New Course Request

Indiana University
South Bend Campus

Check Appropriate Boxes:
Undergraduate credit [x] Graduate credit [ ] Professional credit [ ]

1. School/Division  Liberal Arts and Sciences
2. Academic Subject Code  MATH

3. Course Number  M111 (must be cleared with University Enrollment Services)
4. Instructor  Various

5. Course Title  Mathematics in the World

Recommended Abbreviation (Optional)  
(Limited to 32 Characters including spaces)

6. First time this course is to be offered (Semester/Year):  Fall 2005

7. Credit Hours: Fixed at 3 or Variable from ______ to ________

8. Is this course to be graded S-F (only)? Yes [ ] No [x]

9. Is variable title approval being requested? Yes [ ] No [x]

10. Course description (not to exceed 50 words) for Bulletin publication:
P: MATH-M 14 or Level 3 on Mathematics Placement Exam. Conveys spirit of mathematical languages of quantity; students apply concepts from algebra, geometry, management science, probability, and statistics, and use scientific software to analyze real world situations.

11. Lecture Contact Hours: Fixed at 3 or Variable from ______ to ________

12. Non-Lecture Contact Hours: Fixed at ________ or Variable from ________ to ________

13. Estimated enrollment: 120 per sen. of which 0 percent are expected to be graduate students.

14. Frequency of scheduling: every sem.  Will this course be required for majors? No ________

15. Justification for new course: Will satisfy the general education quantitative reasoning requirements at campuses in the IU system.

16. Are the necessary reading materials currently available in the appropriate library? Yes ______

17. Please append a complete outline of the proposed course, and indicate instructor (if known), textbooks, and other materials.

18. If this course overlaps with existing courses, please explain with which courses it overlaps and whether this overlap is necessary, desirable, or unimportant.

19. A copy of every new course proposal must be submitted to departments, schools, or divisions in which there may be overlap of the new course with existing courses or areas of strong concern, with instructions that they send comments directly to the originating Curriculum Committee. Please append a list of departments, schools, or divisions thus consulted.

Submitted by:

[Signature]  Date  4-12-05

Department Chairman/Division Director

[Signature]  Date

Dean of Graduate School (when required)

[Signature]  Date

Chancellor/Vice-President

[Signature]  Date

University Enrollment Services

After School/Division approval, forward the last copy (without attachments) to University Enrollment Services for initial processing, and the remaining four copies and attachments to the Campus Chancellor or Vice-President.

UPS 724  University Enrollment Services—White; Chancellor/Vice-President—Blue; School/Division—Yellow; Department/Division—Pink; University Enrollment Services Advance—White
To: CLAS Curriculum Committee
From: Anne Brown & Yi Cheng
Subject: MATH-M 111 course proposal
Date: April 8, 2005

- **Course Specifics**

  Title: *Mathematics in the world*
  Credit hours: 3

- **Prerequisites:**

  MATH-M 014 or equivalent, or Level 3 on the Mathematics Placement Examination

- **Course description**

  Conveys the flavor and spirit of mathematical languages of quantity; students apply concepts from algebra, geometry, management science, probability, and statistics, and use scientific software to analyze real world situations. Satisfies Liberal Arts and Sciences Languages of Quantity distribution requirement and General Education Requirements for baccalaureate degrees at Indiana University.

- **Topics**

  Proposed topics for MATH-M 111 are mainly from the topics of IU South Bend’s current MATH-M110 with some minor changes.

- **Note**

  Currently, the IU South Bend version of MATH-M 110 is taught at a higher level than the MATH-M 110 course taught at other IU campuses. We need the number and name changes to distinguish our offering from those at other campuses. Unlike MATH-M 110 at other campuses, the new IU South Bend MATH-M 111 will automatically satisfy the general education quantitative reasoning requirements at campuses in the IU system.

- **The outline of MATH-M 111**

  (See next page)
Outline of MATH-M111

Mathematics in the World

Department of Mathematical Sciences, IU South Bend

March 25, 2005


This is a course at the college level designed to convey the flavor and spirit of mathematical languages of quantity. Students will apply concepts from algebra, geometry, management science, probability, and statistics, and use scientific software to analyze real world situations. It satisfies the Liberal Arts and Sciences Languages of Quantity distribution requirement and the General Education Requirements for baccalaureate degrees at Indiana University.

1. **Probability and Statistics** (about 12 classes)
   - Basics in sampling, biased sampling methods, simple random sampling
   - Experiments and observational study. Randomized comparative experiments
   - Displaying data distribution: histograms, box-plot
   - Numerically describing center and spreading, mean, median, standard deviation, and quartiles
   - Relations between two random variables: scatter-plot, correlation coefficient, and regression
   - Basic in probability: sample space, events, probability rules
   - Probability models and mean of a probability model
   - Normal distribution: shape, quartiles, and the 68%-95%-99.7% rule
   - Central Limit Theorem and sampling distributions
   - Confidence intervals for population proportions and population means, margin of error

2. **Management Science** (about 10 classes)
   - Basics of graphs: vertices, links, valences, Euler circuits and Euler theorem
   - Traveling salesman problem, Hamiltonian circuits, nearest-neighbor & sorted-edges algorithms
   - Minimum cost spanning trees and Kruskal’s algorithm
   - Scheduling tasks: order-requirement digraph and list-processing algorithm
   - Mixture problems and linear programming

3. **On size and Shape** (about 6 classes)
   - Geometric similarity, the language of growth, enlargement, and decrease
   - Scaling real objects and solving the problems in scale
   - Golden ratio
   - Balance in symmetry
   - Analyzing patterns

Class evaluation will include weekly homework assignments, projects using software, quizzes, two midterm tests, and a final exam.