas and a shorter one for Easter. Examinations were held at the end of April, with surveying instruction and field school following in May. Most courses were listed as full-year in duration, and there do not appear to have been exams at Christmas. Tuition fees were $300 for the first or second year or $30 for individual courses, with separate fees of $1- each charged for examinations [11]. Students were warned that University residence spots were limited, and that they would probably need to secure lodgings in the city at an average cost of $5- per week for a room and $7- for board. The admission process appears to have been simple and unbureaucratic, as the deadline for applications was 25 August, only 10 days before the start of lectures on 4 September! A significant number of the students would have been returning servicemen (a strong motivator for postwar university expansion), for whom special admission provisions are listed in the Calendar. As was common in universities at that time, cadet training was available in the form of the Canadian Officers' Training Corps and the University Naval Training Divison.

The list of the pioneering 43 students in the 1947-48 Calendar gives interesting insight into

the demographics of the student body: 22 were from Ontario (all but one from Ottawa itself), 6 from Québec, one from New Brunswick, 13 from the US (all but one from Massachusetts), and one from Mexico. About half - 22 - had francophone names [11]. The significant proportion of Americans reflected the University's long-standing connections with francophones and other Catholics in the northeastern US who did not have ready access to Catholic educational institutions at home [2]. Enrolment grew steadily, reaching 69 students in 1953, out of a total of 4461 students at the University [19].

2.4 The First Engineering Degrees and Departments - 1953-1960

In recognition of the growth of the School and of its diversification into the sciences, by Senate decision of 29 September 1953 it became the School of Pure and Applied Science. The Senate minutes note that "La réorganisation de cette École appelle d'autres transformations qui seront effectuées ultérieurement" [20], a reference no doubt to the fact that between 1953 - 1955 all science courses previously offered by the Faculty of Arts were transferred to the new Faculty, with the exception of first year and high school level instruction which were retained by Arts for the time being. The re-organized School did not formally become a Faculty until 1961, but the Calendars refer to it as such right from the start, as do numerous references in Senate minutes, and it was headed up by a Dean rather than a Director. Whatever its name, the new unit initially comprised four departments - Chemical Engineering, Chemistry, Mathematics, and Physics. Despite the beginnings of the Faculty in the engineering disciplines, and despite the inclusion of "Applied Science" in its formal name, the calendar covers from the very start referred to it simply as the "Faculty of Science", and from henceforth until the separation in 1986 Engineering played a minority role within the unit. The first Dean was Dr. Pierre-R. Gendron, a chemist from Université de Montréal, and he was responsible for recruiting much of the teaching staff. He also set up an external advisory committee which included the presidents of the National Research Council, the Defence Research Board, and Atomic Energy of Canada [1].

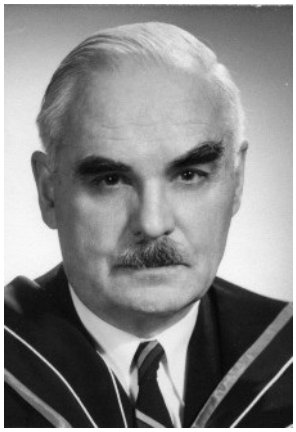
Pierre-R. Gendron, first Dean of Pure and Applied Science.
AUO-PHO-NB-32-547.

L.A. Madonna, first Chair of the Dept. of Chemical Engineering.
AUO-PHO-NB-32-535.

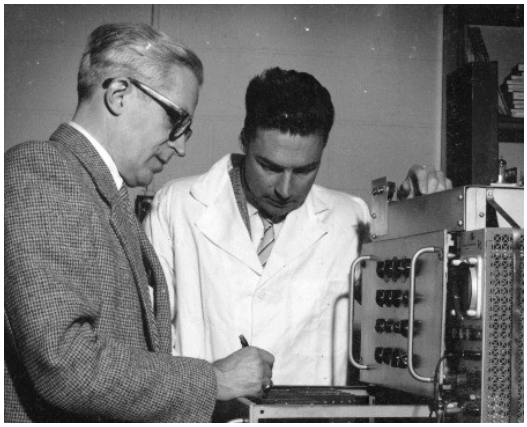
The programs of the School were approved by Senate in December 1953, and are listed in its first Calendar in 1954. These included the first full engineering degree program - Chemical Engineering, a 5 year undergraduate program - as well as the first three years of the other engineering programs named earlier. Geological and Mining Engineering, formerly two separate partial programs, were consolidated into one at the same time [17]. The first chair of Chemical Engineering was Dr. Louis A. Madonna, hired in 1954 and listed as acting head in the first departmental staff listing in the 1955-56 Calendar [21]. The first BASc degree was

awarded to Gaétan Perrault in 1956 [22]; he was apparently the only graduate that year, but four more followed in 1957, all of course in Chemical Engineering [23].

Remarkably, the next engineering program started by the new Faculty was not another bachelor's degree, but a graduate program in Nuclear Engineering in collaboration with Atomic Energy of Canada's Chalk River Laboratories. This was approved in January 1956, and was considered sufficiently important to warrant its very own calendar booklet for 1956-57. The program was intended to be of 12 months duration, with 8 months being spent at the University and the balance at Chalk River. Despite the "engineering" in the name, the content of this program was largely physics and chemistry, and students with science as well as engineering bachelor's degrees were admissible to it. The program led to something quite unique among Canadian universities: the founding of a Department of Nuclear Engineering, which existed briefly from 1957-1960. Six MSc's in Nuclear Engineering were awarded in 1957, and three more in 1958. One of the 1957 theses - "A consideration of the factors involved in theoretical prediction of steam bubble slip", by Stanley Hopkins [24] - is the first recorded work at the University on nuclear reactor thermalhydraulics, which has been a major research theme in Mechanical Engineering for over forty years and still continues today. The Nuclear Engineering program and department disappeared in 1960: the Dean's correspondence preserved in the University archives notes that the program would not be offered in 1958-59 owing to a lack of qualified applicants that year, and it appears that in view of this the university was not willing to make the investment in permanent staff needed to put the program on a long-term footing [25]. However, collaboration in nuclear research continued, resulting in 1975 in startup of the Mechanical Engineering Chalk River graduate program.



Col. R.A.H. Galbraith, first Chair of Electrical Engineering.
AUO-PHO-NB-32-493.



George Glinski, high-technology pioneer and second Chair of Electrical Engineering, with an unidentified second person, 1961.
AUO-PHO-NB-32-58.

The next full engineering program and department to be formed was Electrical Engineering, which began in the summer of 1956 [18], with Col. R.A. Harvey Galbraith appointed as the first Chair [18]. This program, like Chemical Engineering, was five years in duration. The final year was offered for the first time in 1958-59, and the first graduating class - 6 students - received their degrees in 1959 [26]. The program had a choice of two options in the fifth year, Power (which included a course in Thermal Power Plant, essentially mechanical engineering thermodynamics), and Electronics. In common with most electrical engineering programs at that time, there was a substantial degree of civil and mechanical engineering content: drafting, surveying, mechanics, materials, thermodynamics and machine design [18]. This disappeared in the course of

time, but the program still retained courses in mechanics of materials and a choice of fluid mechanics or machine design in the early 1980's. In 1959 George S. Glinski became Chair of Electrical Engineering; he had previously been a co-founder of Computing Devices Canada Ltd and is considered by many to be the Canadian pioneer of the high-technology industry [27].

Graduate programs began to be offered shortly after the startup of each Department, but precise dates are not known, since no explicit approval of these programs appears in the minutes of Senate. MSc and PhD programs in Chemical Engineering are first mentioned in the 1955-56 Calendar [21], but no details appeared until the next year (1956-57), when a separate graduate studies section was added to the Calendar (this in addition to the separate Graduate Studies Calendar which the University had been issuing for years). The degree requirements were similar but somewhat heavier than ours today: 20 (later 16 [28]) course credits above a BSc for the MSc in Chemical Engineering and another 16 credits for the PhD, a research thesis in each case, and for the PhD a comprehensive exam and a technical French and German language requirement [18]. Graduate courses were initially appended to the lists of undergraduate courses without any distinction except the course code; explicit listings of graduate courses or individual programs first appeared in the 1960-61 Calendar. The first engineering graduate degree, an MSc in Chemical Engineering, was awarded in 1960 to Paul-Henri Trudel [29] (who had previously graduated in the second undergraduate class in 1957 [23]). Electrical Engineering MSc and PhD programs first appear in the 1957-58 Calendar, immediately after the startup of the Department, and their first degrees were both awarded in Fall 1961: one PhD (to Gabor Times, the first engineering PhD) and one MSc [30]. From here on significant numbers of graduate degrees appear, at times comparable to the still small undergraduate classes. The current master's degree titles of MASc and MEng date from July 1968 [31].

The approval of new graduate programs seems to have been a much simpler process than it is today, and it appears that the University simply extended to each new department the authority granted it by the Provincial Legislature to award graduate degrees. Both Electrical and Civil Engineering, for example, offered degrees up to the PhD level from the very start [18, 32]! Shortly after the formation of Mechanical Engineering in 1967, however, a more rigorous process of external appraisal started, with the result that its initial listing of PhD degrees was dropped in 1970, and the Department had to channel its PhD students through Chemical or Civil Engineering until final approval of its PhD program by the Ontario Council on Graduate Studies in 1982. As a curious note, the Civil Engineering PhD program initially had Russian as well as German language requirements, which however were removed in 1968 [33].

2.5 Facilities

The engineering campus ca. 1960, looking to the southeast from Gendron Hall. To the left is Electrical Engineering (later Vachon Hall), to the right Chemical Engineering (the "Cube"), and in between the "barracks" housing the other programs and the computing centre. The two storey barracks in the background are residences. AUO-PHO-NB-32-42.

Engineering programs were initially housed in the Science Building on Wilbrod Street, now known as Academic Hall [11]. As programs grew, space was found in wartime temporary buildings known as the "barracks" to the southwest of King Edward and Somerset and in old houses on University-owned land in the neighbourhood; some of these premises had been vacated by the Faculty of Medicine on the opening of Vanier Hall in 1954 [13]. However, these were unsuited to laboratory use, and accordingly two buildings specifically designed for engineering were soon built. The first was the Chemical Engineering Building, now known as The Cube, which was officially opened by the President of the National Research Council, Dr. E.W.R. Steacie, on 29 October 1955 [25]. This provided lab space for Chemical Engineering's pilot plant until the Department moved to Colonel By Hall in 1970. The second was the Electrical Engineering Building, located at the southwest corner of what are now called Marie Curie and Louis Pasteur. Later known as Vachon Hall and then demolished in 2002 to make way for the eastern wing of the new biosciences complex, it was completed in 1957 after only 9 months work [25]. The speed with which the newly formed (1956) Electrical Engineering Department was rewarded with its own building is an indication of the confidence that the administration of those days had in their new programs. At the official dedication of this building and the new chemistry building (now Marion Hall) on 6 December 1958, a D.Sc. *honoris causa* was awarded to C.J. Mackenzie, "homme de science" [34] and then-chancellor of Carleton University, ironically the man whose name now graces the engineering building of that institution. The Electrical Engineering and Chemistry buildings together cost $4 million; architect for both as well as for the earlier Chemical Engineering building was Jean-Serge Lefort [25] who

was responsible for many of the University's buildings of that era. At the time the University's plan foresaw construction of a Civil Engineering building in 1960 and another building for Mechanical, Metallurgical, Mining and Geological Engineering in 1961 [3], but these did not materialize.

The "barracks", looking southeast towards King Edward, ca. 1960. The two-storey ones are residences. Today's safety officer would not approve of the unsecured gas bottles! AUO-PHO-NB-32-43

Interior of the Chemical Engineering Building at its dedication, 1955. From left to right: Patrick Kerwin (Chief Justice, Supreme Court), Fr R. Normandin (Rector), Mgr J.N. Gélineau (Vicar-General, Archdiocese of Ottawa, who blessed the building), P.-R. Gendron (Dean). AUO-PHO-NB-32-4.

Electrical Engineering Building, later Vachon Hall. View from near front of Marion Hall, looking northeast, ca. 1958. AUO-PHO-NB-32-15.

Electrical power lab in the basement level of Vachon Hall, ca. 1965. Power Engineering was one of two options in the early Electrical Engineering program. Photo from the 1965-66 Calendar.

A pioneering facility in the form of the Faculty of Pure and Applied Science's first computing centre opened on 24 July 1958. This housed an IBM 650 computer, a design from 1953 which was the world's first mass-produced computer [35], with a processing speed of 78 000 additions per minute [*sic* - not per second] and a storage capacity of 2000 words [25]. As this machine had a vacuum-tube processor (the first commercial transistor had only been produced four years earlier), an air-conditioning system of 26 kW capacity was required to remove the heat dissipated by its operation. The substantial operating costs of $22 934 per year were partially met by participation of the Ministry of Mines, the Defence Research Board, and the National Research Council, all of whom wished to use the new facility. Ironically, this high-tech innovation was housed in one of the old barracks buildings!

Computer Centre, 1958. Note the substantial ductwork necessary for air cooling of the vacuum tube processor. AUO-PHO-NB-32-11.

Correspondence between the Faculty and the central administration held by the University Archives gives interesting insights into the costs of this period [25]. New professors were offered salaries in the range of $4000 - $5000, a proposal for nuclear engineering estimated the cost of a full-time professor and a part-time mathematician at $15 000, and fairly substantial pieces of lab equipment could be had for sums of a few hundred dollars [25]. Tuition fees for 1958-59 were set at $300- for 1st year, $400 for 2nd and 3rd year, and $425- for 4th and 5th year [28] - not much higher than the $300- charged 11 years before [10]. As a private Roman Catholic university, which did not receive public funding until it became a fully public institution in 1965, the administration needed to maintain tight financial control, and even fairly small expenses required approval by the Administrative Council (item: travel expenses for a trip to Toronto, comprising $25 for train fare - including sleeping car charges - and $8 per day for hotel and meals [25]).

3. The 1960's and 1970's

3.1 The Faculty of Pure and Applied Science - 1961 - 1970

On 7 September 1961, Senate requested that the School become the Faculty of Pure and Applied Science. This action was merely giving official status to the title which had been in wide usage in calendars and other university documents almost since the beginning of the School. In the same academic year a separate common first year for engineering programs was introduced [36]; prior to this both Science and Engineering programs had shared all first year courses. A major curriculum reform was carried out in 1962, reducing the duration of engineering programs to the current standard of four years (two years for the partial programs in Civil and Mechanical Engineering, Geological and Mining Engineering, and Metallurgical Engineering, which had previously been three years) [37].

Civil Engineering was the next program to expand to a full four years, with the third and fourth year curricula being approved by Senate in April 1964 to appear in the 1964-65 Calendar. The Department of Civil Engineering was formed the following year, and J.D. Scott became its first Chair [38]. For some years prior to this the Calendar had carried a non-departmental Engineering listing with all the engineering courses and personnel that were not part of Chemical or Electrical Engineering, and most of this now became the new Department. The first graduating class - 2 students - emerged promptly in the fall of 1966 [39].

J.D. Scott, first Chair of Civil Engineering.
AUO-PHO-NB-32-864.

The last full engineering program and department, Mechanical Engineering, came into being as a spin-off from Civil Engineering: the initial curriculum proposal was presented to Senate by the Chair of Civil Engineering [40], and the first department chair was Civil Engineering professor Adolf Feingold. The first three years of the Mechanical Engineering curriculum were approved for the 1967-68 academic year, with the fourth year following in 1968-69. Substantial changes to the Civil Engineering curriculum were made at the same time to more clearly differentiate it from that of the former combined Civil and Mechanical Engineering program. The first graduates from the new Department were seven BASc's and one MASc in the spring of 1969 [41]; note that once again graduate degrees were offered as soon as the Department was founded.

The last remaining two-year programs, Geological and Mining Engineering and Metallurgical Engineering, were abolished by Senate decree in October and December 1966 respectively (Architecture had already disappeared early in 1957) [42]. Both of these had already become narrow specialities that could only be sustained by a small number of universities; our University wisely decided to focus on the four "mainstream" engineering disciplines.

Regulation of undergraduate engineering programs by the professional licencing bodies began in 1965 with the creation of the Canadian Accreditation Board, now the Canadian Engineering Accreditation Board. The Chemical and Electrical Engineering programs received their first

accreditation in the same year, while Civil and Mechanical Engineering followed in 1971 [43]. All have been continuously accredited ever since.

On 8 November 1967 Senate approved creation of the new discipline of Computer Science (Informatique), with a 3 year program leading to a BSc with mention and a four year BSc with specialization program. The new programs were under the joint direction of the Departments of Mathematics and Electrical Engineering, and had been developed by S. Bainbridge (Mathematics) and M. Krieger (Electrical Engineering) [44]. The program structure reflected this with substantial electrical engineering content, including courses on circuits, electronics and controls, but only 5 courses on computing *per se* [45]! Computer Science became a Department of its own in 1970. It became part of the Faculty of Science when the split between Science and Engineering occurred in 1986, but re-joined Engineering much later with the formation of the School of Information Technology and Engineering (SITE) in 1997. The Department began offering graduate courses in 1976, but did not grant graduate degrees until the formation of a joint graduate program with Carleton in 1982 [44].

3.2 The Faculty of Science and Engineering 1970-1986

In 1970 the Faculty was once again re-named, this time becoming the Faculty of Science and Engineering. The name change gave more importance and visibility to Engineering: although in theory Engineering was recognized in the "Applied Science" part of the Faculty's formal title, in practice the Faculty was simply known as the Faculty of Science, a designation used even on calendar covers and in other official documents. At this point all of the engineering departments had been established and had grown in size and activity to the point where their future was secure.

The status of Engineering was also reflected in the creation in 1970 of the new position of Associate Dean Engineering (or Vice-Dean Engineering, as it was called in the early 1970's) on the Faculty Executive, an office first held by Dr. Benjamin C.-Y. Lu, then Chair of Chemical Engineering. One of the reasons for this new function was the requirement of the newly formed Canadian Accreditation Board that engineering units be headed up by a licenced professional engineer. In theory this could be the Dean, and provision was later made that if the Dean happened to be an engineer, the position would become Associate Dean (Science) instead. However, in fact all Deans without exception had been scientists, and given the strong majority of the pure sciences in the Faculty would continue to be so. In the late 1960's the Vice-Dean had been an engineer (George Glinski, from Electrical Engineering), but the creation of the new position ensured more permanent leadership for Engineering. The office of Associate Dean (Engineering) effectively became the starting point for the later creation of an independent Faculty.

B. C.-Y. Lu, first Vice-Dean Engineering and longtime Chair of Chemical Engineering.
AUO-PHO-NB-32-800.

Coincident with these changes was the opening in September 1970

[46] of a large new building, Colonel By Hall, to house all the engineering departments. Electrical and Chemical Engineering vacated their previous quarters and moved into the new building; Vachon became the Biochemistry building and the Cube was used for a variety of other purposes. Initially Colonel By was shared with the School of Nursing and the Department of Geology; however, Nursing moved out in the early 1980's and Geology in the mid-1990's, and the building has been entirely engineering ever since. The building's name of course honours Colonel John By, the Royal Engineer who from 1826 to 1832 built the nearby Rideau Canal, Upper Canada's largest civil engineering work of the early 19th century. Among the facilities were a new Chemical Engineering pilot plant (replacing the Cube), large structures and hydraulics labs for Civil Engineering, and a complete engine testing facility with four large test cells and an extensive fuel supply system for Mechanical Engineering. A large cold room facility was included for cold climate engineering work; unfortunately, the complex refrigerating plant did not function properly, and a long and ultimately unresolved dispute with the contractor ensued. The area with large windows in the B section on the first floor was originally intended to house an Engineering library, but this never materialized, and the space eventually became the engineering computing facility.

Colonel By Hall under construction, looking southeast, 2 July 1969. At the bottom centre is the tunnel to Macdonald Hall. AUO-PHO-NB-32-399.

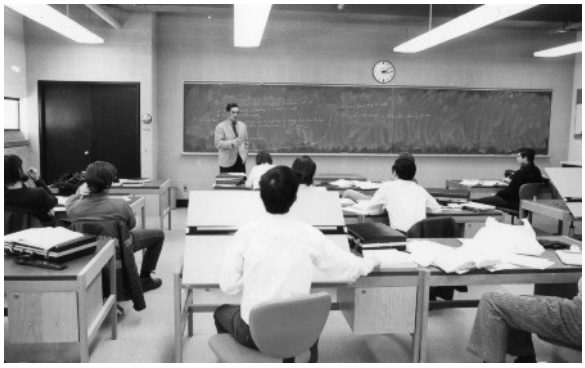
Ironically, the site of the new building and of the future SITE building had itself had an engineering function: it had been until 1957 the terminus of the New York and Ottawa Railway, a New York Central Railway branch line extending from a St Lawrence River bridge at Cornwall up to Ottawa, which included a small engine shed and other facilities for servicing steam locomotives.

The 1960's and 1970's were a period of tremendous growth in both student populations and in university facilities, as the table below shows, reflecting the demand of the "baby-boom" generation. It also shows the gradual influx of women into what up till then had been an almost exclusively male profession. The first woman engineering professor at the University of Ottawa was Dr. Martha Salcudean, who took up a position in Mechanical Engineering in 1977. (She left in 1985 to assume the position of Chair of Mechanical Engineering at the University of British Columbia). Finding female candidates for faculty positions in engineering at this time was a challenge: in all of

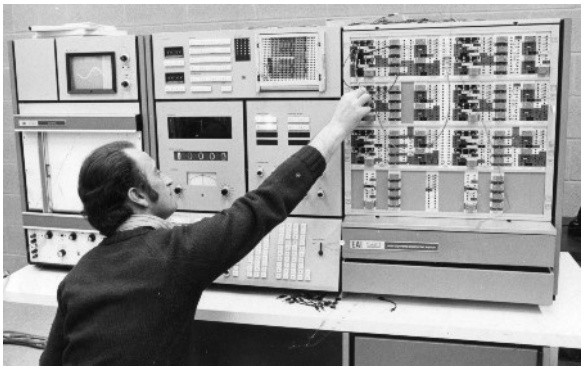
Canada in 1984, only 3 female PhD's graduated in engineering, all of them in Chemical [47].

Table 3.1: Engineering Enrolments in Canada and in Ontario [48]

Year	full-time undergraduates Canada	full-time undergraduates Ontario	% female Canada
1962-63	15950	4923	0.9%
1970-71	25706	10707	1.8%
1979-80	37079	17459	8.9%



A class in the Mechanical Engineering design lab, Colonel By B203, ca. 1970. The instructor appears to be Dr J. Newman. AUO-PHO-NB-6-1239.



An analogue computer in use, ca. 1970. Analogue computers used electric circuit elements to simulate the dynamic behaviour of mechanical and other systems. AUO-CON-NB-6-1226-88

Our own engineering programs mirrored the growth everywhere else, as the table overleaf makes clear, and a number of program innovations took place. The most significant was probably the startup of co-operative programs in Engineering in 1981, shortly after the start of the University's very first co-op program, that of Mathematics. The first Engineering co-op students went out on co-op work terms in the summer of 1982. There was no central co-ordinating office in the early days, so that most of the work of finding student placements and conducting on-site visits had initially to be done by the departmental professors designated as co-ordinators. Although early co-op classes were small - around a half dozen students in each department - this required a substantial amount of work.

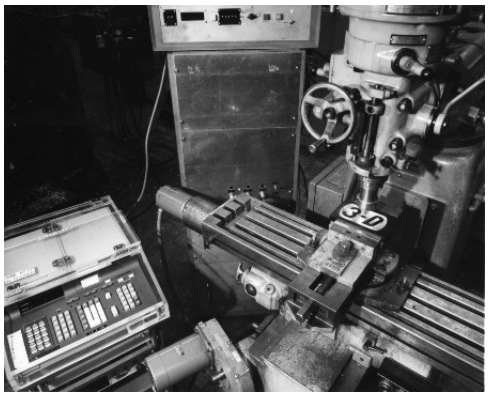
Table 3.2: Statistics for Engineering Units 1975 - 1983 [49]

	Civil	Chemical	Electrical	Mechanical	Total
Full-time professors:					
1975-76	12	9	14	10	45
1983-84	13	10	17	13	53
Undergraduates:					
1975-76	156	110	128	151	545
1983-84	224	165	363	259	1011
Graduate students:					
1975-76	47	31	130	31	239
1983-84	40	32	154	50	276
Research funds ($1000)					
1975-76	119	130	98	146	493
1983-84	384	327	820	835	2366

Two interdisciplinary programs were also started in this period. The first was Engineering Management in both its undergraduate and graduate forms, which combined courses from the Faculty of Administration with engineering programs. This was the brainchild of Alexander S. Krausz, Chair of Mechanical Engineering from 1972-1981, and the other engineering professors involved were also in that department. The undergraduate version, introduced in 1977, was the Engineering Management Option, which substituted administration courses for other technical and non-technical courses in the regular program. A more ambitious offering followed, the Engineering Management Program, which required a fifth year of courses on top of the regular engineering program and granted students a Certificate in Engineering Management along with the BASc degree. This was introduced in September 1980 [50], but had first been announced in the 1978-79 Calendar with the fourth and fifth years listed as “in preparation”. The Option continues to be offered today in all programs of the Faculty, but the undergraduate Program with its extra year proved unattractive after the graduate program had been introduced, and it disappeared in the mid-1980's, with the Certificate being abolished in 1987 [51]. At the graduate level, a Diploma in Engineering Management was initiated in the Fall of 1981 [50] as a collaboration between the Faculty of Administration and Engineering. The students for this program were initially practicing engineers from industry and government, in particular National Defence, whose training needs were a major factor in starting the program. This later expanded into a Master’s of Engineering degree program, which commenced in September 1989 [52, 53] and is still offered today.

The second interdisciplinary effort was the undergraduate Biochemistry/Chemical Engineering program, created in 1984 by the two namesake departments in recognition of the increasing role of biological processes in Chemical Engineering. This granted its students two degrees after five years of study. Again, this program is still thriving, and biological processes have now taken on such importance that Chemical Engineering was recently (2010) re-named Chemical and Biological Engineering.

A structural change in most engineering graduate programs took place in 1983 with the formation of joint graduate institutes with Carleton University in Civil, Electrical and Mechanical Engineering (Chemical Engineering had no counterpart at Carleton and hence was spared). This occurred partially in response to the Ontario Government, which briefly toyed with the idea of having individual universities focus on particular research areas, somewhat as the Thatcher government in the U.K. was doing at that time. The resultant pooling of courses and admission processes and the coordination of standards and examination procedures between the two Universities was convincing evidence of the elimination of wasteful duplication, and no further government action occurred on this theme.



Computer numerically-controlled milling machine, Mechanical Engineering, 1978. AUO-PHO-NB-32-2177.

A significant development of this era was the increasing application of computational tools to all aspects of engineering, in particular the design process. In response to this, in 1984 the Faculty opened its first computer-aided design (CAD) facility on the first floor of Colonel By Hall, housing a VAX 11/780 mini-computer and 7 CAD workstations (one of them colour!) running Anvil software [54]. (For the uninitiated, a “mini-computer” was smaller than a room-filling mainframe, but still a large piece of equipment, equivalent to several filing cabinets in size.) It was first used in the Winter of 1985 with the introduction of the fourth year computer-aided design course in Mechanical Engineering, and shortly afterwards most of the first year drafting instruction in Civil and Mechanical Engineering became computer-based. The counterpart to CAD, computer-aided manufacturing (CAM), had been introduced earlier by Mechanical Engineering in the form of a CNC (computer numerically controlled) milling machine; a photograph from 1978 shows this machine in action.

The 1970's and early 1980's were a period of rapid inflation, and this is reflected in tuition fees, which rose from $550- in 1965-66 (the year the University first began receiving provincial government funding) to $711 in 1974-75 and $1070 in 1982-83 (the last year for which they were published in the Calendar). A new junior professor in the early 1980's could expect to receive a salary of around $25 000 per year, about five times that of his counterpart of the mid-1950's.

4. The Faculty of Engineering

4.1 Events Leading to the Formation of the Faculty

As the engineering programs grew, it became increasingly clear that a separate engineering unit was required. We have already seen that some degree of separate leadership for Engineering was provided from 1970 on by the position of Associate Dean (Engineering), created partly to satisfy accreditation regulations. A further accreditation requirement was that engineering programs be in control of their own curricula, but in a Faculty whose Council had a majority representation of non-engineers this was by no means assured, and Council meetings saw occasional turf wars over the ownership of certain curriculum elements. In fact, the report from an accreditation visit in 1984-85, shortly before the Faculty was created, drew attention to this problem, noting that "the present situation at the University of Ottawa does not guarantee that effective control of the programs rests with registered engineers" [47]. The associate deans from the time of creation of the position held periodic meetings of engineering professors, and these began to press for the formation of a separate Faculty of Engineering, a process that would take a total of 16 years.

The first step towards this was a motion at one of the first of these engineering faculty meetings, on 9 November 1970, that a committee be set up to study the feasibility of separation. This was approved by 29 out of the 40 professors present. Since the engineering faculty meetings had no legal powers, this had then to be presented to Faculty Council, which approved setting up a committee comprising the four engineering chairs plus the chairs of Chemistry, Physics and Mathematics. A further committee comprising two professors from each engineering department (W. Kozicki and B. Pruden from Chemical, N.J. Gardner and R.G. Warnock from Civil, J.V. Marsh and W. Steenaart from Electrical, and Y. Lee and J.A. Newman from Mechanical, with N.J. Gardner as chair), delivered a report in October 1972. This second committee agreed in principle, but by no means unanimously, that a separate Faculty should be created at some undefined point in the future when a majority of engineering professors agreed that conditions justified it [55]. On the one hand, arguments in favour of a separate Faculty included the nature of a professional program as distinct from an ordinary undergraduate one, the constraints of accreditation, the image of the programs and their draw for potential students, and the greater degree of independence in budgeting, curriculum, hiring, and interaction with the profession. The disadvantages cited included additional costs (a Dean plus three support staff was costed at $80 000 per year), a possible loss of interdisciplinary interaction in research (a particular concern for Electrical Engineering, which only five years previously had been an initiator of Computer Science), and the potential in a small Faculty for a greater administrative burden and "the polarization of ideas" [55].

Another committee of eight, chaired by R.G. Warnock from Civil Engineering, reported late in 1976, and recommended the creation of a separate Faculty as of May 1978 [47]. In the meantime, the Faculty was dealing with the proposals of the University's Commission on Revision of Structures. This body, headed by Denis Carrier, had been set up in March 1972 to conduct a University-wide review of teaching and research structures, and had recommended grouping the engineering departments and Computer Science into a single unit - a School - within the Faculty.

Faculty Council rejected this, asking that the departments remain separate units, and decided in November 1976 that a Faculty of Engineering should be created from the engineering departments (without Computer Science) at such time as conditions were deemed favourable, this decision to be made according to the criteria of steady enrolments, budgetary realities, space, and bilingualism. The Academic Planning Committee of Senate accepted this recommendation in April 1977, but decided that "whereas the committee is not prepared to decided for or against Faculty status for engineering as a matter of principle, it is of the view that on balance the time is not yet appropriate for this development" [56, 57]. These recommendations were subsequently ratified by Senate, putting a temporary hold on further progress.

Not all proposals on the status of Engineering were in favour of creating a separate Faculty. In 1981 the Five Year Plan Committee of the Faculty (A.J. Baer, Dean, J. Fréchet, Chemistry, and N.D. Georganas, Electrical Engineering) recommended the retention of a single Faculty but with two "sections", each headed by a dean; these section deans were then to alternate as Dean and Vice-Dean of the Faculty as a whole [58]. This recommendation was actually approved by Faculty Council on 29 January 1981 but was not further acted on.

In 1983, a discussion paper prepared by W. Steenaart, the then Associate Dean, called for a separate Faculty starting July 1984 [49]. The statistics included with this paper, summarized earlier in Section 3.2, give a good picture of the growth of the engineering units since the proposals of the 1970's. It was noted that the University of Ottawa now had the fifth largest undergraduate enrolment of the twelve Ontario engineering programs but was the only one without the status of a separate Faculty. (When the separation finally occurred in 1986, it left Laval as the only remaining Canadian university with a shared Faculty.) With regard to costs, the paper proposed that some aspects of administration should continue to be shared between Science and Engineering, and gave reassurances that service courses given by Science would still be required.

Finally, on 24 May 1984 Faculty Council agreed to set up yet another committee, this time composed of the Dean (A.J. Baer) and two representatives each from Science and Engineering (M. Déruaz, Mathematics, G. Marchand, Physics, E.J. Schiller, Civil Engineering, and N.J. Gardner, Civil Engineering, newly appointed as Associate Dean (Engineering)). The Committee submitted its report on 8 January 1985 [56, 59]. Its core was a series of motions to create a separate Faculty, which were presented at the Faculty Council meeting of 26 February 1985. The historic main motion read as follows:

> It is moved that the Faculty of Science and Engineering be re-organized into a Faculty of Engineering comprising the Departments of Chemical, Civil, Electrical and Mechanical Engineering and a Faculty of Science comprising the Departments of Biology, Biochemistry, Chemistry, Computer Science, Geology, Mathematics and Physics, as of July 1 1985. The Council recognizes the special case of Computer Science, which has entered into discussions affecting its future orientation. [60]

A secret ballot was called for, and after some long moments of anticipation in the Faculty Council chamber in the basement of Marion Hall the result was announced: 33 in favour and 16 opposed. Since this was considered as a by-law change for the Faculty, a two-thirds majority was required for

approval, and the motion therefore only passed by one vote. Subsidiary motions were passed which provided for *ex-officio* membership of the Dean of Engineering on the Faculty of Science executive committee and *vice-versa*, for open exchange of information and consultation between curriculum committees, especially in the case of changes to service courses, and for joint committees for laboratory safety, library holdings, and Christmas lectures.

These motions were subsequently relayed to Senate, which however at its meeting of 8 July 1985 requested further details, in particular with regard to the details of the structure of the new Faculty and the extent to which it would be bilingual. The Associate Dean, Dr. Gardner, sent a detailed reply in late August, with assurances that new faculty hires would be bilingual or francophone, while noting the particular difficulties of recruiting Franco-Ontarian professors and graduate students. The additional costs of running the new Faculty were estimated at $200 000 per year [61], some of which was expected to be recouped in savings in the new Faculty of Science and in additional revenue from a more visible and competitive Faculty of Engineering. Assurances were given that redundancies in course offerings would not be created by changes in science service course requirements [47]. The separation of the Faculty was then finally approved by Senate on 9 September 1985 and by the Board of Governors on 28 October 1985 [62], and the starting date for the new Faculties was set for 1 July 1986. The Board noted that approval did not entail the allocation of any new resources to accomplish the separation, although one-time costs of around $100 000 for the establishment of the new Engineering Dean's office were recognized [63].

Although the wording of the actual motions makes it clear that the Faculty was being split into two independent parts, the event is almost always remembered as the Faculty of Engineering separating *from* the Faculty of Science. This was partly a result of the long-standing habit, as we have seen before, of referring to the old Faculty simply as "Science" even in official usage, but it was also a reflection of the large majority status and culture of natural scientists in the old unit. Engineering had, however, become very productive in proportion to its size: statistics for Science and Engineering given in the table below make this clear, particularly when the comparison is made on a per professor basis.

Table 4.1: Comparative Statistics for Science and Engineering Departments, 1983-84 [47]

	full-time professors	full-time undergraduates	full-time graduate students	research grants and contracts
Science	116	1687	450	$3.4 million
Engineering	55	1005	494	$2.4 million

At a distance of a quarter century and more from these events, it may seem strange to us that such an obvious step as the creation of separate faculties did not receive unanimous support, not even always from engineering professors. There were a number of reasons for this. It is clear from the response to Senate in August 1985 that there was anxiety among the Science units regarding Engineering's future demand for the numerous mathematics and science services courses in their

programs [47]. Thanks largely to accreditation requirements, however, Engineering's needs for these courses have remained essentially unchanged, and Science has benefitted from Engineering's substantial enrolment growth since then. The placement of Computer Science was an unresolved issue: we recall that it originated as a collaboration between Mathematics and Electrical Engineering, and a number of its faculty were licenced professional engineers who considered themselves to be computer engineers rather than computer scientists [59]. This question would finally be settled a decade later with the formation of SITE (the present-day School of Electrical Engineering and Computer Science). Some felt that the separate faculties would be too small and therefore lose visibility and weight within the University and outside, while others saw wasteful duplication in the extra administrative unit and the possibility of a redistribution of resources to the detriment of the science departments. Finally, then as now there were many fruitful research and academic program collaborations between the two units, collaborations which some thought would become more difficult.

Ironically, approval of the separation came too late for the Calendar production deadline, so that a 1986-87 Calendar was produced for a Faculty that no longer existed! A paragraph in the Foreword was the only indication of the change that was about to take place.

4.2 The Faculty of Engineering - 1986 to the present

First meeting of the new Faculty of Engineering, 2 July 1986. Front row, left to right: S. Stuchly (Chair, Electrical), S. Mirza (Chair, Mechanical), R.G. Warnock (Chair, Civil), A. D'Iorio (Rector), N.D. Georganas (Dean), B.J.R. Philogène (Dean - Science), P. Morand (Vice-Rector, Research), B. C.-Y. Lu (Chemical). N.J. Gardner (Associate Dean, Engineering) is in the second row above Dr Philogène. Photo U. of O. *Gazette*, 14 July 1986.

The first Dean of the new Faculty was Nicholas Georganas, a professor in Electrical Engineering since 1971, former department chair, and much later Associate Vice-Rector Research. The Faculty was inaugurated with a meeting of all professors on 2 July 1986, and in his opening remarks Dr. Georganas expressed gratitude for the work that the former Associate Deans of Engineering and others had done towards its establishment, noting particularly that "[N.J.] Gardner

kept the flame of a separate Faculty of Engineering alive for more than 10 years" [64]. The new Dean quickly moved to set up a secretariat for Engineering on the third floor of Colonel By Hall, space formerly occupied by the School of Nursing, and to put in place the necessary administrative structures. At that time graduate and undergraduate student academic administration was still largely carried out in the individual departments, so that the Dean's office staff *per se* was smaller than it is now, and all its functions fitted comfortably into the single floor in the A block of Colonel By Hall. The inaugural Faculty Executive Committee was as follows:

Dean: N.D. Georganas (Electrical Eng'g)
Vice-Dean: F.D.F. Talbot (Chemical Eng'g)
Assistant Dean (Academic): C. Lemyre (Electrical Eng'g)
Secretary: P.E. Wisner (Civil Eng'g)
Department Chairs: Chemical Engineering: V. Hornof
Civil Engineering: R.G. Warnock
Electrical Engineering: S.S. Stuchly
Mechanical Engineering: S. Mirza


N.D. Georganas, first Dean of Engineering.

The dominant theme of the next decade was the spectacular expansion of the high-technology industry in Ottawa, which became known as "the Silicon Valley of the North". Established companies such as Nortel and new firms such as Newbridge, Mitel, JDS Uniphase and a host of smaller start-up companies went through years of unprecedented growth, and a huge demand for graduates of electrical engineering, computer science and related disciplines resulted. The Faculty took a number of program initiatives to support this. The first was the establishment of the Computer Engineering undergraduate program in 1989 [65], which had had its beginning in a Computer Engineering option in Electrical Engineering in 1983. This program focussed on the hardware aspects of computing systems and was therefore a natural extension of Electrical Engineering. Computer Engineering was the first program to be offered completely in both English and French; all other programs at that time were only bilingual up to the second or third year level, engineering courses in the upper years being offered only in English.

To reflect the increasing importance of information technology in its programs, the Department of Electrical Engineering was renamed Electrical and Computer Engineering in 1996. However, shortly after this development, a much greater structural change took place. We noted that when the Faculty of Engineering was formed, Computer Science for the time being remained with the other Science departments, but its ultimate alignment was left as an open question. It became increasingly clear that a close collaboration between Electrical Engineering and Computer Science would be highly beneficial for the support of programs in information technology. Accordingly, at the invitation of the Faculty of Engineering [66], in 1997 Computer Science unanimously decided to "come home" to Engineering, its original starting point thirty years earlier, and was amalgamated with the Department of Electrical and Computer Engineering to form the School of Information Technology and Engineering, or SITE for short, effective 1 May 1997. Robert Probert from Computer Science became acting director pending the appointment of Emil Petriu (Electrical Engineering) as the first Director of SITE. In 2011, the name of the School was changed to School

of Electrical Engineering and Computer Science (SEECS) in an effort to better align its name with those of the main disciplines it serves.

The creation of SITE (the present-day SEECS) was above all the brainchild of Gilles Patry, who had become the second Dean of Engineering in 1993. Dr. Patry was originally a graduate (1971) of the University of Ottawa's Civil Engineering program who had been a professor at École Polytechnique and at McMaster University, and had also started and run a very successful engineering consulting firm before returning to us. He became Vice-Rector Academic in 1997, shortly after creating SITE, and ultimately served as Rector from 2001-2008. His work as Dean was made more difficult by an economic recession in the early 1990's, resulting in cutbacks of government funding and the infamous "Rae Days", unpaid holidays mandated for the public sector as a cost-saving measure in 1993 by the Ontario Government. Dr. Patry was succeeded as Dean by Tyseer Aboulnasr, a professor of Electrical Engineering and the Faculty's first female Dean. In her earlier role as Associate Dean Academic, she had overseen a major overhaul of the undergraduate curriculum, and she was now about to steer the Faculty through an unprecedented era of growth in information technology.

The combination of computer scientists and engineers in SITE made possible the startup of the Software Engineering undergraduate program in September 1998. The recognition of large-scale software development as an engineering activity, rather than as programming or computer science, with the level of design, responsibility and duty implied by its designation as a professional field, was a matter that was hotly debated at the time. Suffice it to say that Software Engineering was officially recognized as a professional engineering discipline by the engineering licencing bodies when in 2001 our program became the first such in Canada to receive accreditation by the Canadian Engineering Accreditation Board [43].

A significant driving force for development in the information technology area was the introduction by the Ontario Government of the ATOP (Access to Opportunities) program in 1997. This promised additional funding to universities for education in high-technology disciplines, but only if they doubled their enrolments in the designated areas: no additional funds at all would be forthcoming if the targets were not met. At the time, this seemed like a logical response to the industry's demand for more graduates, but in hindsight it led to massive and unsustainable overbuilding by the province's universities. This led to large increases in enrolments in SITE (the present-day SEECS) and hirings of new staff: in the Fall of 1999 alone, 10 new professors took up positions in SITE! It also led to other departments generating a share of ATOP enrolments by creating the Computing Technology double degree program, which allowed students in conventional engineering disciplines to add a year's worth of computing courses to their programs and graduate with a second degree. A further, but temporary, enrolment increase came in 2003, when the Ontario school system abolished Grade 13, resulting in the "double cohort" of the last Grade 13 and the first Grade 12 graduates arriving on campus simultaneously.

This expansion led to a serious shortage of space. The departure of the Department of Geology from Colonel By Hall in 1994 made some additional lab and office space available to

Engineering, but this was soon occupied. Other stopgaps included temporary buildings ("trailers") placed behind Colonel By to house graduate student offices and loans of lab space from other departments. Another issue was the integration of Computer Science into SITE: their offices remained in MacDonald Hall, as did the office of the Director of the School, making interaction with Electrical Engineering more difficult, but there was no other place to move to. It became clear that a second building for Engineering was required, and planning began for the SITE building, to be situated immediately south of Colonel By, with a space study of the existing facilities. Construction began in January 2000, with the official groundbreaking taking place on 29 March 2000, and soon the groundhogs living in the bank to the south of Colonel By were evicted by the sound of piledrivers. Major disruption to labs in the bottom level of Colonel By ensued in the Winter of 2000 as large steam and other service pipes were run through to serve the new building. The SITE building was completed for occupancy in the Spring of 2002, with the official opening taking place in September. A construction boom in the Ottawa area at the time had led to substantial increases in costs: the final price for the building was $47M, nearly double the original estimate of $25M. Innovative features included the use of pre-stressed hollow concrete slabs manufactured off-site for the floors. The tubular hollow spaces in these slabs also serve as air-conditioning ducts, saving vertical space that would otherwise have been required for ductwork and ceilings.

Construction of the SITE building, Spring 2000. View to the south from Colonel By. Photo W. Hallett.

Ironically, the opening of the SITE building coincided with the beginning of massive shrinkages in the local high-tech industry: large layoffs at Nortel, the transfer of JDS Uniphase production overseas, and the failure of many smaller companies. This was mirrored by sharply declining enrolments in the undergraduate programs in SITE (the present-day SEECS), and by 2005 first year SITE admissions had dropped to half the 2002 level.

A completely different area of new development in this era was environmental engineering, a joint enterprise between Civil and Chemical Engineering. Waste treatment and water supply systems had traditionally been the purview of Civil Engineering, but newer environmental hazards and treatment processes for them which fell more clearly into Chemical Engineering had considerably widened the scope of the field, and a synthesis of both was an obvious step. A full slate of graduate degrees in Environmental Engineering (MASc, M.Eng., and PhD) was initiated first,

receiving provincial approval in 1990 [65]. This was followed by undergraduate options in both departments which started operation in 1992.

The new millenium saw an increasing interest in biomedical and biological engineering. For many years there had been individual researchers in almost all engineering departments working on aspects of biomedical engineering such as instrumentation, imaging, artificial hearts, and tissues. The Faculty's first offering in this area was an elective course in Biomechanical Engineering initiated by James Newman in Mechanical Engineering in the early 1970's. (Dr. Newman later left the University to found Biokinetics and Associates, a major local biomechanics consulting firm.) In the late 1990's a Faculty committee was set up to develop a proposal for a graduate biomedical engineering program. The process was complicated by the interdisciplinary nature of the field and by the decision to make this a joint graduate institute right from the start, so that the final structure included three departments at the University of Ottawa and four (not all of them engineering departments) at neighboring Carleton. The MASc program in Biomedical Engineering was finally approved by the Ontario Council on Graduate Studies in 2005 and began operation at the start of 2006. In the meantime, Mechanical Engineering had introduced the first undergraduate offering in the field, the Biomedical Mechanical Engineering Design option, in the Fall of 2004. This was shortly afterwards expanded to a full degree program, entitled Biomedical Mechanical Engineering, which was approved for funding by the Province in August 2005 and welcomed its first students in the Fall of 2006. As in the case of Software Engineering, this was the first accredited program of its kind in the country [43]. It was followed by a Biomedical Engineering option in Software Engineering in 2006 and in Chemical Engineering in 2009. These programs have been supported by a number of recent faculty hirings in various branches of biomedical engineering, including a Canada Research Chair in Bioengineering in Orthopædics.

The Faculty has more than doubled in size since its inception in 1986, as the statistics in the table overleaf demonstrate. The Faculty is currently presided over by Claude Laguë, who became Dean in 2006. An agricultural engineer, originally from Université Laval, he had previously held a research chair and then served as Dean of Engineering at the University of Saskatchewan before coming to Ottawa. During his tenure, Civil, Chemical and Mechanical Engineering have undergone significant growth, as have the recently introduced biomedical programs. Some badly needed new space for student design projects and other laboratory uses has been acquired at the old Algonquin College campus on Lees Avenue, purchased by the University in 2007.

As the Faculty celebrates the 25th anniversary of its creation, and the 65th / 138th anniversary of Engineering at the University, it faces the perennial challenges of budgetary restraints and space limitations, and the never-ending struggle to maintain its share of excellent students, research funding, and public visibility. But we can face the future with a good deal more certainty than did those brave pioneers 65 years ago, who started engineering on a shoestring budget in tumbledown barracks buildings. And we can also learn from the dedication and far-sightedness of the Oblates of 140 years ago, whose vision eventually led to what we have now.

Table 4.2: Statistics for the Faculty of Engineering - 1986 and 2011

	1986-87 [65]	2010-11 [66]
undergraduate enrolment	900	1957
graduate enrolment	217	767
full-time professors	59	119
regular support staff		69
research funding[1]	$2.8 million	$13.8 million
Faculty budget		$21.9 million

[1]not adjusted for inflation

5. List of References

[1] Guindon, R. Coexistence féconde. La dualité linguistique à l'Université d'Ottawa. Vol 3: 1936-1965. Les Presses de l'Université d'Ottawa, Ottawa, 1995
[2] Guindon, R. Coexistence difficile. La dualité linguistique à l'Université d'Ottawa. Vol 1: 1848-1898. Les Presses de l'Université d'Ottawa, Ottawa, 1989.
[3] Carrière, G. Chronique universitaire: Au coeur de la nature. *Revue de l'Université d'Ottawa* **26** (1956), 498-512.
[4] College of Ottawa, Prospectus, 1874.
[5] College of Ottawa, Prospectus, 1880.
[6] College of Ottawa, Prospectus, 1885.
[7] Prévost, M., The University of Ottawa Since 1848, University of Ottawa, 2008.
[8] College of Ottawa, Prospectus, 1876.
[9] College of Ottawa, Prospectus, 1878.
[10] Minutes of Senate, 20 June 1946.
[11] School of Applied Science, Calendar for 1947-48.
[12] Chronique universitaire, *Revue de l'Université d'Ottawa* **16** (1946), p. 367-368.
[13] Chronique universitaire, *Revue de l'Université d'Ottawa* **24** (1954), p. 376 and p. 487.
[14] Chronique universitaire, *Revue de l'Université d'Ottawa* **18** (1948), p. 377.
[15] École des Sciences Appliquées, Annuaire 1948. [This covers academic year 1947-48 and part of 1948-49; it appears to have been issued some months later than the English version above.]
[16] Minutes of Senate, 11 March 1947
[17] Faculty of Pure and Applied Science ("Faculty of Science") Calendar for 1954-55
[18] Faculty of Pure and Applied Science ("Faculty of Science") Calendar for 1957-58
[19] Chronique universitaire, *Revue de l'Université d'Ottawa* **23** (1953).
[20] Minutes of Senate, 29 September 1953
[21] Faculty of Pure and Applied Science ("Faculty of Science") Calendar for 1955-56
[22] Minutes of Senate, 21 May 1956
[23] Minutes of Senate, 17 January 1957 and 23 May 1957
[24] Minutes of Senate, 16 November 1957
[25] University of Ottawa Archives, Fonds 32, 10815 (documents relating to the Faculty of Science).
[26] Minutes of Senate, 21 May 1959
[27] Georganas, N.D. Brief History of the Dept. of Electrical Engineering (1956-1997), 2004.
[28] Faculty of Pure and Applied Science ("Faculty of Science") Calendar for 1958-59
[29] Minutes of Senate, 6 October 1960
[30] Minutes of Senate, 10 October 1961
[31] Minutes of Senate, 8 July 1968
[32] Faculty of Pure and Applied Science ("Faculty of Science") Calendar for 1965-66
[33] Minutes of Senate, 18 November 1968
[34] Minutes of Senate, 17 October 1958
[35] IBM on-line archives, http://www-03.ibm.com/ibm/history/index.html
[36] Faculty of Pure and Applied Science ("Faculty of Science") Calendar for 1961-62
[37] Faculty of Pure and Applied Science ("Faculty of Science") Calendar for 1962-63
[38] Faculty of Pure and Applied Science ("Faculty of Science") Calendar for 1966-67
[39] Minutes of Senate, 14 October 1966
[40] Minutes of Senate, 9 January 1967
[41] Minutes of Senate, 20 May 1969
[42] Minutes of Senate, 14 October 1966 and 12 December 1966
[43] Canadian Engineering Accreditation Board, Annual Report (any year - every annual report contains the listing with dates of all accredited programs)
[44] A Capsule History of the Department of Computer Science, author unknown, single page, May 2004.
[45] Minutes of Senate, 8 November 1967
[46] Faculty of Science and Engineering Calendar for 1971-72

[47] Gardner, N.J. Report to Senate on the proposal to create a Faculty of Engineering, Aug. 1985. University of Ottawa Archives, Fonds 32-NB-1690.
[48] Statistics on enrolments in engineering, apparently from the Canadian Council of Professional Engineers. University of Ottawa Archives Fonds 32-NB-4773
[49] Establishment of a Faculty of Engineering at the University of Ottawa, Document for discussion, 1983 (collection of the author).
[50] Mechanical Engineering, departmental report 1980-81 (collection of the author).
[51] Minutes of Senate, 4 May 1987
[52] Correspondence relating to the Engineering Management Program, University of Ottawa Archives Fonds 32-NB-7095
[53] Minutes of Senate, 16 January 1989
[54] Program accreditation documents, Mechanical Engineering, Sept. 1984.
[55] Report of the Committee to Prepare a Brief on the Creation of a Faculty of Engineering, 1972. University of Ottawa Archives, Fonds 32-NB-1690.
[56] Gardner, N.J. Report of Committee to Study the Creation of a Faculty of Engineering, 8 January 1985. University of Ottawa Archives, Fonds 32-NB-1690.
[57] Minutes of Senate, 27 June 1977.
[58] Five Year Plan Committee of the Faculty (A.J. Baer, J. Fréchet, N.D. Georganas), report “Pour une restructuration de la faculté”, Jan 1981.University of Ottawa Archives, Fonds 32-NB-1690.
[59] Minutes of committee to set up a Faculty of Engineering 1984-85. University of Ottawa Archives Fonds 32-NB-7226.
[60] Minutes of Faculty Council, Science and Engineering, for 26 February 1985.
[61] Gardner, N.J., cost proposal for Faculty of Engineering, 6 March 1985, University of Ottawa Archives, Fonds 32-NB-500.
[62] Correspondence of A. D’Iorio (Vice-Rector Academic) and B.J.R. Philogène (Acting Dean, Science and Engineering). University of Ottawa Archives, Fonds 32-NB-1690.
[63] University of Ottawa *Gazette*, 5 November 1985.
[64] University of Ottawa *Gazette*, 14 July 1986.
[65] Georganas, N.D. The Starting Years 1986-93 (report on the Faculty’s activities during his tenure as Dean).
[66] Minutes of Faculty Council, Faculty of Engineering, 15 January 1997.
[67] Laguë, C., personal communication, 2011.
[68] Carrière, G. Dictionnaire biographique des Oblats de Marie Immaculée au Canada, Éditions de l’Université d’Ottawa. CD version held by University of Ottawa Archives.

Appendix A - List of Engineering Units and Administrators

School of Applied Science (1946-1953)

Director: Louis Cloutier (1946-1953)

School of Pure and Applied Science (1953 - 1961)
later named Faculty of Pure and Applied Science (1961-1970), then Faculty of Science and Engineering (1970 - 1986)

Deans: Pierre-R. Gendron (1953 - 1962)
Louis-Paul Dugal (1962 - 1965)
Léo Marion (1965 - 1969)
Antoine D'Iorio (1969 - 1976)
Peter Morand (1976 - 1981)
Alec J. Baer (1981 - 1985)
Bernard J.R. Philogène (1985-86 - acting)

Associate Vice-Dean Engineering / Associate Dean (Engineering) (exact title varies):
Benjamin C.-Y. Lu (1970 - 1977)
William Kozicki (1977 - 1981)
Frank D.F. Talbot (1981 - 1982)
Willem Steenaart (1983 - 1984)
N. John Gardner (1984 - 1986)

Faculty of Engineering (1986 - present)

Deans: Nicholas D. Georganas (1986-1993)
Gilles G. Patry (1993 - 1997)
David D. Maclean (acting - 1997)
Tyseer Aboulnasr (1998 - 2004)
Brian E. Thompson (2004)
Eric Dubois (acting - 2004)
Emil Petriu (acting - 2005-2006)
Claude Laguë (2006 - present)

Appendix B - Department Staff at Startup

The following gives the professors in each department as listed by the calendar within a year or so of their startup. Only full-time staff are listed, unless otherwise noted.

Chemical Engineering (startup 1953)

Listing for 1955-56 (no entry in the 1954-55 Calendar):
Acting Head: L.A. Madonna, M.Sc.
Part-time lecturers: J. Klassen, PhD, St. Clair Hayes, B.Sc.

Listing for 1957-58:
Chairman: Louis A. Madonna, M.Sc.
Assistant Professors: Edgar A. Lavergne, Ph.D., Benjamin C.-Y. Lu, Ph.D.
Sessional Lecturers: E.J. Casey, Ph.D., St. Clair Hayes, B.Sc.

Electrical Engineering (startup 1956)

Listing for 1957-58:
Chairman: Col. R.A. Harvey Galbraith, O.B.E., M.A.
Associate Professors: Louis-A. Beauchesne, M.Sc.

Civil Engineering (startup 1965)

Listing for Engineering, 1965-66:
Associate Professors: Carl Berwanger, M.Sc., Raymond Rowe, B.Eng.
Assistant Professors: Maurice G. Proulx
Sessional Lecturers: 11 listed

Listing for Civil Engineering, 1966-67:
Chairman and Professor: J.D. Scott, Ph.D.
Associate Professors: Carl Berwanger, M.Sc., Raymond Rowe, B.Eng.
Assistant Professors: Maurice G. Proulx
Sessional Lecturers: 14 listed

Mechanical Engineering (startup 1967)

Full-time staff, 1968-69, reconstructed from departmental records:
Chairman and Professor: Adolf Feingold, Ph.D.
Assistant Professors: S.-C. Cheng, Ph.D., Roger P. Henry, Ph.D., Yung Lee, Ph.D.

(Starting with 1967-68, the calendars ceased giving departmental staff listings. The graduate calendar does give one, but it includes part-time as well as full-time staff)