GER 1 – MATHEMATICS AND QUANTITATIVE REASONING

Proposed revision to the description of GER 1 criteria:

Courses offered by the College in fulfillment of GER 1 must develop computational techniques in the context of problems that are pertinent to the experience and training of the students. The setting of these problems should be recognizable to an informed non-mathematician. The problems themselves must require mathematical tools for their analysis.

GER 1 Criteria:

Courses offered by the College in fulfillment of GER 1 must:

(a) involve numerical calculations;

(b) include mathematical justifications explaining why the approaches and calculations used in the course actually work;

(c) include applications of mathematics to real-world settings or to disciplines other than mathematics.

Elaboration:

The numerical calculations in (a) may be carried out by hand, using calculators, or using computers.

The justifications in (b) may be either mathematical proofs or careful analyses of the mathematical models used in the course, aimed at giving students experience in the process of creating appropriate mathematical models and/or understanding why one mathematical model of a given phenomenon is preferable to another.

The applications envisioned in (c) must be recognizable as such by an educated non-mathematician. It is not enough for a GER1 course to study a family of mathematical or statistical techniques that *could* be used in real-world problems. To meet GER1 goal (c), a course must show how the techniques *are* used in the study of real-world problems.

To qualify for approval, a GER 1 course must satisfy the following two requirements:

- A) Include BOTH mathematics and quantitative reasoning at its core. Thus, it is expected that numerical procedures (quantitative reasoning) will be accompanied by mathematical theory as justification; and
- B) Devote a significant amount of time to applications of the mathematical methods developed in the course.

Interpretative Guidelines:

1. Currently offered courses in the Mathematics Department that are most likely to satisfy GER 1 include the first course in calculus and the elementary probability course. But, in order to conform to Standard B, the Mathematics Department should ensure that its beginning courses offered for GER 1 credit will be heavily oriented toward applications. Specialized new courses in the department that are offered for GER 1 credit are expected to display practical content, not confine themselves solely to the development, however sophisticated, of a mathematical topic.

2. Mathematically oriented courses that might satisfy GER 1 are also found outside the Mathematics Department. Typically, such courses employ specialized tools and focus on discipline-specific applications, comprehensible only to those acquainted with the subject field. It is unlikely that a 3 or 4 hour course can accommodate an explanation of the peculiar quantitative needs of a discipline as well as a sound exposition of pertinent mathematical methods and still find time to provide reasonable practice in the application of those methods. It is anticipated, therefore, that courses offered for GER 1 credit by departments other than Mathematics, or by one of the Schools, will ordinarily have a subject matter prerequisite.

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