DATE SUBMITTED: 4-2-04

COLLEGE/SCHOOL: CMPS

DEPARTMENT/PROGRAM: Mathematics

PROPOSED ACTION (A separate form for each) ADD: DELETE: CHANGE: x

DESCRIPTION (Provide a succinct account of the proposed action. Details should be provided in an attachment. Provide old and new sample programs for curriculum changes.)

The change is from the Citation in Actuarial Mathematics to the Minor in Actuarial Mathematics.

JUSTIFICATION/REASONS/RESOURCES (Briefly explain the reason for the proposed action. Identify the source of new resources that may be required. Details should be provided in an attachment.)

Reason: Citations are being phased out, and minors are being instituted. The changes required in shifting from Citation in Actuarial Mathematics to Minor in Actuarial Mathematics are minimal. We believe that there will be either no new resources required or essentially no new resources that are required.

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APPROVAL SIGNATURES

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<tr>
<td>1</td>
<td>Department Committee Chair</td>
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<td>2</td>
<td>Department Chair</td>
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<td>Chair, Senate PCC</td>
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<td>Chair of Senate</td>
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<td>8</td>
<td>Vice President for Academic Affairs &amp; Provost</td>
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VPAAAP Rev. 3/1/04
MEMORANDUM

TO:     Stephen Halperin  
       Dean, College of Computer, Mathematical and Physical Sciences

FROM:   Victor Korenman  
        Associate Provost for Academic Planning and Programs

SUBJECT: Proposal to Convert the Existing Citation in Actuarial Mathematics to a Minor in Actuarial Mathematics (PCC Log No. 03055)

At its meeting on May 6, 2004, the Senate Committee on Programs, Curricula, and Courses approved your proposal to convert the existing citation in Actuarial Mathematics to a Minor in Actuarial Mathematics. A copy of the approved proposal is enclosed.

This approval is effective in Fall, 2004. All advisors should be notified and the College should ensure that the approved guidelines are followed.

VK.ksfm
Enclosure
Cc:     Dr. Sylvester J. Gates, Chair, Senate PCC
        Dr. Mary Giles, University Senate
        Ms. Barbara Hope, Data Administration
        Dr. Phyllis Peres, Undergraduate Studies
        Ms. Anne Turkos, Archives
        Dr. Scott Wolkert, College of Computer, Mathematical and Physical Sciences
        Dr. Linda Yokoi, Records & Registrations
MINOR IN ACTUARIAL MATHEMATICS

The Department of Mathematics offers a Minor in Actuarial Mathematics for students whose majors are not mathematics. The goal of the Minor in Actuarial Mathematics is to provide the student with an introduction to statistics in general and actuarial mathematics in particular. This minor is closely related to the Minor in Statistics, but its focus is on actuarial mathematics.

TRANSCRIPT TITLE: Minor in Actuarial Mathematics

CATALOGUE DESCRIPTION: The Minor in Actuarial Mathematics is designed for students whose majors are not mathematics, but who wish to obtain sufficient mathematics and statistics so that they can have the option of going into the actuarial field.

The requirements entail 16 credits:

Math 241: Calculus III (4 credits)

One of the three pairs of 3-credit courses:

Math 461: Linear Algebra for Scientists and Engineers (3 credits)  (Math 240: Introduction to Linear Algebra, which has 4 credits, may be substituted for Math 461.)
Stat 470: Actuarial Mathematics (3 credits)

Recommended: Math 424 (Mathematics of Finance) and/or Stat 430 (Introduction to Statistical Computing and SAS).

Minor faculty coordinator: Professor Eric Slud, Dept. of Mathematics (evs@math.umd.edu)

DISCUSSION PERTAINING TO THE COURSES: The minor coursework begins with Math 241 (4 credits), which is the third of the 3-course sequence of calculus courses designed for physical science, engineering and mathematics students and which form the foundation for a mathematics major. The student will be required to complete four upper-level courses, three of which focus on statistics. First is the pair of statistics courses in (1), or the pair in (2), or the pair in (3):

1) Stat 400 and 401, which together introduce students to the basic topics in probability and statistics, such as random variables, standard distributions, the law of large numbers, unbiased and consistent estimators, interval estimation, analysis of variance, and maximum likelihood estimators, hypothesis testing, regression, and non-parametric methods.

2) Stat 410 and 420: Stat 410 provides an introduction to probability theory, including random variables, distribution functions, moments, limit theorems. Stat 420 presents theoretical concepts of statistics, such as sufficiency, completeness, the information inequality and optimal testing, and sets forth key methods of inference, such as the use of likelihood, least squares, and nonparametric methods.
(3) Stat 410 and 401: Stat 410 provides an introduction to probability theory, including random variables, distribution functions, moments, limit theorems. Stat 401 includes unbiased and consistent estimators, interval estimation, analysis of variance, and maximum likelihood estimators, hypothesis testing, regression, and non-parametric methods.

The student obtaining the Minor will be required to complete the following two courses:

Math 461: Math 461 is a course that provides the basic concepts of linear algebra: solutions to systems of linear equations, matrices, eigenvalues, and quadratic forms. Linear algebra is prerequisite for Stat 470 on actuarial mathematics. Although the 3-credit Math 461 exists primarily for science and engineering majors, it is not available for mathematics majors. Math 240, a 4-credit linear algebra course primarily for mathematics majors, can be substituted.

Stat 470: Stat 470 is an introduction to calculations of life-insurance premiums, including compound interest, probability distribution and expected values derived from life tables, regular probabilistic behavior of large populations, and expected values arising in insurance problems.

PRESENT CITATION IN ACTUARIAL MATHEMATICS:

Math 240: Introduction to Linear Algebra (4 credits)
Math 241: Calculus III (4 credits)

One 3-credit course in each pair:

Stat 470: Actuarial Mathematics (3 credits)

RELATION OF THE MINOR TO THE EXISTING CITATION IN STATISTICS: The coursework is identical with two small exceptions. Math 240 is in the present citation. Because it is designed mainly for mathematics and physics majors, we suggest Math 461, which is considered to be a very similar but is an upper-level mathematics course that has 3-credits. The other alteration occurs in selection of Stat 400, 401, 410, 420, where we have spelled out clearly which pairs are reasonable and thus are included in the requirement. The recommended courses, Math 424 (Mathematics of Finance) and Stat 430 (Introduction to Statistical Computing and SAS) are optional, and give information, both of a theoretical and a technical nature, that would be useful in actuarial work.

GRADES: The student will need to achieve at least a C- in each course for the Minor of Actuarial Mathematics.

OTHER ISSUES RELATED TO COURSEWORK:

(a) The Minor in Actuarial Mathematics is NOT open to Math Majors.

(b) A student may use a maximum of 2 courses to satisfy the requirements of both a major and a minor.
(c) No more than 1 of the courses required for the Minor may be taken at an institution other than the University of Maryland, College Park.

OVERSIGHT: Professor Eric Slud, of the Department of Mathematics, has been the departmental faculty coordinator and will continue with the Minor in Actuarial Mathematics. The Office of Undergraduate Studies keeps records and all information pertinent to the Minor as well as the students working toward the Minor. The Department of Mathematics expects to have a review of the Minor within a 5-year period.

EXCEPTIONS: First, concerning the number of courses (credits) taken off-campus, there is the quality control issue (not all multivariable calculus courses are quite equivalent, and other courses suffer from the same issue). Also, CMPS has a policy that classes designated for the mathematics major cannot be taken off-campus. The same should be true for minors, since some students expecting to get a minor may choose later to switch to a major. Second, because there are 3 and 4 credit courses in the requirement, it is clearer to specify the number of courses (2) that can be taken at a different institution, rather than the number of credits.

RESOURCE IMPLICATIONS: There are none known at this time.