Indiana University Bloomington
General Education Curriculum
Mathematical Modeling Course Proposal

Instructions

For each proposed course, please fill out this form, append a course syllabus, save the file, and send to the appropriate school academic officer (i.e., school/college official) by email as a PDF. The proposal file must be named according to the following convention:

Subject code <hyphen> letter prefix and course number <hyphen> GenEd category abbreviation.pdf

For example: MATH-M118-MM.pdf

Please be sure to complete **all five (5) pages** of the course proposal form.

The method for appending a file to a PDF varies depending your version of Adobe Acrobat or Adobe Reader. Please consult the instructions or help menu for your software. Do not attempt to use non-Adobe software to fill out this proposal form.

Note: Course proposals may not be submitted directly to the GenEd Committee by individuals or departments. All course proposals must be approved by the appropriate school, who will then forward the proposals to the GenEd Committee.

PART I: Course Information

Subject area (e.g., MATH-M): _____   **Catalog number (e.g., 118): _____**   **Credit hours: _____**

Course title: _____

Generic/variable-title course: ○ Yes   ○ No (If proposing a single topic of a generic course, please include topic title below.)

Topic title: _____

Bulletin description:

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Proposal submitted by

Department or Program: _____

School / College: _____   Date: _____

PART II: GenEd Learning Outcomes

Mathematical Modeling courses provide rigorous instruction in fundamental mathematical concepts and skills presented in the context of real-world applications. The modeling skills provide analytical methods for approaching problems students encounter in their future endeavors.

Learning Outcomes

Students proficient in Mathematical Modeling should demonstrate the ability to

1. create mathematical models of empirical or theoretical phenomena in domains such as the physical, natural, or social sciences;
2. create variables and other abstractions to solve college-level mathematical problems in conjunction with previously-learned fundamental mathematical skills such as algebra;
3. draw inferences from models using college-level mathematical techniques including problem solving, quantitative reasoning, and exploration using multiple representations such as equations, tables, and graphs.

PART III: Learning Outcomes for the Proposed Course

Please list below the student learning outcomes for the proposed course as they appear in the course syllabus. Alignment with GenEd MM learning outcomes should be evident. (NB. Syllabi for GenEd-approved courses must include a clear statement of the learning outcomes for the course.)

PART IV: Alignment of Course Learning Outcomes with GenEd Learning Outcomes

IU Bloomington GenEd Student Learning Outcomes for This Course

Below, please explain how each of the GenEd MM learning outcomes is addressed in the proposed course (e.g., readings, assignments, etc.). To be approved as a GenEd Foundations course (EC or MM), a course must meet all of the corresponding GenEd learning outcomes.

1. Students proficient in Mathematical Modeling should demonstrate the ability to create mathematical models of empirical or theoretical phenomena in domains such as the physical, natural, or social sciences.

2. Students proficient in Mathematical Modeling should demonstrate the ability to create variables and other abstractions to solve college-level mathematical problems in conjunction with previously-learned fundamental mathematical skills such as algebra.

3. Students proficient in Mathematical Modeling should demonstrate the ability to draw inferences from models using college-level mathematical techniques including problem solving, quantitative reasoning, and exploration using multiple representations such as equations, tables, and graphs.

PART V: Course Characteristics

Mathematical Modeling Course Characteristics

Mathematical Modeling courses provide rigorous instruction in fundamental mathematical concepts and skills presented in the context of real-world applications. The modeling skills provide analytical methods for approaching problems students encounter in their future endeavors.

Course Characteristics

1. Mathematical modeling courses

- are mathematics courses that either are required for students in the natural and mathematical sciences or address problems through mathematical models;

- emphasize mathematical rigor and abstraction, fundamental mathematical skills, and college-level mathematical concepts and techniques; teach how to develop mathematical models and draw inferences from them;

- include a full semester or equivalent of frequent and regular assignments that provide practice in mathematical modeling and mathematical techniques. Problems providing modeling practice

  o are phrased with limited use of mathematical notation and symbols;

  o require a formulation step on the part of the student;

  o require college-level mathematical techniques leading from the formulation to the conclusion;

  o have a conclusion that involves discovery or interpretation.

2. Courses approved for the Mathematical Modeling requirement must demonstrate and provide a system for consistency in instruction and in assessment of student achievement.

3. Courses approved for the mathematical modeling requirement should engage students with mathematical concepts and techniques that prepare them for a variety of possible future courses and degrees.

4. A course used to satisfy the Mathematical Modeling Foundations requirement may not double-count toward the Breadth of Inquiry Natural and Mathematical Sciences requirement.

Please explain how the proposed course exhibits the MM course characteristics. If proposing a generic (i.e., variable title) course for blanket approval, please explain how all topics/variable titles of this course exhibit MM course characteristics.

PART VI: Course Syllabus

A course syllabus must be appended to this proposal. The syllabus should indicate a clear and consistent connection between the elements of the course—i.e., course description, learning objectives, course readings, assignments, and assessments—and the GenEd MM learning outcomes and course characteristics.

You may also provide annotations, sample assignments, or additional explanation further highlighting the alignment of the course with the GenEd learning outcomes and course characteristics.

If proposing a variable title course for blanket approval, please append syllabi for at least three topics.