

SIMON FRASER UNIVERSITY

S.74-87

MEMORANDUM

To SENATE

From SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Subject NEW COURSE PROPOSAL - CHEMISTRY
233-2 - INORGANIC CHEMISTRY OF
BIOLOGICAL PROCESSES

Date JUNE 18, 1974

MOTION: "That Senate approve, as set forth in S.74-87,
the new course proposal for CHEM 233-2 -
Inorganic Chemistry of Biological Processes."

SIMON FRASER UNIVERSITY

S.74-87

MEMORANDUM

To..... SENATE


From..... SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Subject..... NEW COURSE PROPOSAL
Chemistry 233-2

Date..... June 18, 1974

At its meeting of 4th June, 1974, the Senate Committee on Undergraduate Studies considered the attached new course proposal for Chemistry 233-2 and recommends its approval by Senate.

The documentation provided includes the memorandum of transmittal to SCUS from the Faculty of Science, the course proposal form and the course description. It should be noted that, while this course will become part of the core program in Bio-Chemistry (see section 3 of course proposal form and P.1 of Bio-Chemistry proposal), it has been submitted separately from that proposal since it is a purely departmental course which has followed a different route to Senate from the revisions in that program.


I. Mugridge

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att.

SIMON FRASER UNIVERSITY

MEMORANDUM

To Senate Committee on Undergraduate Studies

From S. Aronoff *S. Aronoff*
Dean of Science

Subject NEW COURSE PROPOSAL
CHEMISTRY 233-2

Date April 18, 1974

The Faculty of Science at its meeting of April 9, 1974 approved the attached new course proposal for Chemistry 233-2, Inorganic Chemistry of Biological Processes and recommends its approval by SCUS.

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cc: T. Bell, Chairman
Department of Chemistry

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

NEW COURSE PROPOSAL FORM

1. Calendar Information

Department: Chemistry

Abbreviation Code: Chem Course Number: 233 Credit Hours: 2 Vector: 2-1-0

Title of Course: Inorganic Chemistry of Biological Processes

Calendar Description of Course:

An introduction to the principles governing the formation, properties, and investigation of metal-ligand complexes with special reference to the role of metals in biological processes.

Nature of Course Lecture

Prerequisites (or special instructions):

Chemistry 105-3. It is recommended that Chem 251 precede or be taken concurrently.

What course (courses), if any, is being dropped from the calendar if this course is approved: None. The frequency of offering of Chem 232 will be reduced if demand necessitates.

2. Scheduling

How frequently will the course be offered? Once per year initially

Semester in which the course will first be offered? Fall 1975

Which of your present faculty would be available to make the proposed offering possible? Prof. Sutton, Einstein, Peterson

3. Objectives of the Course

This is a core course in the biochemistry majors program; designed to provide instruction in a sub-area of inorganic chemistry of importance and applicability to biochemistry.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty	Nil (Rearrangement of the Chemistry program offerings will permit CHEM 233 to be offered once per year with existing faculty.)
Staff	Nil
Library	Nil
Audio Visual	Nil
Space	Lecture Room
Equipment	Nil

5. Approval

Date: 18/4/74

18/4/74

[Signature]
Department Chairman

[Signature]
Dean

_____ Chairman, SCUS

Chemistry 233-2 Inorganic Chemistry of Biological Processes

Course Description

Lecture

- 1-4 Background: main biological functions of metal ions; oxidation states and electronic configurations of metal ions; size relationships, solvation energies, entropies and structure; complex formation, stability constants, types of ligand, chelates.
- 5-10 Group I and II ions Na, K, Mg and Ca: general properties; distribution inside and outside cells; concentration gradients, membrane selectivity and electrical potentials. Selectivity of macrocyclic ligands (including antibiotics and phosphoprotein) toward metal ions. The sodium and calcium pumps. Trigger and control mechanisms utilising Ca^{2+} , muscle contraction and nerve-impulse transmission.
- 11-14 First-Row Transition-Metals M^{2+} and M^{3+} ions and their general properties. Ligand field theory; high-spin/low-spin complexes, visible spectra, octahedral and tetrahedral complexes. Distortions from regular geometry, unusual coordination numbers. Ligand-field stabilisation effects.
- 15-24 Metal- Activated Enzymes Metalloenzymes and metal-protein complexes, general description and distinction. Metal-binding sites, metal ion probes. Models for binding sites. Hydrolytic metal-activated enzymes (carboxypeptidase-A as detailed example). Oxidation-Reduction metalloproteins, electron-transport, heme and non-heme iron proteins, copper proteins, cobalt B_{12} coenzymes. Nitrogen fixation and the nitrogen cycle. Oxygen carrier and storage metalloproteins, model for hemoglobin, synthetic oxygen carriers.

Student Text-Book

None currently available specific to the course as a whole. Lectures 1-4 and 11-14, together with parts of 15-24 are covered by Huheey, "Inorganic Chemistry".

Teachers Text-Book

M.N. Hughes, "The Inorganic Chemistry of Biological Processes".