Routing #30 79-80  Resolution #29
1979-1980

TO:  PRESIDENT ALBERT W. BROWN
FROM:  THE FACULTY SENATE
RE:  X  I. Formal Resolution (Act of Determination)
      II. Recommendation (Urging the fitness of)
      III. Other (Notice, Request, Report, etc.)

SUBJECT:
Proposed Revision to the Major in Chemistry

(see attached)

Robert J. Kramel
Sign 4/15/80

To:  THE FACULTY SENATE
From:  PRESIDENT ALBERT W. BROWN
Re:  I. DECISION AND ACTION TAKEN ON FORMAL RESOLUTION
    Accepted. Effective Date 4-17-80
    b. Deferred for discussion with the Faculty Senate on
    c. Unacceptable for the reasons contained in the attached explanation

II. III. a. Received and acknowledged
        b. Comment:

Distribution: Vice Presidents:  Douglas
Others as identified:

Distribution Date: 4/17/80
Signed:  (President of the College)

Date Received by the Senate:  

APR 1 1980
Proposed Revision to the Major in Chemistry

These changes were adopted by a majority vote in Chemistry Department Staff meeting February 26, 1990.

Submitted for review by the Dean, Faculty of Natural and Mathematical Sciences on March 5, 1989.

J. Morley Morris (Acting Chairman
Chemistry Department

Approved - Disapproved

Derek L. Hill
Dean, Faculty of Natural and Mathematical Sciences

The Chemistry Department at Brockport offers students who wish to major in chemistry three options:

1. The major in chemistry

This program provides fundamental grounding in general and inorganic chemistry, analytical chemistry, organic chemistry, and physical chemistry. This program has required 30 credits in chemistry since chemistry majors were first offered at Brockport. It is appropriate for students with a variety of career goals including government service, business, primary or secondary school teaching, pre-medicine/pre-dentistry and all the broad range of career paths open to liberal arts graduates.

2. The major in chemistry with American Chemical Society Certification

This program provides a more thorough course of study in the broad range of chemical science and aims to meet the needs of students intending to pursue a professional career as a practicing chemist (either by direct entry into a technical position at the bachelor's level or after graduate study in chemistry or the closely related sciences.) The Chemistry faculty is governed in this second track by the guidelines of the American Chemical Society Committee on Professional Training (ACS-CPT). This Committee functions as an accrediting agency for undergraduate chemistry programs and maintains a listing of approved undergraduate chemistry programs. Brockport has been on this list since 1972; we are subject to re-evaluation by the Committee by annual report and by self-study at 5 year intervals. Brockport certifies to the Committee those of our graduates who complete a program which the Brockport faculty has designed to meet the objectives of the guidelines of the ACS-CPT. These Certified graduates are immediately eligible for full membership in the American Chemical Society. Non-certified graduates may become Associate Members, and, after 3 years' experience in chemistry, may become Full Members. Certified graduates are much more readily hired in technical jobs and are much better prepared for graduate work in chemistry.

The ACS-CPT requires that schools on the approved list offer students the opportunity to become certified graduates; we are not obligated, however, to require all graduates to do so. Some college and university chemistry departments have elected to offer only an ACS certifying major, but we continue to believe that Brockport students are best served by having two options.
3. In addition, the chemistry faculty has described a biochemistry track in this as a formal advisement description of our judgment as to the program suited to the student whose interests are chemical and whose goals are biochemistry. Pharmacology, toxicology, and/or related biochemical specialties, Brockport students also regularly prepare themselves to work in these areas by completing double majors in Chemistry and Biology (approximately 30 credits in each). The Biochemistry track is a chemistry major with explicit advisement on electives. With appropriate choices a student on the biochemistry track can become an ACS Certified graduate. Until very late in her/his student career a student on the Biochemistry track can readily opt to complete both chemistry and biology majors or easily turn away from biochemistry to either "straight chemistry" or "straight biology".

The Changes Proposed for the Major in Chemistry

1. To require a 1 credit course in Chemical Safety.
2. To require a 1 credit (2 semesters of participation) in Chemistry Seminar.
3. To require three credits of elective instead of two. To accommodate students with double majors, an appropriate advanced course in another area of science or mathematics may be substituted by petition.
4. To revise CHM 205-206 to include more descriptive chemistry and to change its name to College Chemistry I, II.

The Rationale

1. Safety requirement: Heightened consciousness of safe practice and of hazards associated with use of chemicals and with chemical experimentation is incumbent on all persons so employed (while they are students and on the job). The following paragraph is reproduced from the most recent (1978) revision of the Committee on Professional Training's Guidelines. It reinforces our judgment that a formal course in Chemical Safety is a necessary part of our undergraduate chemical programs.

   "There should be strong emphasis upon instruction in chemical safety, maintenance of safety devices, and observation of standard safety practices in the laboratory, including the regulations of the U.S. Occupational Safety and Health Administration. Special facilities should be available for the handling, storage and disposal of hazardous chemicals. The toxicity of some of the more common chemicals (e.g., CCl4, benzene) is a special problem warranting specific and systematic instruction of both teaching assistants and students. Eye protection for everyone engaged in laboratory work should be required. Experiments that risk fire, explosions, or exposure to toxic materials should not be allowed without special planning for protection from those hazards. Showers and eye baths should be provided in all laboratories where any hazardous chemical may be used."

2. Seminar requirement: See attached yellow sheet for a rationale and a description of this revised course.

3. From the beginning (1966) of a chemistry major at Brockport, three credits of elective were required. In 1977 the required course, CHM 303, Quantitative Analysis, was changed to 4 credits to provide a course more suited to the needs of our students. In order to keep to 30 credits for the major we sacrificed one credit of elective. Since we believe some additional work (beyond the survey course in each of the divisions of chemistry) is necessary we are unwilling to abandon a requirement for elective credit. Since, with the added requirements of Chemical Safety and Chemistry Seminar we are forced to exceed 30 credits to provide an elective, we have decided to reestablish the elective requirement of 3 credits. (Students have a variety of options for fulfilling this elective requirement, chosen from 1, 2, 3 or 4 credit courses, and including those required in the ACS Certification program.)
4. The swinging pendulum in chemical education now favors inclusion of more descriptive inorganic chemistry in the curriculum. We have rejected designing a new course and adding yet another requirement, but we are in agreement that more descriptive chemistry is needed. CHM 205-206 seems the appropriate place to include it. The change of name to College Chemistry seems an appropriate title and gives this first chemistry course for science majors a name similar to that of the first course in physics for science majors (PHS 201-202. College Physics.)

Changes Proposed for the ACS Certification Program

1. The newly required courses for the major in chemistry are added; namely, Chemical Safety and Chemistry Seminar I, II.

2. The requirement of Inorganic Chemistry is replaced by the option of choosing either Inorganic Chemistry or Biochemistry.

3. One additional credit in a chemistry laboratory course is required, but choice of which laboratories is expanded.

4. The range of options for electives is expanded by accepting an appropriate course from any other natural and mathematical science.

The Rationale

1. The chemistry major remains the core of the ACS certified program and the proposed changes there are clearly appropriate for students intending to become practicing chemists.

2. Previously the ACS-CPT guidelines required Inorganic Chemistry. With the 1978 revision to the guidelines ACS-CPT now accents either Biochemistry or Inorganic Chemistry. We favor providing flexibility where ever possible.

3. The guidelines call for at least 500 hours of laboratory instruction, of which at least 425 must be "structured" (i.e., course) laboratories. With the Brockport 14 week calendar and the suspension of classes for Jewish Religious Holidays we have not been able to provide 500 hours with the existing requirements. More importantly we believe our students need additional structured laboratory experience. The new laboratory requirement increases by one credit the number of hours of laboratory work required. A student completing this program would then have approximately 530 to 550 clock hours of laboratory work (according to the class schedule). The requirement is stated so that students have to achieve some breadth in advanced laboratory work but also have some choice among the advanced laboratory courses available to them.

Changes Proposed for the Biochemistry Track

No changes are proposed except that Chemical Safety and Chemistry Seminar will be required as for all chemistry majors. The new elective requirement for the chemistry major is already exceeded in the biochemistry track.

A comparison of the present requirements and proposed revised requirements appears on the accompanying pink sheet.

Effective Date

The new requirements will be effective for all students entering Brockport on or after September 1, 1980.
3. Completion of CHM 414. Instrumental Analysis 3 cr
   CHM 416. Instrumental Analysis Laboratory 1 cr

4. Completion of CHM 431. Inorganic Chemistry 4 cr
   (now includes Laboratory)

5. Completion of six semester hours of upper level chemistry electives in addition to the above courses. The combination of PES 310 and PES 311, or an advanced course in mathematics or physics for which calculus is a pre-requisite may be substituted for one Chemistry elective.

It is strongly recommended that the student also develop a reading knowledge of scientific German or Russian.

III. Biochemistry Track

The only change is the additional requirement of the two courses Chemical Safety and Chemistry Seminar.
II. ACS Certification Program

   1 cr

   1 cr

3. Completion of 2 credits of advanced laboratory
   1 cr

II. ACS Certification Program

MPS 201-202 are strongly recommended in preference to MPS III-112.

III. General Education

1. 12 cr

a. MPS I-112 General Physics
   6 cr

b. MPS 201-202 College Physics I, II
   6 cr

IV. Chemistry Courses

30 cr

a. Elective (9)

b. MPS 401-409 Physical Chemistry I, II

2 cr

(c. upper level)

a. MPS 501-509 Organic Chemistry I, II

2 cr

b. MPS 601-609 Quantum Chemistry

2 cr

V. Proposed Revision

February 1980

Proposed Revision to the Major in Chemistry

Presidnt Requirements

The major in chemistry
One of the significant shortcomings of our program is that our students have not been required to (nor forcefully suggested to) have any experience, much less become proficient, in oral presentation of technical, chemical topics (but some of our advanced elective courses do have oral presentation requirements). Employers regularly and publicly lament the lack of oral communication skills in the baccalaureate candidates they have to consider. Our students also seldom have the opportunity/need to venture into uncharted, technical areas (uncharted in the sense of not part of current course work); i.e., their listening and integrative skills may not be adequately challenged. Chemistry Seminar can provide some opportunities for these types of learning activities.

Chemistry Seminar should at least

1. provide explicit information on getting a job, such as resume preparation, job hunting, interview techniques
2. present outside speakers discussing research topics
3. present students giving literature-based technical reports
4. provide Brockport students who have been conducting research an optional forum to present their results (including practice presentations for ACS-Undergraduate Research Symposium papers).

If we have 10 to 15 seniors per year, all of these things cannot be accomplished in 12-14 weeks as we have been attempting to do.

CHM 400. Chemistry Seminar I.
Prerequisite: Majors or minors in chemistry; junior or senior standing
Preparation of a resume and other job seeking skills; current topics of interest in chemistry; preparation and delivery of an oral presentation of a current topic; evaluation of other oral presentations.
0 semester hour credit.

CHM 401. Chemistry Seminar II.
Prerequisite: CHM 400
Continuation of CHM 400. The seminar series runs throughout the year.
Students are required to participate in both semesters; most student presentations will be scheduled in the second semester.
1 semester hour credit.

A typical organization for the revised Chemistry Seminar follows:

CHM 400: Week 1. Organization; requirements
2. Brockport Faculty: topic
3. Job seeking subjects
4. 6-10. Visitor: topic
11-13. Student: topic
14. Visitor: topic

CHM 401: Week 1-10. Student/Visitor: topic
11,12. Practice presentations
ACS Undergraduate Research Symposium
13,14. Student/Visitor: topic

It is to be expected that 6 to 10 visitors and 10 to 15 students will present seminars. Brockport Faculty may substitute for visitors and each student is expected to make one 30 to 45 minute presentation based either on literature or on literature plus her/his own research results. Students registered for independent study (research) but not registered for seminar will be encouraged but not required to attend seminar regularly.

Required student products:
1. A suitable resume; a list of potential employers with addresses; a letter of inquiry for employment; practice, mock interviews with faculty will be optional
2. For all topics as a listener: One page written summary of main points and critique of presentation for organization, clarity, style, slides, and overall success in communication.
3. For all topics as a speaker: A typed report of the topic presented (normally approximately equivalent to a script) with an appropriate bibliography. An appropriate abstract must be submitted two weeks before speaking date.