

S.74-52

SIMON FRASER UNIVERSITY

MEMORANDUM

To SENATE

From SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Subject CHEMICAL PHYSICS PROGRAMS

Date MARCH 18, 1974

i) REVISED HONORS CHEMICAL PHYSICS PROGRAM

ii) PROPOSED MAJORS CHEMICAL PHYSICS PROGRAM

MOTION 1: "That Senate approve, as set forth in S.74-52, the revised Honors Chemical Physics program."

MOTION 2: "That Senate approve, as set forth in S.74-52, the proposed Majors Chemical Physics program."

SIMON FRASER UNIVERSITY

MEMORANDUM

To SENATE

From Senate Committee on Undergraduate Studies

Subject CHEMICAL PHYSICS PROGRAMS

Date March 18, 1974

The attached proposal for a major program in chemical physics and an honors program in chemical physics has been considered by the Senate Committee on Undergraduate Studies and is now forwarded to Senate for its consideration.

It should be noted that:

- 1. the proposed programs consist entirely of courses already offered by the departments concerned; and
- 2. the Committee discussed at some length the obvious restrictions which would be placed on students enrolling in these programs and concluded that, while there may be a sense in which it was undesirable for students to take courses in such a limited range of subjects as this program requires, the provision of an adequate grounding in these areas makes such restrictions inevitable.

*I. Muiridge*  
I. Muiridge

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# SIMON FRASER UNIVERSITY

SCUS 74-10

## MEMORANDUM

To..... Senate Committee on  
..... Undergraduate Studies  
Subject..... CHEMICAL PHYSICS PROGRAMS

From..... S. Aronoff *S. Aronoff*  
..... Dean of Science  
Date..... January 10, 1974

The attached proposal was approved by the Faculty of Science at its meeting of December 11, 1973. Part I is the revised Honors Chemical Physics program, Part II the proposed Majors Chemical Physics program, and Part III contains the rationale for the changes in the Honors Chemical Physics program and the initiation of a Majors Program in Chemical Physics.

This proposal is now forwarded to the Senate Committee on Undergraduate Studies for its consideration.

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REVISED HONORS CHEMICAL PHYSICS PROGRAM

<u>Physics</u>	<u>Chemistry</u>	<u>Mathematics</u>	<u>Arts</u>
201-2	104-3	151-3	any
202-2	105-3	152-3	6 hrs
203-2	115-2	232-3	
204-2	117-2	253-4	
205-2	232-3		
206-2	251-3		
233-2	252-3		
234-2	256-2		
<hr/> 16 hrs	<hr/> 21 hrs	<hr/> 13 hrs	<hr/> 6 hrs
331-3	332-3	311-4 or 431-4	
332-3 <sup>a</sup> or 351-4	336-2 or 341-3	352-2	
341-4*	361-3 <sup>c</sup>	412-4 or P382-4	
381-4	366-2 or 367-2 <sup>d</sup>		
382-4 or M412-4	462-3		
412-4	463-3 <sup>e</sup>		
421-4 or 431-4 <sup>b</sup>			
461-4			

\*CHEM 261-3 plus CHEM 362-3 may be taken instead of PHYS 341-4.

In addition, the student is required to select at least 5 hours from 300 or 400 level Chemistry courses.

<hr/> 22 minimum 31 maximum	<hr/> 21 minimum 28 maximum	<hr/> 6 minimum 10 maximum	<hr/> 6 hrs
<hr/> 38 minimum 47 maximum	<hr/> 42 minimum 49 maximum	<hr/> 19 minimum 23 maximum	<hr/> 6 hrs

Lower level hours specified: 56

Upper level hours specified: 61 minimum  
65 maximum

TOTAL hours specified: 117 minimum  
121 maximum

Prerequisites

- a) P332-3 -- the requirement that P351-4 must precede, or be taken concurrently with P332-3 can be waived with the permission of the instructor.
- b) P431-4 -- the prerequisite P332-3 can be waived.
- c) C361-3 -- the prerequisite C261-3 can be waived provided P341-4 has been taken, or is being taken concurrently.
- d) C367-2 -- the prerequisite C366-2 can be waived provided P233-3, P234-2, and P331-3 have already been taken.
- e) C463-3 -- the prerequisite C261-3 can be waived if the student has taken P341-4 in place of C261-3 and C362-3.

PROPOSED CHEMICAL PHYSICS MAJORS PROGRAM

<u>Physics</u>	<u>Chemistry</u>	<u>Mathematics</u>	<u>Arts</u>
201-2	104-3	151-3	any
202-2	105-3	152-3	6 hrs
203-2	115-2	232-3	
204-2	117-2	253-4	
205-2	232-3		
206-2	251-3		
233-2	252-2 or 256-2		
234-2			
<hr/>	<hr/>	<hr/>	<hr/>
16 hrs	18 hrs	13 hrs	6 hrs
331-3	332-3	352-2	
341-4*	336-2		
381-4	341-3		
461-4	361-3 <sup>c</sup>		
332-3 <sup>a</sup>	366-2 or 367-2 <sup>d</sup>		
351-4	462-3		
382-4	362-3		
431-4 <sup>b</sup>	367-2		
	416-3		
	463-3 <sup>e</sup>		

at least  
one of  
these

at least  
one of  
these

\*CHEM 261-3 plus CHEM 362-3 may be taken instead of PHYS 341-4.

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14 minimum  
19 maximum

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18 minimum  
25 maximum

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2 hrs

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30 minimum  
35 maximum

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36 minimum  
43 maximum

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15 hrs

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6 hrs

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Lower level hours specified: 53

Upper level hours specified: 38 minimum  
42 maximum

TOTAL hours specified: 91 minimum  
95 maximum

FREE ELECTIVES:  
[25 - 29]<sup>1</sup>

<sup>1</sup>The students are advised to select as electives some courses in Computer Science.

Prerequisites

- a) P332-3 -- the requirement that P351-4 must precede or be taken concurrently with P332-4 can be waived with the permission of the instructor.
- b) P431-4 -- the prerequisite P332-3 can be waived.
- c) C361-3 -- the prerequisite C261-3 can be waived provided P341-4 has been taken or is being taken concurrently with C361-3.
- d) C367-2 -- the prerequisite C366-2 can be waived provided P233-2, P234-2, and P331-3 have already been taken.
- e) C463-3 -- the prerequisite C261-3 can be waived if the student has taken P341-4 instead of C261-3 and C362-3.

COMPARISON OF "NEW" HONORS CHEMICAL PHYSICS  
VERSUS "OLD" HONORS CHEMICAL PHYSICS

The courses listed below are those courses which have been specified differently in the two programs.

<u>PHYSICS</u>		<u>CHEMISTRY</u>		<u>MATHEMATICS</u>	
new	old	new	old	new	old
<u>100 and 200 level courses</u>					
omit	P235-2	may omit*	C261-3		
<u>300 and 400 level courses</u>					
P351-4 or P332-3	P351-4	C336-2 or C341-3	C336-2	M311-4 or M431-4	M311-4
P382-4 or M412-4	P382-4 <u>and</u> M414-4	omit*	C362-3	M412-4 or P382-4	M414-4 <u>and</u> P382-4
P341-4*	P341-4 or C471-3	C366-2 or C367-2	C366-2		
omit	P411-4	C463-3	omit		
P421-4 or P431-4	P421-4 <u>and</u> P431-4	plus 5 hrs of 300 or 400 level Chemistry	omit		

\* P341-4 or C261-3 plus C362-3

Justification of the New Honors Chemical Physics Program

1. A better balance between Chemistry and Physics courses has been achieved in the new HCP program. This has been done by:
  - a) omitting 8 hrs of 400 level Physics and adding 8 hrs of 300 or 400 level Chemistry,
  - b) recognizing that the chemical physicist with a background in both Chemistry and Physics should be able to learn with equal facility thermodynamics and statistical mechanics either from the perspective of the physicist (P341-4) or from the perspective of the chemist (C261-3 plus C362-3). The committee realizes that the objectives and course content of these Chemistry and Physics courses are different and could not be considered equivalent for the Honors Chemistry or Honors Physics student.



2. The new HCP program offers a greater selection of courses from specified courses. This may alleviate the timetabling difficulties which were encountered in the old HCP program.
3. The new HCP program has 17-21 hours of free electives (including the 6 hours of Arts specified for degree requirements) versus the 12-13 hours permitted by the old HCP program. By increasing the number of hours of free electives it becomes possible for the student to strengthen his specialization in either Chemistry or Physics, or alternatively to broaden his knowledge of other fields.
4. The specified 100 and 200 level courses may be regarded as core courses which permit the student who initially enrolls in Honors Chemical Physics to be able at the end of 4 semesters to switch conveniently to a degree in Honors Chemistry or Honors Physics.

Comments on the Prerequisite Changes Suggested for the  
Chemical Physics Programs

- a) P332-3 -- It is advisable that a chemical physicist obtain practical experience in geometrical and physical optics. It is possible to complete successfully the optics lab course, P332-3, without having taken the lecture course in optics P351-4.
- b) P431-4 -- It is possible to complete successfully the lab course P431-4 without having taken the optics courses P337-3 and P351-4.
- c) C361-3 -- P341-4 and C261-3, although differing in content, can be considered interchangeable as far as the prerequisite requirements of quantum chemistry C361-3 are concerned.
- d) C367-2 -- The lab course C367-2 contains experiments which the chemical physicist may find of use and of interest. By requiring that the three physics labs, P233-2, P234-2, P331-3, be taken before C367-2, the student should not encounter difficulties with the instrumentation involved in C367-2.
- e) C463-3 -- The student who has taken the thermodynamics and statistical mechanics course P341-4 will be better prepared for the thermodynamics course C463-3 than the student who has taken only the Physical Chemistry course C261-3.

General Rationale for the Majors Program

1. The program represents a coherent, recognized field of study which is provided with presently available resources.
2. An Honors Chemical Physics student failing to accrue a sufficient grade point average to graduate with honors can now graduate with a majors degree in Chemical Physics.
3. Students graduating with a majors degree in Chemical Physics should be able to work in, or have competence in certain technical areas which are not possible by other kinds of training.