TO: Dr. Paul Yu, College President

FROM: The Faculty Senate Meeting on November 2, 1998

RE: □ I. Formal Resolution (Act of Determination)
   □ II. Recommendation (Urging the fitness of)
   □ III. Other (Notice, Request, Report, etc.)
   For your information

SUBJ: Proposed Changes to Earth Sciences Majors: Geology, Earth Science, Meteorology & Water Resources

Signed: Thomas Bonner Date Sent: 11/18/98
(Thomas Bonner, Faculty Senate President)

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TO: The Faculty Senate

FROM: Dr. Paul Yu, College President

RE: I. Decision and Action Taken on Formal Resolution
   a. Accepted. Effective Date: 12/3/98
   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: Administrative Staff (Please share with appropriate staff)

Distribution Date: 12/3/98 Signed: [Signature]
(President of the College)
Geology Major:

Environmental and applied geology will be a major area of growth in the next few years. They are interdisciplinary fields, requiring that students have a strong, broad background in geology as well as a general understanding of the other physical sciences. Our proposed changes will increase the core requirements and allow additional courses with environmental applications (e.g. ESC 455 Intro to Soils, GEL 457 Geochemistry) as designated electives. The minimum number of required coursework in the major will increase from 37 to 42 credit hours. The most significant change, however, will be to require 16 credit hours of corequisites: two semesters each of chemistry and physics. These courses have become important for employment in the environmental field, and are required for admission into geology graduate programs. The specific changes are highlighted below.

- Add ESC 350 Computational Methods in the Field Sciences to the core requirements.
- Replace GEL 491 Seminar in Geological Problems with ESC 493 Seminar in Earth Science Problems
- Expand the core requirements by shifting GEL 306 Introduction to Paleontology, GEL 408 Structural Geology, and GEL 431 Petrology from 'Designated Electives' to required core courses.
- Because of the increase in the core requirements, the number of required designated electives can be reduced from 18-19 to 8, bring the Geology major in line with the other majors. Several new courses will be added to the list of designated electives to reflect the current emphasis on surface processes and environmental applications. Students will be able to tailor their program towards post-graduate employment or graduate school, depending on their career goals.
- Add 16 hours of required corequisite courses: CHM 205/206, and PHS 115/116 or PHS 201/202
July 17, 1998

To: Larry Kline, Chair
Faculty Senate Curriculum Committee

From: Judy Massare, Chair
Earth Sciences Department

Re: Proposed changes to majors for Faculty Senate approval

Two years ago, the Department of the Earth Sciences added a technical writing course (ESC 391) to the degree requirements of its four majors (Geology, Earth Science, Meteorology & Water Resources). A senior seminar course (ESC 493) was also added to the Earth Science major. These changes reflect our desire to develop the written and oral communication skills of our graduates to make them more competitive. Senior seminars are required of three of our four majors. In order to emphasize the interrelationships among the disciplines within the earth sciences, we propose to combine the senior seminar course (GES 491, ESC 491, and ESC 493) into a single seminar course (ESC 495) to be required of all majors. Furthermore, given the rapidly changing technologies and the nature of the job market, we strongly feel the need to improve the computational skills of our students as well. In particular, we would like our graduates to have a better understanding of current data analysis methods and computer visualization techniques in the various earth sciences disciplines. Therefore, we propose to add ESC 350 Computational Methods in the Field Sciences to the core requirements of our four majors. The course has been a recommended elective for three of the majors.

Furthermore, we propose herein to structure the degree requirements of our three technical majors following a single model. For each major, we have identified a list of core requirements which will provide a well-rounded background in the discipline and a set of designated electives to satisfy specific career goals or interests. No additional staffing is required to implement these changes. In fact, the expertise of our new faculty blends nicely with the proposed changes.

A comparison of the current and proposed major requirements for our four majors are presented in the attached pages. A brief text pertaining to each major explains the proposed changes.
Meteorology Major:

The changes that we are proposing do not substantially change the major, although the number of required credit hours will increase from 37 to 41. Corequisites will not change. The modifications to the major requirements are listed below.

- ESC 350 Computational Methods in the Field Sciences will be changed from a designated elective to a required core course. It has been typically taken by nearly all MET majors as one of their designated electives.

- ESC 351 Computational Methods Lab will be added to the required core. The National Weather Service requires a knowledge computer programming, preferably FORTRAN, for employment. Currently FORTRAN programming is a component of ESC 350, but students require more practice with the language than can be accommodated in that course.

- Replace ESC 491 Seminar in Meteorological Problems with ESC 493 Seminar in Earth Science Problems
Geology Major:

Environmental and applied geology will be a major area of growth in the next few years. They are interdisciplinary fields, requiring that students have a strong, broad background in geology as well as a general understanding of the other physical sciences. Our proposed changes will increase the core requirements and allow additional courses with environmental applications (e.g. ESC 455 Intro to Soils, GEL 457 Geochemistry) as designated electives. The minimum number of required coursework in the major will increase from 37 to 42 credit hours. The most significant change, however, will be to require 16 credit hours of corequisites: two semesters each of chemistry and physics. These courses have become important for employment in the environmental field, and are required for admission into geology graduate programs. The specific changes are highlighted below.

- Add ESC 350 Computational Methods in the Field Sciences to the core requirements.

- Replace GEL 491 Seminar in Geological Problems with ESC 493 Seminar in Earth Science Problems

- Expand the core requirements by shifting GEL 306 Introduction to Paleontology, GEL 408 Structural Geology, and GEL 431 Petrology from ‘Designated Electives’ to required core courses.

- Because of the increase in the core requirements, the number of required designated electives can be reduced from 18-19 to 8, bringing the Geology major in line with the other majors. Several new courses will be added to the list of designated electives to reflect the current emphasis on surface processes and environmental applications. Students will be able to tailor their program towards post-graduate employment or graduate school, depending on their career goals.

- Add 16 hours of required corequisite courses: CHM 205/206, and PHS 115/116 or PHS 201/202
Water Resources Major.

The proposed changes in the WTR major reorganizes the requirements into core courses and designated electives. The new core requirements would give our students a background in watershed systems and landforms, subsurface water, and low temperature geochemistry; the additional electives will allow them to select courses to emphasize surface water, groundwater, or water quality. The required courses for the major will increase from 34 to 43 credit hours. The required corequisites will remain unchanged. The modifications to the major requirements are shown below.

- Add ESC 351 Computational Methods Lab to the core requirements.
- Add ESC 493 Seminar in Earth Science Problems to the core requirements, which would match the senior seminar requirement in the other majors.
- Require both ESC 211 Weather and GEL 101 Our Earth, rather than requiring just one of the two. Given the interdisciplinary nature of the field, students need a good background in both geology and meteorology.
- Eliminate ESC 364 Water Resources Issues from the requirements. This course is designed for non-majors, as one of the Contemporary Issues courses for the General Education requirements. We should encourage our majors to take an issues course outside of their major. Furthermore, some of the problems addressed at an elementary level in this course can be better addressed at a more advanced level in the senior seminar.
- Introduce 6 credit hours of designated electives by changing some of the specialized courses that are currently required to 'Designated Electives'. Presently, the major does not allow students any choice in selection of their upper division courses within the major. With the recent hiring of two new faculty who contribute to the major, we will now be able to offer students more options beyond the core requirements.
Earth Sciences Major:

The proposed changes mainly alter the distribution of requirements between the core and the designated electives. The number of required credit hours will increase from 31 to 32. The 8 hours of required co-requisite courses in lab sciences would remain unchanged. The modifications to the major are shown below.

- Eliminate the ‘Analytical Methods’ elective, and add ESC 350 Computation Methods in the Field Sciences to the core requirements. This would change the core requirements from 14 hours to 17 hours.

- Add a fourth choice to the lists for the ‘Geology Elective’ and ‘Meteorology Elective’. The added courses highlight topics that ESC majors pursuing Secondary Education Certification would find useful. It does not change the requirement, but merely gives additional recommendations for electives and allows students a wider choice of appropriate courses. Students are presently allowed to substitute these courses for existing requirements with the approval of their advisor. The only prerequisites for the electives listed are the required core courses.