University of Hawai‘i - West O'ahu
General Education Foundations Requirement
Course Designation Proposal

To propose a course for acceptance as meeting the General Education Foundations hallmarks, submit this form along with a course outline to the UHWO General Education Committee by the proposal deadline. Check with your Division Chair for deadlines for each semester. If this is a new course, you must also submit Form CC1 to the Curriculum Committee at the same time for approval.

1. Course information

   Subject Alpha and Number: Math 112

   Any cross-listings: ______________________

   Course Title: Math for Elementary School Teachers II

   # of credits: 3

2. Indicate which Foundation designation(s) you are requesting

   _____ Global & Multicultural Perspectives (FG)
   (please circle subcategory: a, b, or c here, as defined in the hallmarks)
   __x__ Symbolic Reasoning (FS)
   _____ Written Communication (FW)

3. Official course description (limited to 75 words)

   This course is the second in the sequence of two math courses required for students in the K-6 B.Ed. degree program. The focus of this course is on mathematical content for teaching. This includes not only topics, ideas, skills and procedures in specific mathematical domains, but also the mathematical thinking and reasoning involved in the mathematical tasks that teachers do. Emphasis will be placed on problem solving, communication, representation, reasoning and proof, and mathematical connections.
4. **Hallmarks.** Explain in detail how this course meets each of the appropriate hallmarks.  
(a more detailed explanation of the hallmarks are located at the UHWO General Education website, [http://www.westoahu.hawaii.edu/gened](http://www.westoahu.hawaii.edu/gened))

To satisfy the Symbolic Reasoning (WS) requirement, a course will: Courses in Symbolic Reasoning (FS) should present symbolism as a means to facilitate reasoning and not merely as a technique to represent course content. They should engage students in the active use and application of symbolic techniques, but should not present the use of symbolization strategies and techniques in a strictly mechanical way. Rather, they should focus on presenting concepts and tools of symbolic reasoning to further understanding of the course material. The majority of a FS course should address issues of symbolic reasoning, and impart an appreciation of the power and clarity that such reasoning brings to our thinking and understanding. Courses that apply for the FS designation should meet all six hallmarks.

Math 112 will address the symbolic reasoning hallmarks in the following ways:

1. **Expose students to the beauty, power, clarity and precision of formal systems.**  
   Students will examine (including comparing and contrasting) several systems including the whole number system, the natural number system, the rational number system and the real number system, in terms of their associated mathematical definitions, relations, axioms, and theorems. By studying these things, students will be exposed to the beauty, power, clarity and precision of formal systems.

2. **Help students understand the concept of proof as a chain of inferences.**  
   As an emphasis of the course, students will study mathematical proofs, with a focus on what it means to "prove" something mathematically. Students will examine existing proofs and will be required to create simple mathematical proofs to conjectures such as "an odd number plus an odd number equals an even number."

3. **Teach students how to apply formal rules or algorithms.**  
   Students will re-examine the usual algorithms of arithmetic, as well as examine new algorithms such as the Euclidean algorithm for finding the greatest common divisor of two integers. The coverage of such topics will not only be on applying rules and algorithms, but also on understanding why and how such algorithms work, and, in instances, how they are related to one another.

4. **Require students to use appropriate symbolic techniques in the context of problem solving, and in the presentation and critical evaluation of evidence.**  
   Within every assignment, students will be required to utilize appropriate symbolic techniques in the context of problem solving, as well as use appropriate and accurate symbolic notation in presenting solutions and mathematical explanations.

5. **Not focus solely on computational skills.**  
   A primary goal of this course is to move beyond computational skills to a conceptual understanding of those computations, why they work, and how they are related. Students will learn several ways to model each of the basic arithmetic operations, and will be able to explain the hows and whys of their mathematical solutions.

6. **Build a bridge from theory to practice and show students how to traverse this bridge.**  
   The bridge from theory to practice will be traversed, and then some. A large part of learning mathematics for teaching is developing a profound understanding of how mathematical theory comes to life in its applications. The students learn not only the theory and what it means, but also how to apply it, and, furthermore, how to teach these things to others.
5. Please read this agreement, sign below and submit to Division chair for signature.
As Division Chair and Course Coordinator we understand that we are responsible for:
a) ensuring that all course instructors are aware of the course's Foundations designation,
b) providing the General Education committee with a complete list of the course's instructors and section numbers each semester, and
c) collecting and reviewing all course syllabi to make sure that all sections are taught in accordance with the Foundations Hallmarks each semester.

Division Chair
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Signature: ___________________________ Date: ____________________________

Course Coordinator
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Form CC1 and course outline attached.