

LSC Use Only No:	LSC Action-Date:	UWUCC USE Only No.	UWUCC Action-Date:	Senate Action Date:
		02-87c	App - 3/18/03	App - 3/1/03

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

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Proposing Department/Unit Mathematics	Phone 7-2608

Check all appropriate lines and complete information as requested. Use a separate cover sheet for each course proposal and for each program proposal.

1. Course Proposals (check all that apply)

New Course Course Prefix Change Course Deletion

Course Revision Course Number and/or Title Change Catalog Description Change

MATH 430 Seminar in Teaching Secondary School Mathematics

Current Course prefix, number and full title Proposed course prefix, number and full title, if changing

2. Additional Course Designations: check if appropriate

This course is also proposed as a Liberal Studies Course. Other: (e.g., Women's Studies, Pan-African)

This course is also proposed as an Honors College Course.

3. Program Proposals

New Degree Program Program Title Change Other

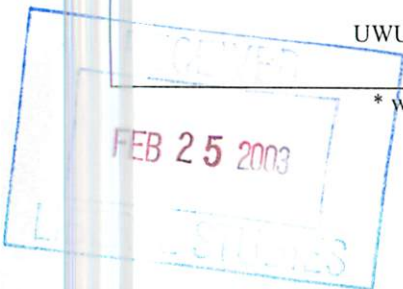
New Minor Program New Track

Catalog Description Change Program Revision

Current program name Proposed program name, if changing

4. Approvals		Date
Department Curriculum Committee Chair(s)	<i>Janet M. Walch</i>	2-7-03
Department Chair(s)	<i>Mary Stoudt</i>	2-7-03
College Curriculum Committee Chair	<i>[Signature]</i>	02/12/03
College Dean	<i>Jabon D. Eckel</i>	2/12/03
Director of Liberal Studies *		
Director of Honors College *		
Provost *		
Additional signatures as appropriate: (include title)	<i>Joseph Demerutis</i>	2-25-03
	<i>[Signature] - Dean COEET</i>	2-25-03
UWUCC Co-Chairs	<i>Gail Schiist</i>	3/18/03

* where applicable



I. Catalog Description

MATH 430 Seminar in Teaching Secondary School Mathematics

3 class hours

0 lab hours

Prerequisites: Junior Standing

3 credit hours

(3c-01-3cr)

Students in the class will gain insights into the teaching of general mathematics, algebra, geometry, probability, and statistics. Students will become aware of and use the resources and methods of instruction for teaching mathematics at the secondary level. Open to secondary mathematics education majors only and must be taken within two semesters prior to student teaching.

II. Course Objectives

Students will be able to:

1. Design appropriate learning activities involving a variety of mathematical topics to promote discovery among secondary school students.
2. Use real-world situations in the teaching of mathematics.
3. Do mathematics that engages the students as active participants.
4. Develop mathematical tasks that allow secondary school students to construct new meaning by building on or extending their prior knowledge.
5. Communicate mathematical ideas, concepts, and procedures in written, oral, symbolic, and pictorial forms, using mathematical reasoning to pose, explore and validate conjectures and arguments.
6. Pose questions and tasks that elicit, engage, and challenge thinking.
7. Use technology as a tool to promote mathematical thinking.

III. Course Outline

A. Teaching Middle School Mathematics:

6 hours

1. Arithmetic of whole numbers, rational numbers, and integers
2. Patterns and Relationships
3. Number Sense and Number Theory
4. Estimation

B. Teaching Algebra:

11 hours

1. Problem solving in algebra
2. Common misconceptions in algebra
3. Questions frequently asked in an algebra classroom
4. Uses and applications of algebra
5. Equations and inequalities
6. Coordinate representations and graphing calculators
7. Functions and their properties

Midterm

1 hour

C. Teaching Geometry:

12 hours

1. The van Hiele Model of geometric thought
2. Common misconceptions in geometry
3. Methods of teaching proof
4. Problem solving in geometry
5. Questions frequently asked in the geometry classroom
6. Geometric constructions
7. Uses and applications of geometry
8. Integration of algebra and geometry

D. Teaching Probability:

6 hours

1. Theoretical vs. experimental probability
2. Problem solving using fundamental counting principle
3. Uses and applications of probability
4. Geometric probability
5. Combinatorics

E. Teaching Statistics:

6 hours

1. Gathering, organizing, analyzing, and summarizing data
2. Measures of central tendency and dispersion
3. Uses and applications of statistics
4. Multiple representations of data
5. Integration of probability and statistics through simulations

F. Final Exam**IV. Evaluation Methods**

Grades will be based on quizzes, assignments, lesson plans, projects, class participation, mini-lessons, mid-term examination, and a comprehensive final examination.

The final grade will be determined as follows:

Class assignments and participation	40%
Lesson plans, presentations and mini-lessons, and self-critique	25%
Quizzes	15%
Midterm/Final Exams	20%

Grading Scale: A: 90-100%; B: 80-89%; C: 70-79%; D: 60-69%; F: below 60%

Students will write lesson plans that are consistent with the approved lesson-plan format. These lessons will be appropriate for teaching mathematics in the secondary schools.

Students will present mini-lessons appropriate for secondary schools, incorporating technology and other appropriate learning activities.

V. Attendance Policy:

Students are expected to attend class. The attendance policy will be defined by the instructor according to the University Course Attendance Policy.

VI. Required Textbook(s), Supplemental Books and Readings

Cangelosi, J. S. (2003). Teaching Mathematics in Secondary and Middle School: An Interactive Approach. (3rd ed.). Columbus, OH: Merrill/Prentice Hall Publishing Co.

Johnson, D. R. (1982). Every Minute Counts: Making Your Math Class Work. Parsippany, NJ: Dale Seymour Publishing Co.

Johnson, D. R. (1986). Every Minutes Counts Even More: A Sequel to Every Minute Counts. Parsippany, NJ: Dale Seymour Publishing Co.

Johnson, D. R. (1994). Motivation Counts: Teaching Techniques That Work. Parsippany, NJ: Dale Seymour Publishing Co.

VII. Special Resources or Requirements

Students are required to have a TI-83+ graphing calculator.

VIII. Bibliography

Boaler, J. (Ed.). (2000). *Multiple Perspectives on Mathematics Teaching and Learning*. Westport, CT: ABLEX Publishing Co.

Burrill, G. & P. Hopfensperger. (1999). *Exploring Systems of Inequalities*. White Plains, NY: Dale Seymour Publications.

Cooney, T. J., et. al. (1996). *Mathematics, Pedagogy, and Secondary Teacher Education*. Portsmouth, NH: Heinemann.

Cooney, T. J. (Ed.) (1990). *Teaching and Learning Mathematics in the 1990's*. Reston, VA: National Council of Teachers of Mathematics.

Crouse and Sloyer. (1987) *Mathematical Questions from the Classroom*. Janson Publications.

Davidson, N. (Ed.) (1990). *Cooperative Learning in Mathematics: A Handbook for Teachers*. Reading, MA: Addison-Wesley Publishing Co.

Friel, S. (Editor), (2001). *Navigating through Algebra in Grades 6-8*. Reston, VA: National Council of Teachers of Mathematics.

Heid, K. et. al. (1995). *Algebra in a Technological World. Addenda Series, Grades 9-12*. Reston, VA: National Council of Teachers of Mathematics.

Hopfensperger, P., & Kranendonk, H, & Scheaffer, R. (1999). *Probability Models*. Palo Alto, CA: Dale Seymour Publishing Co.

- Hopfensperger, P., & Kranendonk, H., & Scheaffer, R. (1999). *Probability Through Data*. Palo Alto, CA: Dale Seymour Publishing Co.
- Landwehr, J. & Watkins, A. E. (1996). *Exploring Data, Revised Edition*. Palo Alto, CA: Dale Seymour Publications.
- Lott, J. (Editor), (2001). *Navigating through Geometry in Grades 9-12*. Reston, VA: National Council of Teachers of Mathematics.
- Lott, J. (Editor), (2001). *Navigating through Algebra in Grades 9-12*. Reston, VA: National Council of Teachers of Mathematics.
- Lott, J. (Editor), (2001). *Navigating through Geometry in Grades 6-8*. Reston, VA: National Council of Teachers of Mathematics.
- Mager, R. (1984). *Preparing Instructional Objectives*. Belmont, CA: Pitman Learning, Inc.
- Mathematical Sciences Education Board. (1998). *High School Mathematics at Work*. Washington, DC: National Academy Press.
- Moses, B. (Ed.). (1999). *Algebraic Thinking, Grades 9-12*. Reston, VA: National Council of Teachers of Mathematics.
- Murdock, J., et. al. (2000). *Discovering Algebra, An Investigative Approach, Preliminary Edition*. Emeryville, CA: Key Curriculum Press.
- National Council of Teachers of Mathematics. *Addenda Series for Grades 5-8 and Grades 9-12*. Reston, VA: National Council of Teachers of Mathematics.
- National Council of Teachers of Mathematics. *Mathematics Teacher (MT)*. Reston, VA: National Council of Teachers of Mathematics.
- National Council of Teachers of Mathematics. *Mathematics Teaching in the Middle School (MTMS)*. Reston, VA: National Council of Teachers of Mathematics.
- National Council of Teachers of Mathematics. (1993) *Assessment Standards for School Mathematics*. Reston, VA: National Council of Teachers of Mathematics.
- National Council of Teachers of Mathematics. (1991). *Professional Standards for Teaching Mathematics*. Reston, VA: National Council of Teachers of Mathematics.
- National Council of Teachers of Mathematics. (1989). *Curriculum and Evaluation Standards for Teaching Mathematics*. Reston, VA: National Council of Teachers of Mathematics.
- National Council of Teachers of Mathematics. (2000). *Principles and Standards for School Mathematics*. Reston, VA: National Council of Teachers of Mathematics.

- National Council of Teachers of Mathematics. (1981). *Teaching Statistics and Probability: NCTM Yearbook*. Reston, VA: National Council of Teachers of Mathematics.
- Pennsylvania Department of Education (1994) *Mathematics Curriculum Framework*. Harrisburg, PA: Pennsylvania Department of Education.
- Phillips, E., et al. (1986). *Probability: Middle Grades Mathematics Project*. Menlo Park, CA: Addison-Wesley Publishing Co.
- Phillips, E., et al. (1986). *Spatial Visualization: Middle Grades Mathematics Project*. Menlo Park, CA: Addison-Wesley Publishing Co.
- Phillips, E., et al. (1986). *Mouse and Elephant: Middle Grades Mathematics Project*. Menlo Park, CA: Addison-Wesley Publishing Co.
- Phillips, E., et al. (1986). *Similarity and Equivalent Fractions: Middle Grades Mathematics Project*. Menlo Park, CA: Addison-Wesley Publishing Co.
- Phillips, E., et al. (1986). *Factors and Multiples: Middle Grades Mathematics Project*. Menlo Park, CA: Addison-Wesley Publishing Co.
- Serra, M. (1998). *Discovering Geometry, An Inductive Approach*. Emeryville, CA: Key Curriculum Press.
- Sobel, M. & Maletsky, E. (1988). *Teaching Mathematics: A Sourcebook of Aids, Activities, and Strategies* (2nd edition). Englewood Cliffs, NJ: Prentice Hall Publishing Co.
- Wah, A. & Picciotto, H. (1994). *Algebra*. Mountain View, CA: Creative Publications.

Course Analysis Questionnaire—MATH 430 Seminar in Teaching Secondary School Mathematics

Section A: Details of the Course

- A1 How does this course fit into the programs of the department? For what students is the course designed? (majors, students in other majors, liberal studies). Explain why this content cannot be incorporated into an existing course.

This course will be required of Secondary Mathematics Education majors. Currently these students are required to take two 1 credit seminars in teaching. These seminars are in the teaching of general mathematics, algebra, geometry, and probability and statistics and are offered on a rotating basis, one per semester. Students therefore often miss one or two of the seminars. With this new course all students will be introduced to methods of teaching in all five areas.

- A2 Does this course require changes in the content of existing courses or requirements for a program? If catalog descriptions of other courses or department programs must be changed as a result of the adoption of this course, please submit as separate proposals all other changes in courses and/or program requirements.

This course requires a change in the requirements for the B.S. Ed. in Secondary Mathematics Education. This course is part of the revised program proposal.

- A3 Has this course ever been offered at IUP on a trial basis (e.g. as a special topic) If so, explain the details of the offering (semester/year and number of students).

This course has not been offered at IUP.

- A4 Is this course to be a dual-level course? If so, please note that the graduate approval occurs after the undergraduate.

This course is not a dual level course.

- A5 If this course may be taken for variable credit, what criteria will be used to relate the credits to the learning experience of each student? Who will make this determination and by what procedures?

This course cannot be taken for variable credit.

- A6 Do other higher education institutions currently offer this course? If so, please list examples (institution, course title).

Ball State University, MATHS 395, Introduction to the Teaching of Mathematics
 East Stroudsburg, PSED 420/421, Seminar in Secondary Education I/II
 Edinboro, MATH 403, Mathematics for the Secondary School Teacher
 University of Illinois at Chicago, MthT 438/439 Educational Practice with Seminar I/II

- A7 Is the content, or are the skills, of the proposed course recommended or required by a professional society, accrediting authority, law or other external agency? If so, please provide documentation.

Content and skills are required by NCATE and the PDE.

7-12 Outcomes	
2.4	Programs prepare prospective teachers who can identify, teach, and model problem solving in grades 7-12.
2.5	Programs prepare prospective teachers who use a variety of physical and visual materials for exploration and development of mathematical concepts in grades 7-12.
2.6	Programs prepare prospective teachers who use a variety of print and electronic resources.
2.7	Programs prepare prospective 7-12 teachers who know when and how to use student groupings such as collaborative groups, cooperative learning, and peer teaching.
2.8	Programs prepare prospective teachers who use instructional strategies based on current research as well as national, state, and local standards relating to mathematics instruction.
2.9	Programs prepare prospective teachers who can work on an interdisciplinary team and in an interdisciplinary environment.
2.10	Programs introduce and involve prospective teachers in the professional community of mathematics educators.

Section B: Interdisciplinary Implications

- B1 Will this course be taught by instructors from more than one department? If so, explain the teaching plan, its rationale, and how the team will adhere to the syllabus of record.

This course will not be taught by instructors from more than one department.

- B2 What is the relationship between the content of this course and the content of courses offered by other departments? Summarize your discussions (with other departments) concerning the proposed changes and indicate how any conflicts have been resolved. Please attach relevant memoranda from these departments that clarify their attitudes toward the proposed change(s).

There is no relationship.

- B3 Will this course be cross-listed with other departments? If so, please summarize the department representatives' discussions concerning the course and indicate how consistency will be maintained across departments.

This course will not be cross-listed.

Section C: Implementation

- C1 Are faculty resources adequate? If you are not requesting or have not been authorized to hire additional faculty, demonstrate how this course will fit into the schedule(s) of current faculty. What will be taught less frequently or in fewer sections to make this possible? Please specify how preparation and equated workload will be assigned for this course.

Faculty resources are adequate. In fact, aside from pedagogical advantages, this course will also help the Mathematics Department deal with its loss of resources. Currently each semester the department offers EDUC 456 Teaching Math in the Secondary Schools and one 1 credit seminar in teaching. This new course will be offered every Spring, EDUC 456 will be offered every Fall, and the one credit seminars will no longer be offered. This still allows Secondary Mathematics Education majors to have a course discussing teaching secondary mathematics in the semester before student teaching whether they student teach in the Fall or Spring semester. It will also save the Mathematics Department two credits of faculty load each year.

- C2 What other resources will be needed to teach this course and how adequate are the current resources? If not adequate, what plans exist for achieving adequacy?

The resources needed to teach the course are adequate.

- C3 Are any of the resources for this course funded by a grant? If so, what provisions have been made to continue support for this course once the grant has expired? (Attach letters of support from Dean, Provost, etc.)

No resources are funded by a grant.

- C4 How frequently do you expect this course to be offered? Is this course particularly designed for or restricted to certain seasonal semesters?

This course will be offered every Spring semester. It is designed so that Secondary Mathematics Education majors will have a course discussing teaching secondary mathematics in the semester before student teaching whether they student teach in the Fall or Spring semester, since EDUC 456 will be offered every Fall semester.

- C5 How many sections of this course do you anticipate offering in any single semester?

One section every Spring semester.

- C6 How many students do you plan to accommodate in a section of this course? What is the justification for this planned number of students?

We plan to accommodate 24 students per section. This is based on the number of majors, the current enrollments in our seminars, and the maximum enrollment allowable to give each student ample opportunity for microteaching.

C7 Does any professional society recommend enrollment limits or parameters for a course of this nature? If they do, please quote from the appropriate documents.

No enrollment limits are recommended.

C8 If this course is a distance education course, see the Implementation of Distance Education Agreement and the Undergraduate Distance Education Review Form in Appendix D and respond to the questions listed.

This course is not a distance education course.

Section D: Miscellaneous

This course fits the Department's overall plan to comply with the 120 credit graduation requirement while functioning with fewer faculty positions. It does so with negligible impact on the mathematics content and opportunities for microteaching that our program requires.