

SIMON FRASER UNIVERSITY

S.445

MEMORANDUM

To.....	SENATE	From.....	H. M. EVANS, REGISTRAR AND SECRETARY
.....		SENATE COMMITTEE ON GRADUATE STUDIES
Subject.....	DEPARTMENT OF CHEMISTRY - CHEMICAL EDUCATION	Date.....	NOVEMBER 20, 1970

This is to advise that the Senate Committee on Graduate Studies approved Paper GS. 98 - New Course Proposal, Department of Chemistry - at their meeting on November 19, 1970, and it is now being forwarded to Senate for approval.

cc J. M. Webster
I. B. Kelsey

Note: The following minor change to the Calendar information was approved by the Executive Committee of the Senate Committee on Graduate Studies: "The ten units of course work in the Faculty of Education cannot be used for credit towards the Ph.D. degree in Chemistry if the student transfers into the Ph.D. program."

SIRION FLASER UNIVERSITY

MEMORANDUM

To.....Members, Senate Committee on Graduate.....Studies.....	From. H.M. Evans, Registrar and Secretary Executive Committee, Senate Committee on Graduate Studies
Subject.....New Course Proposal, Department of .. Chemistry - Paper GS.98	Date. November 17, 1970.....

This is to advise that the new course proposal in the Department of Chemistry was approved by the Executive Committee of the Senate Committee on Graduate Studies at their meeting on November 9, 1970 and is now being forwarded to Senate Committee on Graduate Studies for their approval.

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SIMON FRASER UNIVERSITY

ELS. 12
CS. 98

INTER-OFFICE

File No. G-2-8

Dr. J. Webster

From B.J. Funt

Dean of Graduate Studies

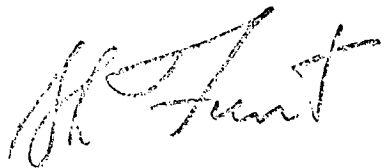
Dean of Science

Subject Chemical Education

Date October 21, 1970

I enclose a course proposal on Chemical Education which has been considered in detail by the Faculty of Science and is now recommended to the Senate Committee on Graduate Studies for approval.

BLF/ma



encl.

cc: Dr. T. Bell
M. McGinn ✓

FACULTY OF SCIENCE MEETING OF OCTOBER 19, 1970

MASTER OF SCIENCE PROGRAM IN CHEMICAL EDUCATION

This proposal was referred from the September 21st meeting of Faculty to the Faculty Graduate Studies Committee. In the interim, support for the proposal has been conveyed from the Faculty of Education, and Dean Stratton's letter of October 5th is included in the documentation as Paper Number 29-D(b). Furthermore, the Department of Chemistry has rewritten the proposal (Paper 29-D(a)). This paper has answered many of the questions which were raised at the Faculty level. The Department has also indicated that it is willing to guarantee T.A. support for students entering into the program on a preferential basis for the period of the masters program. This is necessary as students in this program cannot receive support from the National Research Council or from grants held by faculty members.

In discussions at the Graduate Studies Committee, it was indicated that the original rationale for the proposal is not fully consistent with the proposal in its present form. Dr. Sutton has undertaken to rewrite the rationale for the program. This will be recirculated to the Graduate Studies Committee, and if approved will be presented to Faculty as a separate paper distributed at the meeting.

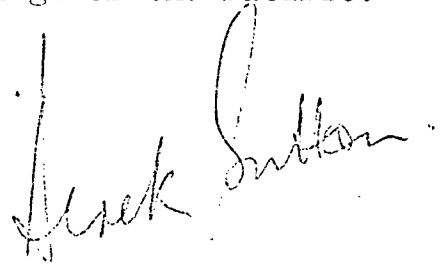
B. L. Funt

SIMON FRASER UNIVERSITY

MEMORANDUM

Dean of Science	From D. Sutton, Chairman, Departmental Graduate Studies Committee
Subject: Chemical Education Proposal	Date: October 14, 1970

Here is the formal proposal, together with an up-to-date version of the original paper by Dr. D'Auria. Both have been revised to take into account the suggestions made at the Faculty Graduate Studies Committee Meeting of October 13th, 1970. I would appreciate it if both documents are forwarded to Faculty and Senate, together with the specimen letter about the proposal from College of the Pacific.



D. Sutton

DS:fk

cc. T. N. Bell
D.G.S.C. Members

1970 OCT 17 10 30 AM

LIBRARY

Faculty of Science

A Proposal for a Chemical Education Option to the Master of Science Program in Chemistry

Revised October 14th, 1970

Calendar Information

898 M.Sc. Thesis. A thesis for the M.Sc. degree may be written on a topic in either Chemistry or Chemical Education. Students electing to write a thesis in Chemical Education are required to complete satisfactorily 10 hours of course work in the Faculty of Education in addition to the minimum chemistry degree requirements.

Justification

At present, and in the foreseeable future, the number of research opportunities available to new chemistry M.Sc. and Ph.D. awardees is decreasing. The number of university positions for such research oriented persons is definitely small. At the same time there is a growing need for properly trained chemistry teachers at the college and junior college level. Clearly then, the program in the Chemistry Department should reflect the situation and re-orient the training offered by the present M.Sc. program to allow qualified and interested students to receive a broader education.

The Chemistry Department wishes to initiate such a process by allowing interested students to broaden their training by becoming especially proficient in the area of teaching chemistry.

Proposal

1. The Department wishes to recognize a thesis relating to chemical education as acceptable for the M.Sc. degree in the Faculty of Science.
2. A student opting to write a thesis in chemical education will be required to satisfactorily complete 10 hours of course work in the Faculty of Education in addition to the normal minimum chemistry requirement of 12 hours. Appropriate course work in chemistry and in education will be determined by the supervisory committee in consultation with the student.
3. The supervisory committee of each student will consist of a senior supervisor and two committee members from the Chemistry Department plus one committee member from the Faculty of Education, who may be a joint senior supervisor.

Proposal - continued

4. The student will be admitted into the Chemistry Department and will otherwise meet all the requirements for the M.Sc. degree in the Faculty of Science. Teaching duties will be carried out in the Chemistry Department.
5. Students who transfer to the Ph.D. program in chemistry, or who enter the Ph.D. program after completion of the M.Sc., will not normally obtain credit for those education courses completed whilst in the M.Sc. program.

Demand for the Proposal

1. At least 3 M.Sc. students registering first in Fall 1969 questioned the possibility of doing such a modified M.Sc. program. All would have enrolled in such an option were it available at that time. This represents about 25% of the new graduate enrollment of 1969.
2. Meetings have been held with representatives of Capilano College, B.C.I.T. and other colleges, at which considerable support and offers of collaboration were expressed.
3. Views were solicited from a number of universities and colleges in Canada and U.S.A. - most of which expressed interest in the proposal. Many universities in the U.S. offer such an option already; the acceptability of graduates from such a course into the college teaching level appears to be excellent.

Effect Upon Degree Requirements

The option proposed can be put into operation immediately upon acceptance, as it is operable within the present regulations for the M.Sc. degree in the Faculty of Science. It is in no way a new program.

Budgetary and Space Factors

1. Faculty Present Chemistry faculty members are eligible to act as senior supervisors and on supervisory committees of students selecting this option. No new faculty are required.
2. Equipment /Space Required - None
3. Other Budgetary Implications - None

Approval

Faculty of Education Graduate Studies Committee (Memo from
Dean Stratton attached.) 1st October 1970.

Faculty of Science Graduate Studies Committee:

October 19, 1970

Faculty of Science:

Senate:

DS:fk

SIXTON FRASER UNIVERSITY

MEMORANDUM

Dr. T. Bell, Acting Chairman Chemistry Department	from	S. T. Stratton, Acting Dean of Education
Subject: M. Sc. - Chemistry Education	Date:	October 5th, 1970

On behalf of the Faculty of Education Graduate Studies Committee I wish to submit the following observations regarding your Department's proposal for an M.Sc. program in Chemistry Education.

1. The Committee supports the concept that there is a need to provide programs which better prepare students to function as Chemistry teachers at the Regional College level.
2. The Committee was of the opinion that the proposal which has been submitted does not necessarily require the development of a new program. It was identified that present regulations do not prohibit students from taking Education courses as part of their degree program or do they prohibit the utilization of members of the Faculty of Education from serving on supervisory committees of students pursuing an M.Sc. degree.
3. Given the accuracy of the above statement, the Committee would like to encourage the Chemistry Department to permit the use of faculty and courses from the Faculty of Education and to implement their program proposal in this manner.
4. The Committee further indicated that there are a number of courses presently offered by the Faculty of Education which would be appropriate to students who wish to broaden their understanding of Education and that the Faculty will be proposing additional appropriate courses in the near future.
5. It was suggested by the Committee that discussions should continue with the Chemistry Department with respect to assisting them in developing some form of a supervised practical teaching experience for the students in question.

I trust that the comments advanced by the Committee may assist you in resolving the problems imposed in trying to implement modifications of existing programs.

S. T. Stratton

A Proposal for a Chemically Education Option
to the Master of Science Program in Chemistry.

Submitted to the Chemistry Department
Graduate Studies Committee by Dr. J.M. D'Auria

The Rationale

When a person has been awarded a graduate degree in science, it is hoped that he has

- increased his intellectual capacities through a rigorous program of mental gymnastics
- demonstrated a complete and in-depth knowledge of his area of speciality
- developed the scientific maturity and attitude to perform independent and scientifically competent basic research
- demonstrated this maturity through the completion of an acceptable thesis.

Indeed the particular field of interest (organic chemistry, ecology, nuclear physics) is incidental as long as these criteria are met and, if the field of study is acceptable. Clearly if a need arises or interest develops in areas presently not included in the Chemistry graduate program, the above criteria must be met before a degree is granted. But given the above, a new field would be added, e.g. chemical physics and biochemistry. At present there is a real need for persons trained in the area of chemical education at the graduate level.

At present and in the foreseeable future the number of research opportunities available to new chemistry Ph.D.'s is decreasing. The number of University positions for such people is definitely at a minimum. Noting this trend, Dr. Rieckhoff in a recent memo ¹ pointed out that new Ph.D's are being forced to take jobs for which they are poorly trained, such as teaching in Junior colleges. Clearly those persons trained to perform basic research, but lacking the research facilities to do so, will become quite frustrated and realize that they have been unfairly treated. Of greater importance the number of students attending junior colleges, colleges, and universities is increasing and thus there is a clear need for more and better qualified teachers in higher education. Surely then these two conditions can be satisfied by initiating a graduate program in chemical education designed to produce people especially trained to teach chemistry, but satisfying the previously listed criteria.

In informal discussions with various persons, it appears that junior colleges would look favourably on the hiring of such persons. Indeed there is a preference for such education-oriented graduates who could show a proficiency for teaching. The opportunities in this area are growing due to the increasing number of junior colleges. By preparing now to initiate such a program, this Department could start attracting a larger number of competent students.

The question has been raised as to whether the Chemistry Department has any persons competent to supervise such a program.

1. Available upon request

Given the relative newness of this program there would be few Departments considered competent outside of the Education Department. However, there are a significant number of faculty members here sufficiently interested in the teaching program who would be clearly capable of such responsibility.

A case can be made for having such students enroll in the M.Sc. (Education) program in the Faculty of Education. My reasons against this are:

- A student seriously interested in teaching chemistry must be knowledgeable in the whole field including recent developments. He will necessarily then spend a major part of his time in Chemistry including his research program. He will be basically a chemist, but trained to teach. The student will be financially supported by the Chemistry Department and will contribute to the evaluation of the undergraduate curriculum.
- The student will maintain contact with the Education Faculty through courses, seminars, and his supervisory committee.

Basically these students want to develop the techniques to become good teachers and the confidence to use the terminology of all specific areas of chemistry. This aim seems best served by having such students in the Chemistry program.

This concludes the general comments on this subject and any positive suggestions or serious criticisms would be appreciated.

The Program

The ideas presented herein should be considered as merely a working set of guidelines subject to change given valid reasons. If you are in favour of this program, then this could be considered a reasonable outline. The reasons for selecting the various requirements are also given for your scrutiny.

- 1) A student entering this program must have an Honors B.Sc. degree in Chemistry with upper 2nd Class standing or its equivalent.

Reasons.

- The student has demonstrated a proficiency in grasping the fundamentals of chemistry.
 - This program is not designed for the mediocre but rather those of clearly demonstrated intellectual ability.
- 2) A student will have a Supervisory Committee composed of three members of the Chemistry Department (with one as Senior Supervisor) and one member of the Faculty of Education, who may be a joint Senior Supervisor.
 - 3) The course requirements for this program include courses from both the Chemistry Department and the Education Department. The student is required to take a minimum of 12 credit hours of graduate work or its equivalent in the Chemistry Department. The courses in the Chemistry Department will normally be arranged such that three of the courses will be in different areas with the student choosing the fourth from any area.

The course requirements in the Faculty of Education will be a minimum of 10 credit hours. Actual courses taken in chemistry and in education would be determined by the Supervisory Committee in consultation with the student, and reflect the needs and interests of the student. A range of suitable education courses have been indentified through consultation with the Faculty of Education, for example BSF 828-5, SPF 831-5, SPF 440-5, PF 810-5, PF 806-5; this list is intended to be illustrative, not exclusive.

- 4) The student must achieve an overall G.P.A. of 3.0 in his required course work.
 - only by producing high quality candidates will this program be recognized as being of high caliber.
- 5) The students attend seminars in both the Chemistry Department and the Faculty of Education.
- 6) The program requires 4 semesters in residence at S.F.U. with at least 2 semesters taken consecutively. A 2 year program is envisaged, which might typically take the form:

Semester 1 (Fall)	1 Ed. course 1 Chem. course T.A. (15 hr.)
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Semester 2 (Spring)	1 Ed. course 1 Chem. course T.A. (15 hr.)
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Summer Semester	T.A. (15 hr.) Thesis
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Semester 4 (Fall)	2 Chem. courses T.A. (15 hr.) Thesis
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Semester 5 (Spring)	T.A. (4 hr.) Thesis
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- 7) The student will prepare a publishable thesis based on some research problem in the field of Chemical Education as specified and deemed acceptable by his Committee.
- typical thesis subject or areas could include:
 - i - development of and evaluation of CAI
 - ii - design and development of audio-visual techniques in teaching chemistry.
 - iii - development of a sound chemistry program for non-scientists.
 - iv - evaluation of the chemistry freshman program in Canadian Universities
 - v - a report of the need for and training of Chemistry B.Sc. students in Canada.
- 8) During his stay in the program, the student will be eligible for 4-15 hour T.A. ships and 1-4 hour T.A. ship in the Chemistry Department.
- in general a person trained (or training) in the field of chemical education has obviously better qualifications than those untrained to teach in our program.
 - the T.A. will provide invaluable on-the-job experience for the graduate student and he should be evaluated for his performance.
 - the student will be put into as many different courses as possible.
 - he will submit an evaluation report on the courses he was involved with to his Committee for evaluation.
 - this feedback will be invaluable for the Chemistry Department to evaluate its own program.

- a research problem in chemical education is just as intellectually stimulating as one in basic research
- 9) During the students last semester the student will be supported from funds allotted to the individual research supervisor upon application and review. Such funds could come from various sources including the President's fund or one of the approximately 15 funds which grants funds specifically for education. It is recognised that N.R.C. operating grants cannot be used for this purpose. In the event of financial difficulty the Department would consider making a further 15 hour T.A. ship available.
- 10) The Chairman of the Supervisory Committee will be given some Departmental support (\$250) to support such graduate students
- research of any type usually needs some support financially
- 11) Less research space is required for such students and indeed in most cases it will be only desk space.