

SIMON FRASER UNIVERSITY

MEMORANDUM

Admitted

S 2296

Curriculum Changes

Members of the Faculty of Science

From B. L. Funt

Dean of Science

Subject: Biochemistry Program

Date: February 14, 1969

An inspection of the Biochemistry Program shows a maximum of four faculty members being added during the next two years. The analysis has been based on general average figures of operating expenses and salary expenses in the Departments of Biological Sciences and Chemistry. It is difficult to determine exactly the needs, as part of the overhead costs do not increase proportionately to faculty, but there would be some special equipment cost in initiating new laboratories. I have accordingly taken the ratio which corresponds to current figures in Biological Sciences and Chemistry. On this basis, the following analysis is probably indicative.

Salaries: Four faculty members, \$55,000

Operating Expense: \$90,000

Total: \$145,000 annual rate

The projected budget requirement for the next three years will probably be as follows:

<u>Year</u>	<u>Annual Rate</u>	<u>Budget Year Commitment</u>
1969-70	\$55,000	\$40,000
1970-71	\$145,000	\$100,000
1971-72	\$160,000	\$160,000

The adjustment on the 1971-72 estimates is based upon probable increases in salary commitments for the same category of academic and supporting members of staff.

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Proposal for the Development of the

Biochemistry Programme

Curriculum Change

At the January 27 meeting of the Biochemistry Committee the undergraduate Biochemistry Programme was discussed. The conclusions were as follows:

The Programme fulfills a demand that arises from two principal sources;

(1) Recent advances in Biochemistry have received wide publicity and have resulted in Nobel Prizes for several Biochemists. This has stimulated many young people to study Biochemistry. Moreover, the subject is now sufficiently developed to appeal to those who demand the scientific rigor formerly associated with pure chemistry and physics.

(2) The Biochemistry Programme is used by many students as a prelude to studies in medicine and related disciplines.

However, there are further impending demands that must be considered. Research in life sciences, for example the study of the metabolism of narcotic drugs and the possibility of synthesis of new biologically active compounds, and the resolution of problems of atmospheric pollution which are in fact biological-chemical problems, demand to a greater

extent than ever, well trained Biochemists.

*Curriculum
Changes*

Besides catering to a demand, the Biochemistry Programme must help graduands fulfill their chosen role in society.

The Committee visualized four main roles for graduands.

They may:

(1) Proceed to further studies and a career in Biochemical research.

(2) Study medicine and related fields.

(3) Study educational techniques and teach.

(4) Become skilled technicians for employment in various biological and chemical establishments.

The present Biochemistry Programme was reviewed in the light of the above factors. It consists of a core programme of 89 prescribed hours: 32 hrs. in Biology, 39 hrs. in Chemistry, 12 hrs. in Mathematics, and 6 hrs. in Physics; plus 31 hrs. of electives, seven of which must be in Science.

The Committee agreed that, as 75% of the programme is presently prescribed, alterations to the programme should not increase the prescription. The alterations should, if possible, provide more variety and allow the student more choice. With these principles accepted there are two means of altering the programme; (1) substitution of a new course for a prescribed one, or (2) no longer requiring

one or more courses of the core programme.

The present core programme is made up of selected courses from the Biology and Chemistry Programmes. Few, if any, courses have been designed specifically for the Biochemist. The Committee strongly feels that the present demand for the programme merits consideration of amendment of this policy.

Changes presently contemplated would require two new courses to be given by the Biology Department. One of these at the 200 level would combine parts of Biology 201 (Cell Biology and Biochemistry), 202 (Genetics), and 203 (Developmental Biology); the second at the 300 level would contain parts of Biology 201 (Cell Biology and Biochemistry), 402 (Physiological Genetics), and 406 (Microbiology).

Similarly in Chemistry the requirement for Chem 231 (Inorganic Chemistry) would be eliminated; Chem 252 (Organic Chemistry II) would be replaced by a new course dealing with the organic chemistry of molecules of biological interest (Chem 20X); and Chem 356 (Organic Chemistry Laboratory II) would be replaced by a Chem XXX (Laboratory).

At present two courses in Biochemistry are being offered: Biology 301 and Chemistry 421. The Committee proposes that Biochemistry students be required to take

Biol. 301, which deals largely with pathways of intermediary metabolism. Intermediary Metabolism could than be dropped from Chem 421 and more emphasis placed on the mechanisms of enzyme action as indicated by recent elucidation of enzyme structure.

Finally, the requirement for Chem 261 (Physical Chemistry I) would be eliminated and Chem 422 (Physical Biochemistry) amended to fill the necessary background.

The revised core programme would be:

- Bioscience 101-4 Introduction to Biology
102-4 Introduction to Biology
20X-3 A new course.
301-3 Biochemistry
302-3 A new course.
305-3 Animal Physiology
315-3 Plant Physiology
401-3 Chemistry
428-3 Experimental Techniques Total 29 hrs.
- Chemistry 102-3 General Chemistry II
103-3 Bonding, Structure and Stereochemistry
116-2 General Chemistry Laboratory
117-2 Quantitative Chemistry Laboratory
251-3 Organic Chemistry I

Chemistry (cont'd)

- 256-2 Organic Chemistry Laboratory I
- 20X-3 Organic Chemistry of Biological Molecules
- 421-3 Altered course.
- 422-3 Physical Biochemistry
- 426-2 Biochemistry Laboratory I
- 427-2 Biochemistry Laboratory II
- 457-3 Modern Laboratory Techniques in Organic

Chemistry

Total 31 hrs.

Mathematics

9 hrs.*

- Physics 100-3 or 101-3 General Physics I
- 102-3 General Physics II

Total 6 hrs.

Total 75 hrs.

*Elimination of Chem 261 will reduce Math requirement.

The proposed core programme would allow 45 hrs. of electives. The Committee will suggest new courses to give Biochemistry students, as well as others, an opportunity to diversify their interests. Presently one suggestion has been made; a course in Biopolymers (Dean Funt?).

Introduction of the core programme would require little additional expense. Probably the changes could be made with

one or at the most two new faculty members in each of the Biology and Chemistry Departments.

However, the ultimate success of the programme depends upon an expansion of present facilities in several ways:

- (1) provision of modern research equipment.
- (2) provision of adequate space and equipment for research and teaching
- (3) recruitment of specialists to faculty.

These requirements are interrelated. The University presently lacks several pieces of major equipment basic to modern biochemical research such as an analytical ultracentrifuge, an amino acid analyzer, or a counter current distribution apparatus. Without such equipment and without adequate space for research and teaching, it will be difficult, if not impossible, to attract to the faculty people presently active in Biochemical Research. And only by attracting men of repute and men with potential can the University establish its reputation in the field of Biochemistry. It will therefore be advisable to allocate some areas in Phase 3 for a nucleus of biochemical research and to budget for additional staff and equipment for this purpose. Phase 4 of the building plans should then provide for further extension of this nucleus.