

MEMORANDUM TO SENATE

FROM K. E. Rieckhoff

RE: Interdisciplinary Program

DATE September 22, 1966

Attached is a program of courses leading to the degree of Bachelor of Science with Honours in Chemical Physics which has been approved by the Faculty of Science in its last meeting of September 22, 1966. Also attached is a memorandum justifying the need and desirability of such an undergraduate program. The vote in favour of this program was overwhelming with only one opposing vote. The Faculty is presenting this program to Senate for its final approval. I should like to take this opportunity to make a few comments regarding it.

This is the first case of an interdisciplinary program coming forward to Senate from the Faculty of Science. The details of this program have been carefully worked out in innumerable discussions within the Faculty and within the Committee charged with putting the program together. The Faculty of Science is, as I believe justly, proud to have reached since the conception of the idea in May of this year such a tremendous consensus on a program of this kind, particularly in consideration of the fact that this program straddles two departments, both of which have a record of jealously guarding the high standards and integrity of their honours programs. The Faculty has also created a Subcommittee of its Standing Committee on Undergraduate Curriculum with the express purpose of ensuring that the program will remain satisfactory and up to date. The Faculty is also proud of having been able to constitute the program using existing courses, thus ensuring that the establishment of this program will not add one cent to the cost of instruction within these departments.

The Faculty hopes for speedy approval of this program by Senate since the first student in the Faculty of Science to enter upper division courses and thus requiring appropriate counsel, are now on campus. The program is a difficult one and leave comparatively few choices particularly in the upper division courses. This may be deplorable but cannot be helped in any of the honours programs within Science unless funds are provided to introduce alternate courses to a minimum program.

The implication of Senate's approval would be the following: the University recommends the program to qualified students as a useful one and obligates itself to give an Honors B.Sc. to any student satisfying the requirements for such a degree under this program. Implied is the readiness of the Departments of Chemistry and Physics to accept students from this program into graduate work. That is, both the Chemistry Department and the Physics Department have faculty who are ready and willing to supervise the graduate research of students coming from this program into graduate work.

"K. E. Rieckhoff"

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Acting Dean of Science

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RECOMMENDED PROGRAM FOR DEGREE IN "HONOURS CHEMICAL PHYSICS"

I.	Physics 101-3 Math 111-3 Chemistry 101-3 Chem. Lab. 106-2 Plus one other course	General Physics I Fundamental Mathematics General Chemistry I Chemistry Laboratory
II.	Physics 102-3 Math 112-3 Chemistry 102-3 Chem. Lab. 116-2 Plus one other course	General Physics II Fundamental Mathematics II General Chemistry II Qualitative Analysis Lab.
III & IV.	Physics 211-3 Physics 221-3 Physics 231-3 Physics 232-3 Math 213-3 Math 214-3 Math 231-3 Chemistry 201-3 Chemistry 216-2 Chemistry 251-2 Chemistry 256-2 Chemistry 261-3	Mechanics I Electricity and Magnetism Introductory Physics Lab. I " " " II Calculus I Calculus II Introduction to Algebra Bonding and Structure Quantitative Analysis Lab. Organic Chemistry I Organic Chem. Lab. I Physical Chemistry I
V to VIII.	Physics 331-3 Physics 341-4 or Chemistry 471-3 Physics 351-4 Physics 381-4 Physics 382-4 Physics 461-4 Math 411-4 Math 412-4 Chemistry 461-3 Chemistry 466-2 Physics 411-4 Physics 412-4 Physics 421-4 Physics 431-4 Math 413-4 Math 422-4 Chemistry 431-3 Chemistry 436-2 Chemistry 451-3 Chemistry 462-3	Intermediate Physics Lab. I * Heat & Thermodynamics Quantum Chemistry Optics Modern Physics Mathematical Physics Solid State Physics Method I Method II Physical Chemistry II Physical Chem. Lab. I * Mechanics II Quantum Mechanics Electricity and Magnetism Advanced Physics Lab. I * Ordinary Differential Equa. Complex Variables Inorganic Chemistry Inorganic Chem. Lab. Organic Chemistry II Molecular Spectroscopy
	Instead of any one of Chemistry 436-2, 451-3 Chemistry 481-5	Undergraduate Research may be substituted.

* Special group of experiments selected for Chemical Physics.

Documentation for the Need of an Honours Program*General*in Chemical Physics

In recent times several research areas such as Material Research, Molecular Physics and Theoretical Chemistry have assumed a strong interdisciplinary position. In universities, research in these areas is sometimes performed in the Physics Department, sometimes in the Chemistry Department. In industry, the research teams often consist of a combination of Physicists, Chemists and Electrical Engineers. The authors of this brief as well as members of the Physics Department are thoroughly familiar from personal experience with the background required for a person performing research in such leading industrial laboratories as Bell Telephone Labs and I.B.M. The Canadian need is similar. Neither a pure Physics program nor any present Chemistry program provides a proper background for the purpose, but the proposed program in Chemical Physics will.

Clearly this need for an interdisciplinary program arises on the undergraduate level, and cannot be postponed until graduate work for two major reasons. First of all, many scientists working in these areas in industry never go beyond the B.Sc., and secondly, the student starting graduate work in special areas of Physics, including some at our own university, is often right at the beginning faced with material preparation problems that require an advanced knowledge of Chemistry, which he would not possess with a straight Physics degree. Had he gone through a Chemistry Program, such as Physical Chemistry, he would neither be prepared for research in the Physics Department, nor would he have the needed pre-requisites for the basic graduate courses offered by our Physics Department. Thus some members of the Physics and Chemistry Departments would prefer graduate students with the background offered in Chemical Physics, rather than in straight Physics or Chemistry, and this is without doubt true for other universities as well. Precedents for a

program in Chemical Physics are becoming abundantly available. Similar programs are being offered by McMaster University, McGill, Princeton and Stanford.

The program will be quite demanding of the student, and an enrollment smaller than for straight Physics or Chemistry is expected. All courses recommended in the proposed program are already given at present. No new courses will be required.

(Retype of original)