

SIMON FRASER UNIVERSITY

S.74-97a,b,c

MEMORANDUM

To SENATE

From SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Subject CHEMISTRY CHANGES

Date JULY 26, 1974

MOTION 1: "That Senate approve, as set forth in S.74-97a
the change in Calendar entries for existing
courses - CHEM 261-3; 361-3; 362-3; 366-2; 367-2;
336-2; 453-3; 416-3."

MOTION 2: "That Senate approve, as set forth in S.74-97b
the new course proposals for:
CHEM 005-3 - The Chemistry of Life
CHEM 007-3 - Chemistry in the World: An Experimental
Approach
CHEM 357-3 - Chemical and Instrumental Methods of
Identification of Organic Compounds
CHEM 455-3 - Organic Synthesis
CHEM 458-3 - Physical Organic Chemistry
CHEM 460-2 - Polymer Chemistry
CHEM 461-2 - Chemical Rate Processes
CHEM 464-2 - Physical Chemistry of Solutions
CHEM 469-2 - Special Topics in Physical Chemistry
CHEM 472-3 - Special Topics in Theoretical Chemistry."

(Note: If the above new courses are approved, the following courses
will be discontinued from the Chemistry curriculum: CHEM 006-2,
351-3, 454-3, 457-3, 463-3, 471-3.)

MOTION 3: "That Senate approve, as set forth in S.74-97c,
the revised Chemistry core program and electives."

SIMON FRASER UNIVERSITY

S.74-97a

MEMORANDUM

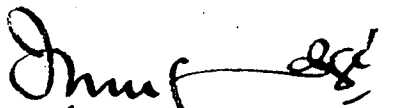
To. SENATE

From. Senate Committee on Undergraduate Studies

Subject

Date. July 26, 1974

At its meeting of 16th July, the Senate Committee on Undergraduate Studies considered the attached proposals for changes in prerequisites and Calendar descriptions for the Department of Chemistry. The Committee is now transmitting these proposals to Senate for its consideration and recommends that they be approved.


I. Mugridge

:ams

att.

SIMON FRASER UNIVERSITY

S.74-976

MEMORANDUM

To SENATE

From Senate Committee on Undergraduate Studies

Subject

Date July 26, 1974

At its meeting of 16th July, the Senate Committee on Undergraduate Studies discussed the attached new course proposals for - Chemistry 005-3 - The Chemistry of Life; 007-3 - Chemistry in the World: An Experimental Approach; Chemistry 357-3 - Chemical and Instrumental Methods of Identification of Organic Compounds; Chemistry 455-3 - Organic Synthesis; Chemistry 458-3 Physical Organic Chemistry; Chemistry 460-2 - Polymer Chemistry; Chemistry 462-2 - Chemical Rate Processes; Chemistry 464-2 Physical Chemistry of Solutions; Chemistry 469-2 - Special Topics in Physical Chemistry; and Chemistry 472-3 Special Topics in Theoretical Chemistry. At the same time, the Committee noted that addition of these courses to the Calendar involved the deletion of the following courses: Chemistry 006-2; Chemistry 351-3; Chemistry 454-3; Chemistry 457-3; Chemistry 463-3; and Chemistry 471-3. The Committee now transmits these proposals to Senate for its consideration and recommends that the additions to and deletions from the Calendar noted above be approved. Should this motion be approved, the Committee recommends that the normal two semester time-lag requirement be waived in the case of Chemistry 007-3; 357-3; 455-3; and 458-3 so that these courses may first be offered in the Spring semester, 1975.

One further note should be added to this recommendation. In the discussion of Chemistry 357, it was noted that this course appeared to be comparable to that in Clinical Chemistry which had recently been approved by Senate. In view of this, the question was asked whether it was the intention of the Department of Chemistry to develop a minor program in identification of compounds. In response to this question, the Chairman of the Science Faculty Curriculum Committee noted that there was no intention at this time to produce such a proposal and that the new courses were designed to accommodate an area of growing importance in this discipline.


I. Mugridge

:ams

att.

SIMON FRASER UNIVERSITY

S.74-97c

MEMORANDUM

SENATE

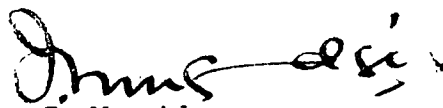
To.....

From..... SENATE COMMITTEE ON UNDERGRADUATE STUDIES

Subject.....

Date..... July 26, 1974

At its meeting of 16th July, the Senate Committee on Undergraduate Studies discussed the attached proposal for revisions to the Chemistry core program. These proposals are now transmitted to Senate for its consideration and the Committee recommends that they be approved.


I. Mugridge

:ams

att.

SCUS 74-26

SIMON FRASER UNIVERSITY

MEMORANDUM

To.....Senate Committee on.....
.....Undergraduate Studies.....
Subject.....CHEMISTRY CURRICULUM CHANGES.....

From.....S. Aronoff *S. Aronoff*
.....Dean of Science.....
Date.....June 28, 1974.....

The attached revisions in the Chemistry curriculum, including changes in prerequisites and calendar descriptions (Appendix A), new course proposals (Appendix B), and revised core program (Appendix C) were approved by the Faculty of Science at its meeting of June 28, 1974. These items are now submitted to SCUS for consideration.

lw

cc: T. Bell, Chairman
Department of Chemistry

Changes in Calendar Entries for Existing Courses

Chem 261-3 Physical Chemistry I - Change in calendar description and prerequisites.

Elements of physical chemistry from macroscopic point of view. Thermodynamics, equilibrium, phase changes, solutions, ~~electrochemistry~~, elementary kinetics, solution transport properties. (deleted with approval of the Registrar. Jan 9/75)

Prerequisites: Chem 105-3, Math 152-3 or 155-3, Physics 201-2 or 102-3.

Chem 361-3 Physical Chemistry II - Change in calendar description and prerequisites.

Elements of physical chemistry from the microscopic point of view. Fundamentals of quantum chemistry. Molecular energy levels and molecular spectroscopy.

Prerequisites: Chem 105-3, Math 352-2, Physics 203-2

Chem 362-3 Physical Chemistry III - Change in calendar description and prerequisites.

Energy distributions, partition functions, Third Law thermodynamics, applications of statistics, kinetic theory of gases, chemical equilibrium, kinetic rate theories, surfaces and interfaces, electro-chemistry, Debye Huckel Theory.

Prerequisites: Chem 261-3, Math 253-4

Chem 366-2 Physical Chemistry Laboratory I - Change in prerequisite.

Prerequisite: Chem 261-3

Chem 367-2 Physical Chemistry Laboratory II - Change in prerequisite.

Prerequisite: Chem 366-2

Rationale - The above changes to the physical chemistry offerings reflect some re-arrangement of the course material between courses, and the removal of the consecutive nature of Chem 361 and 362; these latter two courses may now be taken in any sequence. This will enable students to handle the prerequisite structure in a more flexible manner. The prerequisites reflect the availability of new courses in other departments, and also take into account the re-arranged course material within each course.

Chem 336-2 Inorganic Chemistry Laboratory I - Change in prerequisite.

Prerequisite: Chem 332-3 or Chem 233-2

Rationale - This change reflects the addition of a new course Chem 233-2 Inorganic Chemistry of Biological Processes which is designed for Biochemists.

Chem 453-3 Stereochemistry - Change in calendar description and prerequisite.

A study of the structure and shape of organic molecules with special reference to the spectral and kinetic methods applied in such studies.

Prerequisite: Chem 357-3

Rationale - This change reflects the deletion of Chem 351 from the core and the inclusion of Chem 357.

Chem 416-3 Modern Methods of Analytical Chemistry - Change in prerequisite.

Prerequisite: Chem 117-2 or permission of Department

Rationale - This change reflects a careful consideration of essential prerequisites following the initial running of this course.



T.N. Bell

TNB:rdh

New Course Proposals: (forms attached)

CHEM 005-3 The Chemistry of Life
CHEM 007-3 Chemistry in the World: An Experimental Approach
CHEM 357-3 Chemical and Instrumental Methods of Identification
of Organic Compounds
CHEM 455-3 Organic Synthesis
CHEM 458-3 Physical Organic Chemistry
CHEM 460-2 Polymer Chemistry
CHEM 461-2 Chemical Rate Processes
CHEM 464-2 Physical Chemistry of Solutions
CHEM 469-2 Special Topics in Physical Chemistry
CHEM 472-3 Special Topics in Theoretical Chemistry

Summary of Courses Dropped and Added

Courses Dropped: CHEM 006-2, 351-3, 454-3, 457-3, 463-3, 471-3

Courses Added: CHEM 005-3, 007-3, 357-3, 455-3, 458-3, 460-2,
461-2, 464-2, 464-2, 469-2, 472-3.

SENATE COMMITTEE ON UNDERGRADUATE STUDIES
NEW COURSE PROPOSAL FORM

1. Calendar Information

Department: Chemistry

Abbreviation Code: Chem Course Number: 005 Credit Hours: 3 Vector: 3-0-0

Title of Course: The Chemistry of Life

Calendar Description of Course:

The elements and molecules of life; origins of life and Biochemical evolution; metabolism; food and nutrition; viruses and the chemistry of disease; the effects of drugs and other foreign compounds on life; genetic engineering.

Nature of Course Lecture

Prerequisites (or special instructions):

Prerequisites: None. For chemistry major or honors students, this course is available only as a "free elective".

What course (courses), if any, is being dropped from the calendar if this course is approved: None

2. Scheduling

How frequently will the course be offered? Minimum once every 6 semesters

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? S.K. Lower, W.R. Richards

3. Objectives of the Course

This course will introduce the above subject matter at a level accessible to students outside of the Science Faculty and to non-chemists within Science, interested in this area.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty None

Staff None

Library None

Audio Visual Minimum

Space Lecture Room

Equipment None

5. Approval

Date: 25 April 1974

[Signature]
Department Chairman

Dean

Chairman, SCUS

The Chemistry of Life

The Origin of Life on Earth

Minimum requirements of a living system, primordial metabolites and their possible abiotic formation.

The formation of macromolecules, informational and non-informational systems.

Viruses, membranes and their function.

Nucleic acids and genetics.

The Living Cell

Biological Evolution

Genetic Mutation, natural selection at the molecular level.
Gene duplication.

Natural selection at the organism level.

The evolution of photosynthesis.

The Interdependence of Life

The Development of Mitosis and Meiosis.

Cellular specialization in higher organisms, communication between cells.

The Chemistry of Life in Today's World and the Future

The tools of Modern Biochemistry.

Bioenergetics.

Enzymology

The Biological effects of foreign compounds and poisons.

Bacterial genetics and virology, disease and chemotherapy.

Cancer and molecular diseases.

The Biological Revolution

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

NEW COURSE PROPOSAL FORM

1. Calendar Information

Department: Chemistry

Abbreviation Code: Chem Course Number: 007 Credit Hours: 3 Vector: 1-0-4

Title of Course: Chemistry in the World: An Experimental Approach

Calendar Description of Course: This course is primarily a laboratory oriented session especially designed for the non-scientist. Experiments are designed to demonstrate the relevance of chemistry in the world. A laboratory project of the student's own choosing is undertaken in such areas as environmental chemistry, consumer affairs, etc.

Nature of Course laboratory

Prerequisites (or special instructions): Credit for Chem 007 will not be allowed for persons who have already completed and passed more than one laboratory course in chemistry or who are declared majors in Chemistry, Biology, Physics or related interdisciplinary fields.

What course (courses), if any, is being dropped from the calendar if this course is approved: Chem 006-2

2. Scheduling

How frequently will the course be offered? once per 3 semesters

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

Which of your present faculty would be available to make the proposed offering possible? J. D'Auria, J. Walkley, B.D. Pate

3. Objectives of the Course

The intent of this proposal to add a lecture period to the laboratory course (Chem 006) to allow the opportunity for students and instructor to discuss in detail the background material related to experiments being performed in the laboratory. An increase in credit hours from 2 to 3 is necessitated.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty None

Staff None

Library None

Audio Visual None

Space None

Equipment None

5. Approval

Date: 25 April 1974

J. D'Auria
Department Chairman

Dean

Chairman, SCUS

Chem 007-3 Course Outline

The course content of Chem 007 will be similar to Chem 006 with the addition of a discussion/lecture period to thoroughly explore the chemistry involved in the experiments at hand and the relationship between these and society. The experiments performed are generally selected from the list below with several weeks allowed for students to perform a self-chosen project on related topics. The emphasis in the course is to allow a non-scientist to become aware of the role of chemistry in society and how a chemist works and not just on the depth of the students' understanding of the chemical principles involved.

- The language of chemistry
- Useful experimental measurements
- Physical methods of separation and purification
- Making beautiful crystals (crystallization)
- The separation of colors (introduction to chromatography)
- Chemical analysis of an unknown
- Water pollution studies
- Air pollution studies
- Man-made fibers and plastics
- Dyes and Dyeing
- Flowers, plants, and fruits
- Light from chemistry
- Photography
- The Aspirin project
- Enzymes in action
- Alcoholic beverages
- Drugs
- Chemistry in the body
- Chemistry and crime detection
- Radioactivity: friend or foe?
- Chemistry and advertising
- Projects

SENATE COMMITTEE ON UNDERGRADUATE STUDIES
NEW COURSE PROPOSAL FORM

1. Calendar Information

Department: Chemistry

Abbreviation Code: Chem Course Number: 357 Credit Hours: 3 Vector: 2-0-4

Title of Course: Chemical and Instrumental Methods of Identification of Organic Compounds

Calendar Description of Course:

This course teaches the basic principles involved in the application of infrared, ultra-violet, n.m.r. and mass spectroscopy to the identification of small quantities of organic compounds. Laboratory work involves the identification of several samples of organic compounds, some of which are naturally occurring or are of biological importance.

Nature of Course Lab-Lecture
Prerequisites (or special instructions):

Chem 252-3, Chem 356-2

What course (courses), if any, is being dropped from the calendar if this course is approved: Chem 457-3

2. Scheduling

How frequently will the course be offered? Twice per year

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

Which of your present faculty would be available to make the proposed offering possible? Y.L. Chow, A.C. Oehlschlager, K.N. Slessor, E. Kiehlmann

3. Objectives of the Course

This course is designed to acquaint the student with the principles of application of several commonly used forms of spectroscopy in the determination of structure of organic compounds.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty none

Staff none

Library none

Audio Visual none

Space none

Equipment none

5. Approval

Date: 25 April 1974

[Signature]
Department Chairman

Dean

Chairman, SCUS

Chemical and Instrumental Methods of Identification of Organic Compounds

1. Theory and practice in modern and classic organic structural determination.
2. Development of modern spectroscopic method. Intercorrelation of structure, reactivity and spectroscopic data.
3. Overview of handling an unknown compound.
4. Absorption Spectroscopy
 - a) Electronic spectroscopy (UV and visible range)
 - b) Vibrational spectroscopy (infrared and Raman range)
5. Resonance Spectroscopy
 - a) Nuclear magnetic resonance spectroscopy
 - b) Electron spin resonance spectroscopy
6. Fragmentation Spectroscopy
 - a) Mass spectroscopy
7. Data processing: Judicial application of spectroscopy and chemical methods.
8. Deductive elucidation of structure and confirmatory techniques
9. Literature research
10. Seminar

Laboratory Work

Structural elucidation of 4-5 unknowns with variable degrees of difficulties.

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

NEW COURSE PROPOSAL FORM

Department: Chemistry

1. Calendar Information

Abbreviation Code: Chem Course Number: 455 Credit Hours: 3 Vector: 3-1-0

Title of Course: Organic Synthesis

Calendar Description of Course:

This course teaches the principles involved in the planning and execution of the synthesis of organic molecules. Emphasis is on synthesis naturally occurring compounds of biological importance.

Nature of Course Lecture

Prerequisites (or special instructions):

Chem 252-3, Chem 356

What course (courses), if any, is being dropped from the calendar if this course is approved: Chem 454

2. Scheduling

How frequently will the course be offered? Once per year

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

Which of your present faculty would be available to make the proposed offering possible? Y.L. Chow, K.N. Slessor, A.C. Oehlschlager

3. Objectives of the Course

This course is designed to acquaint the student with the principles involved in planning the synthesis of complex organic molecules. Furthermore it will acquaint the student with new and synthetically useful reactions of organic compounds.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty none

Staff none

Library none

Audio Visual none

Space none

Equipment none

5. Approval

Date: 25 April 1974

M. Sch.
Department Chairman

Dean

Chairman, SCUS

Chem 455-3 Course Outline

Week

- 1,2 Approaches to synthesis of organic molecules, rationales, logistics, analysis of alternate approaches.
- 3 Reduction reactions
catalytic H₂
hydride, hydroboration
dissolving metal
Conditions, directive effects, selectivities.
- 4 Oxidation reactions:
Utilization of chromium and manganese compounds
Utilization of peracids, peroxides
Utilization of salts of Pb, Hg, Se
Conditions, directive effects, selectivities
- 5 Methods of activation of remote C-H bonds
- 6,7 Methods of formation of carbon-carbon bonds
Alkylation of active methylene compounds
Aldol condensation and related reactions
Enamine condensations
Ylid condensation with polar multiple bonds
Cycloaddition reactions
- 8,9 Organometallic reagents in synthesis
Grignard based reagents
Dialkyl lithium cuprates
Nickel-catalyzed condensations and cyclizations
- 10-13 Synthesis of sterol hormones, insect pheromones, prostaglandins, and macrocyclic antibiotics.

Material in weeks 2-9 relates methods of modification of organic molecules. The lecture material assumes knowledge of basic organic reactions as taught in Chem 251-3 and Chem 252-3. During this segment of the course the student will be directed to complete problem syntheses which involve selective transformations. As the student acquires a broad background it is envisioned that the student will be in a position to evaluate alternative routes of synthesis presented and discussed in the latter sessions (weeks 10-13)

Recommended Text

R.E. Ireland - Organic Synthesis, Prentice-Hall (1971)

Reference Text

H.O. House - Modern Synthetic Reactions - Second Edition,
W.A. Benjamin, Inc., N.Y. (1971)

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

NEW COURSE PROPOSAL FORM

1. Calendar Information

Department: Chemistry

Abbreviation Code: Chem Course Number: 458 Credit Hours: 3 Vector: 3-1-0

Title of Course: Physical Organic Chemistry

Calendar Description of Course:

This course teaches the principles involved in the determination of the mechanisms of reaction of organic molecules.

Nature of Course Lecture

Prerequisites (or special instructions):

Chem 261-3, Chem 357-3

What course (courses), if any, is being dropped from the calendar if this course is approved: Chem 351-3

2. Scheduling

How frequently will the course be offered? Once per year

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

Which of your present faculty would be available to make the proposed offering possible? E. Kiehlmann, Y.L. Chow, A.C. Oehlschlager

3. Objectives of the Course

The main objective of this course is to acquaint the student with the principles and methods involved in the deduction of mechanisms of organic reactions. Furthermore it is designed to acquaint the student with the principles involved in utilising mechanistic data for prediction of relative reactivities of organic molecules.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty none

Staff none

Library none

Audio Visual none

Space none

Equipment none

5. Approval

Date: 25 April 1974

J. Sch.
Department Chairman

Dean

Chairman, SCUS

Physical Organic Chemistry

Topics:

Structure and bonding, molecular-orbital and valence-bond theory, resonance, aromaticity, hyperconjugation.

Acids and bases, Bronsted catalysis Law

Structure-reactivity relationships, inductive resonance and steric effects, Hammett and Taft equation.

Study of reaction mechanisms: Non-kinetic methods, kinetics, transition-state theory, kinetic vs. thermodynamic control, kinetic isotope effects.

Nucleophilic aliphatic substitution, neighbouring group effects, allylic rearrangements, ion pairs, solvent effects.

Carbonium ion reactions and rearrangements to electron deficient nitrogen and oxygen, migratory aptitude.

Ionic elimination and addition reactions.

Reactions of carbonyl compounds, enolization, carbanions.

Concerted reactions, analysis by frontier orbital methods.
Diels-Alder, concerted ionization-rearrangements,
thermally induced rearrangements.

Photochemical transformations.

Free-radical reactions, carbenes, oxidation-reduction.

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

NEW COURSE PROPOSAL FORM

1. Calendar Information

Department: Chemistry

Abbreviation Code: Chem. Course Number: 460 Credit Hours: 2 Vector: 2-1-0

Title of Course: Polymer Chemistry

Calendar Description of Course:

Solution properties of macromolecules. Kinetics of polymerization in free radical, ionic and condensation systems. Stereochemistry of polymers.

Nature of Course Lecture Course

Prerequisites (or special instructions):

Chemistry 261

What course (courses), if any, is being dropped from the calendar if this course is approved: None

2. Scheduling

How frequently will the course be offered? Minimum once per 6 semesters

Semester in which the course will first be offered? 75-3

Which of your present faculty would be available to make the proposed offering possible? B.L. Funt

3. Objectives of the Course

This course will provide an introduction to the chemistry of large molecules and will compare the properties of macromolecular systems with those based on small molecules. The chemistry of the textile, fiber, rubber and plastics industries is based on the preparation and modification of polymeric systems. The course will furnish a basis for understanding the molecular architecture and interactions in natural and synthetic polymers.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty None

Staff None

Library None

Audio Visual None

Space Lecture Room

Equipment None

5. Approval

Date: 25 April 1974

M. Sch.
Department Chairman

Dean

Chairman, SCUS

Polymer Chemistry

Science of Large Molecules

Basic Concepts
History of Development

Polymer Solutions

Thermodynamics of Solutions
Conformation of Chains
Phase Separations

Measurement of Molecular Weight and Size

Gel Permeation Chromatography
Colligative Properties
Light Scattering
Ultra centrifuge

Polymerization

Step Reaction Polymerization
a) Classification of polymerization mechanisms
b) Kinetics of Stepwise Polymerization
c) Statistics

Radical Polymerization

Steady State Kinetics
Absolute Reaction Rates
Molecular Weight and Distribution
Emulsion Polymerization
Thermochemistry of Chain Polymerization
Chain Transfer
Equilibrium Polymerization

Cationic Polymerization

a) Initiation
b) Kinetics
c) Effect of gegen ions
d) Energetics

Anionic Polymerization

Polymerization without termination
Effects of reaction media

Chain Copolymerization

Composition, Block and graft copolymers, Donor-Acceptor alternating copolymers

Polymerization in Heterogeneous Systems

Stereoregularity

NEW COURSE PROPOSAL FORM

1. Calendar Information

Department: Chemistry

Abbreviation Code: Chem. Course Number: 461 Credit Hours: 2 Vector: 2-1-0

Title of Course: Chemical Rate Processes

Calendar Description of Course:

Mechanisms of photochemical processes. Excited states and hot molecules
Atmospheric reactions. Free Radical reactions.

Nature of Course lecture

Prerequisites (or special instructions):

Chem 261 or permission of Department.

What course (courses), if any, is being dropped from the calendar if this course is approved:

None

2. Scheduling

How frequently will the course be offered? Minimum once per 6 semesters.

Semester in which the course will first be offered? Fall 1976

Which of your present faculty would be available to make the proposed offering possible? T.N. Bell A.G. Sherwood

3. Objectives of the Course

Revision of Physical Chemistry offerings to offer a broader spectrum of optional topics in courses at the 400 level. Rate processes are fundamental to an understanding of molecular dynamics with applications to environmental, natural and industrial processes.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty Nil

Staff Nil

Library Nil

Audio Visual Nil

Space Lecture Room

Equipment Nil

5. Approval

Date: 25 April 1974

T. N. Bell
Department Chairman

Dean

Chairman, SCUS

SCUS 73-34b:-- (When completing this form, for instructions see Memorandum SCUS 73-34a. Attach course outline).

Chemical Rate Processes

- Photochemical excitation, methods used including lasers.
- The nature of the excited state, energy transfer, fluorescence, phosphorescence.
- Chemical reactions of excited states and hot molecules, of simple and complex structure.
- Chemical reactions in the atmosphere, natural and unnatural sources.
- Free radicals, their production nature, and modes of reactions.

SENATE COMMITTEE ON UNDERGRADUATE STUDIES
NEW COURSE PROPOSAL FORM

1. Calendar Information

Department: Chemistry

Abbreviation Code: Chem Course Number: 464 Credit Hours: 2 Vector: 2-1-0

Title of Course: Physical Chemistry of Solutions

Calendar Description of Course:

Thermodynamics and statistical mechanics of non ideal solutions. Modern theories of electrolyte and non-electrolyte liquids, including water. Solid solutions and phase diagrams.

Nature of Course Lecture

Prerequisites (or special instructions):

Chem 362-3

What course (courses), if any, is being dropped from the calendar if this course is approved: 463-3

2. Scheduling

How frequently will the course be offered? Minimum once per 6 semesters.

Semester in which the course will first be offered? Spring 1976

Which of your present faculty would be available to make the proposed offering possible? J. Walkley I.D. Gay

3. Objectives of the Course

Similar to currently offered 463, however revision required due to a revision of 400 level physical offerings and core course contents.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty Nil

Staff Nil

Library Nil

Audio Visual Nil

Space Lecture Room

Equipment Nil

5. Approval

Date: 25 April 1974

Th. S. S.
Department Chairman

Dean

Chairman, SCUS

Physical Chemistry of Solutions

1. Thermodynamics of non-ideal solutions - activity and fugacity (standard states); their measurement. Experimental measurements on solutions - enthalpy, vapour pressure, miscible and immiscible systems, dilute systems (solubility behaviour, etc).
2. Statistical mechanics
 - a) appropriate ways of treating the partition function for pure liquids - virial expansion, cell theory and their limitations;
 - b) Approximate theories of solutions - Hildebrand, Guggenheim, Regular Solution Theory
3. The generalized van der Waals theory - and its application to real systems (with some discussion of the radial distribution function approach).
4. A look at water and its solutions with other liquids, gases and solids; a comparison with non-polar mixtures and inferences therefrom.
5. Ionic solutions - observed experimental behaviour, salting in, salting out, etc.
6. The Debye-Huckel theory, etc.
7. Types of solid solutions (including alloys, clathrates) and phase diagrams.

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

NEW COURSE PROPOSAL FORM

1. Calendar Information

Department: Chemistry

Abbreviation Code: Chem Course Number: 469 Credit Hours: 2 Vector: 2-1-0

Title of Course: Special Topics in Physical Chemistry

Calendar Description of Course:

Aspects of Physical Chemistry (topics will be determined at the time of offering.)

Nature of Course Lecture

Prerequisites (or special instructions):

Permission of Department.

What course (courses), if any, is being dropped from the calendar if this course is approved: None

2. Scheduling

How frequently will the course be offered? As demand may require.

Semester in which the course will first be offered? -

Which of your present faculty would be available to make the proposed offering possible? Depends on specific interest.

3. Objectives of the Course

To provide in depth treatment for areas of Physical Chemistry, which are not presently covered, e.g. transport properties. Will enable the Dept to utilize the expertise of visitors from time to time.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty Nil

Staff Nil

Library Nil

Audio Visual Nil

Space Lecture Room

Equipment Nil

5. Approval

Date: 25 April 1974

M. Bell

Department Chairman

Dean

Chairman, SCUS

SENATE COMMITTEE ON UNDERGRADUATE STUDIESNEW COURSE PROPOSAL FORM1. Calendar InformationDepartment: ChemistryAbbreviation Code: Chem Course Number: 472 Credit Hours: 3 Vector: 3-1-0Title of Course: Special Topics in Theoretical ChemistryCalendar Description of Course:

Aspects of Theoretical Chemistry (topics will be determined at the time of offering). Possible topics from among - molecular orbital theory of conjugated systems, Huckel Theory, orbital symmetry and group theory. Advanced applications of quantum mechanics to chemical problems.

Nature of Course

Lecture

Prerequisites (or special instructions):

Chem 361

What course (courses), if any, is being dropped from the calendar if this course is approved:

Chem 471

2. Scheduling

How frequently will the course be offered? once per year

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

Which of your present faculty would be available to make the proposed offering possible? G. Malli, M.L. Benston

3. Objectives of the Course

To provide an advanced offering in applied or pure aspects of theoretical chemistry, according to student demand.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty Nil

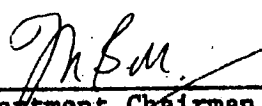
Staff Nil

Library Nil

Audio Visual Nil

Space Lecture Room

Equipment Nil

5. ApprovalDate: 20th June 1974

 Department Chairman

Dean

Chairman, SCUS

REVISED CHEMISTRY CORE PROGRAM

104-3	General Chemistry I
105-3	General Chemistry II
115-2	General Chemistry Laboratory
117-2	Quantitative Chemistry Laboratory
232-3	The Chemistry of Nontransition Elements
251-3	Organic Chemistry I
252-3	Organic Chemistry II
256-2	Organic Chemistry Laboratory I
261-3	Physical Chemistry I
332-3	The Chemistry of Transition Elements
336-2	Inorganic Chemistry Laboratory I
341-3	Radiochemistry
356-2	Organic Chemistry Laboratory II
357-3	Chemical and Instrumental Methods of Identification of Organic Compounds
361-3	Physical Chemistry II
362-3	Physical Chemistry III
366-2	Physical Chemistry Laboratory I
367-2	Physical Chemistry Laboratory II

REVISED CHEMISTRY ELECTIVES

400 Level Chemistry Courses

416-3	Modern Methods of Analytical Chemistry
421-3	Descriptive Biochemistry
422-3	Physical Biochemistry
426-2	Biochemistry Laboratory I
427-2	Biochemistry Laboratory II
432-3	Inorganic Chemistry III
437-2	Inorganic Chemistry II
442-3	Nuclear Chemistry
446-2	Nuclear Chemistry & Radiochemistry Laboratory
453-3	Stereochemistry
455-3	Organic Synthesis

458-3	Physical Organic Chemistry
460-2	Polymer Chemistry
461-2	Chemical Rate Processes
462-3	Molecular Spectroscopy
464-2	Physical Chemistry of Solutions
469-2	Special Topics in Physical Chemistry
472-3	Special Topics in Theoretical Chemistry
481-5	Undergraduate Research
482-3	Directed Study in Advanced Topics

Note: This revised Chemistry Core Program reflects the deletion of CHEM 351-3 and the addition of CHEM 357-3.