LSC Use Only No:	LSC Action-Date:	UWUCC USE Only No. 10-71b	UWUCC Action-Date: App 4/26/11	Senate Action Date: App 9|13|11

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

Contact Person Mary Lou Metz	Email Address mlmetz@iup.edu
Proposing Department/Unit Mathematics	Phone 74759

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

__x__Course Revision   __x__Course Number and/or Title Change   __x__Catalog Description Change

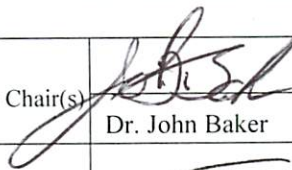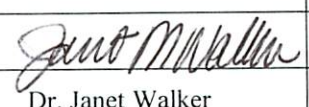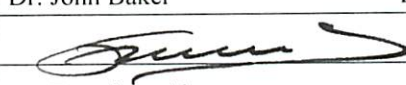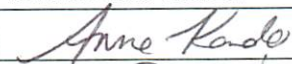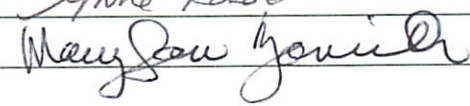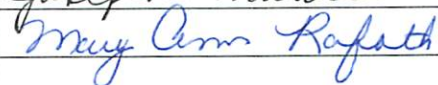| EDEX 221 Methods of Teaching Mathematics to Persons with Disabilities	EDEX 221 Methods of Teaching Mathematics to Secondary Students with Disabilities
Current Course prefix, number and full title	*Proposed course prefix, number and full title, if changing*

2. Additional Course Designations: check if appropriate

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

3. Program Proposals

_____New Degree Program   _____Catalog Description Change   _____Program Revision
_____New Minor Program   _____Program Title Change   _____Other
                                          _____New Track

Current program name	*Proposed program name, if changing*

4. Approvals | Date

Department Curriculum Committee Chair(s)	Dr. John Baker Dr. Janet Walker	
Department Chair(s)	Dr. Francisco Alarcon	11/30/10
College Curriculum Committee Chair	Anne Kondo	1/28/11
College Dean	Mary Lou Zanich	1/26/11
Director of Liberal Studies *		
Director of Honors College *		
Provost *		
Additional signatures as appropriate: (include title)	Joseph Domaracki TECC Mary Ann Rafath	3-1-11 3.3.11
UWUCC Co-Chairs	Gail Sechrist	4-26-11

* where applicable

1

PART II. DESCRIPTION OF THE CURRICULUM CHANGE

1. New Syllabus of Record

EDEX 221   Methods of Teaching Mathematics to Secondary Students with Disabilities   2c-0l-2cr

Prerequisites: EDEX 111
Semesters Taught: once per year

I. Catalog Description

Incorporates recent developments in curriculum and instructional techniques for planning and teaching mathematical concepts and skills to students at the secondary level with special needs. Emphasizes the development, use, and adaptation of manipulatives, visual aids, technology, and other appropriate supportive materials to enhance the conceptual understanding of mathematics by students with special needs. Intended for secondary education majors who will be working with special needs students at the secondary level in a variety of settings. May not be taken by secondary mathematics education majors.

II. Course Outcomes
The student will:
1.   develop the mathematical content knowledge necessary to teach mathematical concepts and skills to secondary students with disabilities (NOTE: This will be integrated within the remaining objectives.)
2.   examine modified and adapted mathematics curricula for secondary students with disabilities
3.   examine state and national mathematics standards, including Pennsylvania's Standards Aligned System (SAS)
4.   investigate theories of the many ways in which students learn mathematics, including the identification and remediation of mathematical misconceptions and errors
5.   investigate and practice implementing pedagogical methods for teaching mathematics to secondary students with disabilities including: whole group instruction, small group instruction, scaffolding, and differentiated instruction
6.   explore various evaluation and assessment methods, including formal and informal formative assessment, alternative assessments, and other types of assessments including those specified by PA's SAS
7.   develop, modify, and adapt materials, including appropriate manipulatives, for use in teaching mathematics concretely, pictorially, and symbolically to secondary students with disabilities
8.   use calculators, computers, and other appropriate technology in the teaching and learning of mathematics for secondary students with disabilities
9.   plan for effective universally designed mathematics instruction for secondary students with disabilities

RELATIONSHIP OF COURSE TO COLLEGE KNOWLEDGE BASE
The College of Education has developed its education program around the teacher as reflective practitioner/education researcher. Course activities, assignments, and readings reflect this theme by providing opportunities for students to engage in reflective and integrative thinking in relation to the instruction of mathematics. In addition, students will be asked to demonstrate knowledge of mathematical concepts at the secondary level, demonstrate the implementation of instructional strategies appropriate for secondary students with special needs, and plan for effective universally designed instruction.

Candidate competencies specified by the Pennsylvania Department of Education in the "PDE Framework for Special Education Program Guidelines" and the INTASC Standards that are addressed in this course are listed in the following matrix.

PDE Program Guidelines	INTASC STANDARDS	COURSE OUTCOME	ASSESSMENT OF OUTCOME
II. Cognition and Development of Students with Disabilities			
B. Individual learning differences	1, 2, 3, 7	4, 5	Plan for universally designed instruction
C. Cognitive development of diverse learners in a standards aligned system	1, 2, 3, 8	2, 3, 4, 7	Midterm, final
III. Assessment			
G. Use targeted formal and informal assessment tools	7, 8	6	Plan for universally designed instruction
H. Select, adapt, and modify assessments to accommodate the unique abilities and needs of individuals with disabilities	1, 3, 7, 8	6	Plan for universally designed instruction
I. Design, implement, and monitor student progress	4, 5, 7, 8	6	Plan for universally designed instruction
IV. Pedagogy			
A. Instructional strategies	1, 4	2, 3, 4, 5, 7, 8, 9	Math Resource Kit
B. Learning environments and social interactions	5	2, 3, 4, 5, 7, 8, 9	Midterm, Final
E. Instructional planning	1, 2, 4, 5, 7	2, 3, 5, 9	Plan for universally designed instruction
V. Inclusion in the least restrictive environment			
A. Least restrictive environment	5	2, 5, 9	Midterm, Final
B. Effective instructional strategies for students with disabilities in inclusive settings	1, 2, 3, 4, 7	3, 4, 5, 7, 8, 9	Math Resource Kit Plan for universally designed instruction
C. Inclusion in state academic standards	1, 2, 3	3, 9	Midterm, Final

III. **Course Outline**

    A. The Standards Aligned System in Mathematics   6 hours
       (outcomes 2, 3, and 6)
         1. Clear Standards
              a. Standards
              b. Assessment anchors
              c. Eligible content for grades 7-12
         2. Fair Assessments
         3. Curriculum Framework
         4. Instruction
         5. Materials and Resources
         6. Intervention
    B. Mathematical Concepts and Pedagogy   16 hours
       (outcomes 1, 4, 5, 7, 8, and 9)
         1. Procedural vs. conceptual understanding of mathematics
         2. Rational number concepts identified by national and state standards
              a. research on the learning of rational number concepts
              b. multiple representations using manipulatives, tables, graphs, symbols
              c. appropriate use of technology
              d. common misconceptions, errors, and learning difficulties
              e. instructional strategies for teaching to students with diverse learning needs
              f. planning universally designed instruction

i. adapting and modifying core curriculum
ii. using a variety of instructional approaches
iii. differentiating instruction
iv. integrating formal and informal formative assessment

3. Algebra concepts identified by national and state standards
    a. research on the learning of algebra concepts
    b. multiple representations using manipulatives, tables, graphs, symbols
    c. appropriate use of technology
    d. common misconceptions, errors, and learning difficulties
    e. instructional strategies for teaching to students with diverse learning needs
    f. planning universally designed instruction
        i. adapting and modifying core curriculum
        ii. using a variety of instructional approaches
        iii. differentiating instruction
        iv. integrating formal and informal formative assessment

4. Geometry concepts identified by national and state standards
    a. research on the learning of geometry concepts
    b. use of manipulatives
    c. appropriate use of technology
    d. common misconceptions, errors, and learning difficulties
    e. instructional strategies for teaching to students with diverse learning needs
    f. planning universally designed instruction
        i. adapting and modifying core curriculum
        ii. using a variety of instructional approaches
        iii. differentiating instruction
        iv. integrating formal and informal formative assessment

C.   Assessment   6 hours
(Outcomes 6 and 9)
1. Types of formative assessment
2. Alternative assessments
3. Adapting and modifying assessments

This syllabus covers 28 hours. The final is an additional 2 hours.

IV. Evaluation Methods

Students will demonstrate mastery of course objectives as demonstrated by successful completion of the following course requirements:

Homework and Class Activities	20%
Quizzes	10%
Outside Readings	10%
Math Resource Kit	10%
Plan for universally designed instruction	30%
Midterm exam	10%
Final Examination	10%

V. Grading Scale

The course grade will be interpreted from the total accumulated points according to the following scale:
    90 - 100% = A
    80 - 89% = B
    70 - 79% = C

60 - 69% = D
below 60% = F

VI. <u>Undergraduate Course Attendance Policy</u>

The course attendance policy is consistent with the University Course Attendance Policy.

VII. <u>Required Textbook</u>

None (Course Packet will be used)

VIII. <u>Special Resources Requirement</u>

Students must have access to a computer with an Internet connection.

IX. <u>Bibliography</u>

Alsopp, D.H., Kyger, M.M, & Lovin, L.H. (2007). *Teaching mathematics meaningfully: Solutions for reaching struggling learners.* Brookes Publishing Co.: Baltimore, MD.

Berch, D. B. and Mazzocco, M.M. (2007). *Why is math so hard for some children?* Brookes Publishing Co.: Baltimore, MD.

Flores, A. (Ed.) (2009). *Mathematics for every student: Responding to diversity, Grades 9 - 12.* NCTM: Reston, VA.

Huck, R., Myers, R., & Wilson, J. (2001). *ADAPT: A developmental activity program for teachers.* Allegheny Intermediate Unit: Pittsburgh, PA.

Hudson, P. & Miller, S.P. (2006). *Designing and implementing mathematics instruction for students with diverse learning needs.* Pearson Education, Inc.: Boston, MA.

Matulis, R. & Jacobs, K., (Eds.) (1991). *Diagnostic and prescriptive mathematics.* Harrisburg: Pennsylvania Department of Education.

National Council of Teachers of Mathematics. *Mathematics Teaching in the Middle School.* NCTM: Reston, VA.

National Council of Teachers of Mathematics. *Mathematics Teacher.* NCTM. Reston, VA.

National Council of Teachers of Mathematics. *Teaching Children Mathematics.* NCTM. Reston, VA.

National Council of Teachers of Mathematics (2000). *Principles and standards for school mathematics.* NCTM: Reston, VA.

Small, M. (2009). *Good questions: Great ways to differentiate mathematics instruction.* Teachers College Press: New York, NY and NCTM: Reston, VA.

Small, M. & Lin, A. (2010). *More good questions: Great ways to differentiate secondary mathematics instruction.* Teachers College Press: New York, NY and NCTM: Reston, VA.

Thornton, C. A. and Bley, N. S. (Eds.) (1994). *Windows of opportunity: Mathematics for students with special needs.* NCTM: Reston, VA.

2. Summary of Proposed Revisions

1. The course title has been revised.

2. The prerequisite courses have been revised.

3. The number of credits has been revised.

4. The catalog description has been revised.

5. The course outcomes have been revised.

6. The course outline has been revised.

7. The evaluation methods and bibliography have been updated.

3. Justification/Rationale for the Revision

The Pennsylvania Department of Education has recently changed teacher certification for special education. In the past students could choose special education as a major. This is no longer possible. Students must choose a dual certificate - either Pre K-8/Special Education, Reading Specialist/Special Education, or 7-12 Secondary Education/Special Education.

1. The focus of this course has changed from being taught for special education majors in the previous Special Education program to being taught for those Secondary Education majors, other than Mathematics Education majors, who wish to obtain 7-12 Secondary Education/Special Education certification. Therefore the course title is being revised to reflect the fact that these teachers will be working with secondary (7-12) students with special needs.

2. In the past, Special Education majors took MATH 151 as part of their program. Because Secondary Education majors do not take MATH 151, this has been eliminated as a prerequisite course.

3. The course has been reduced to 2 credits from 3 credits in order to help make it possible for students to complete a secondary education certification as well as a special education certification.

4. The catalog description has been revised to reflect the above changes in the Special Education program. In addition, the catalog description reflects the requirements of the Pennsylvania Department of Education's "Framework for Special Education: Grades Pre K-8 & 7-12 Guidelines."

5. The course outcomes have been revised to reflect the requirements of the Pennsylvania Department of Education for students seeking certification at the secondary level as specified in the "Framework for Special Education: Grades Pre K-8 & 7-12 Guidelines."

6. The course outline has also been revised to reflect the requirements of the Pennsylvania Department of Education for students seeking certification at the secondary level as specified in the "Framework for Special Education: Grades Pre K-8 & 7-12 Guidelines."

7. The evaluation methods and bibliography have been updated to reflect more appropriate methods of evaluation and more recent research and information on teaching students with special needs at the secondary level.

EDEX 221   METHODS OF TEACHING MATHEMATICS TO PERSONS WITH DISABILITIES   3 s.h.

Prerequisites: EX 111, MA 151
Semesters Taught: Spring and Fall

I.   COURSE DESCRIPTION

Incorporates recent developments in curriculum and instructional techniques for teaching <u>mathematical</u> concepts and skills. Emphasizes the development, use, and adaptation of manipulatives and visual aids to enhance the abilities of students with special needs.

II. COURSE OBJECTIVES

The student will:
1.   examine mathematics curriculum for K-12(354:IIC; CEC: Standard 2 & 7)
2.   investigate theories for learning and teaching mathematics (354:IJ; CEC: Standard 4);
3.   explore various methods of evaluation and assessment;(354: IG; CEC: Standard 8)
4.   scrutinize mathematics content, methods, evaluation and assessment for children with special needs (354: IG, II A: CEC: Standard 7 & 8);
5.   develop materials for use in teaching mathematics concretely, pictorially, and symbolically (354: IJ, II D; CEC: Standard 4, 5 & 7));
6.   use calculators and computers appropriately (354: IJ; CEC: Standard 4);
7.   write lesson plans, including objectives, methods, and evaluation (354: II C, II D; CEC: Standard 4, 5 & 7);
8.   practice teaching mathematical concepts and skills (354: II B; CEC: Standard 5 & 7).

Discipline Specific Standard/ Program Objective	Course Objective and Performance Indicator	Course Assessment Measuring Objective
1. Foundation		
2. Development & Characteristics	1	**Lesson Plans** Take Home Exam
3. Learning Differences		**Lesson Plans** Take Home Exam
4. Instructional Strategies	2, 5 & 7	**Lesson Plans** Take Home Exam
5. Environmental & Social Interaction	5, 7 & 8	**Lesson Plans** Take Home Exam
6. Communication		Oral Exam
7. Instructional Planning	1, 4, 5, 7 & 8	**Lesson Plans** Final Exam
8. Assessment	3 & 4	**Lesson Plans** Final Exam
9. Ethics		Final Exam
10. Collaboration		Final Exam

III. RELATIONSHIP OF COURSE TO COLLEGE KNOWLEDGE BASE

The College of Education has developed its education program around the teacher as reflective

practitioner/education researcher. Course activities, assignments, and readings reflect this theme by providing opportunities for students to engage in reflective and integrative thinking in relation to the instruction of mathematics. In addition, students will be asked to develop a both a short and long math lesson, a manipulative activity, and participate in a field experience related to this course.

IV. STRATEGIES USED

Lecture
Discussion
Simulation
Modeling
Cooperative Learning

V. COURSE OUTLINE

A. Pedagogy
1. What is mathematics? What mathematics is essential for students with special needs?
2. How do we learn? How do we learn mathematics? What is the Information Processing System?
3. What limits the learning of mathematics? Psychological, perceptual and cognitive processing deficits.
4. What is conceptual knowledge? What is procedural knowledge? How do we connect conceptual and procedural knowledge?
5. What methods of assessment and evaluation are used in mathematics classes?

B. Mathematical Concepts
6. Pre-number concepts: Sorting, classification, matching, one-to-one correspondence, comparison, seriation, patterning, directionality, and orientation
    Numbers and Numeration: Rote counting, skip counting, rational counting, reading and writing numerals, types of numbers
7. Operations on numbers: addition and subtraction Concepts and application in real life. Techniques for learning basic addition and subtraction facts. Place value using base ten blocks. Procedures. Paper and pencil computation. Estimation. Using calculators. Operations on numbers: multiplication and division. Concepts and application in real life. Techniques for learning basic multiplication and division facts. Procedures. Paper and pencil computation. Estimation. Using calculators. Measurement: Time. Money. Non-standard and standard measurements.
    Geometry and spatial sense. Identifying shapes. Finding perimeter, area, surface area, and volume. Using LOGO. Reading and following a map.
8. Organizing and interpreting data. Reading and making graphs.
9. Estimation
10. Calculators and computers

VI. COURSE REQUIREMENTS
Students will demonstrate mastery of course objectives as demonstrated by successful completion of the following course requirements:

Take-Home Exam	10%
Homework, Quizzes, &Class Participation	10%
5-Minute Activity (Objectives & Presentation)	10%
Math Box	10%

Field Experience & Report	10%
40-Minute lesson (Plan & Presentation)	10%
Oral Examination	10%
Final Examination	10%

VII. EVALUATION METHODS

The course grade will be interpreted from the total accumulated points according to the following scale:

90 - 100% = A
80 - 89% = B
70 - 79% = C
60 - 69% = D
below 60% = F

VIII. REQUIRED TEXT

Cawley, J. (1990). Developmental mathematics for thelearning disabled. Rockville: Aspen Systems.

IX. SUPPLEMENTAL REFERENCES

Huck, R., Myers, R., & Wilson, J. (1989). ADAPT: A developmental activity program for teachers. Allegheny Intermediate Unit: Pittsburgh, PA.

Lyon, S. R., Domaracki, J. W., Lyon, G. A., & Warsinske,S. G. (1990). Preparation for integrated community living and employment: Curriculum and program development. Harrisburg, PA: Mid-State Instructional Support Center.

X.REFERENCES

Ashlock, R. B. (1986). Error patterns in computation:A semi-programmed approach. Columbus, OH: Merrill.

Blankenship, C., & Lilly, M. S. (1981). Mainstreaming students with learning and behavior problems: Techniques for the classroom teacher. New York: Holt, Rinehart, and Winston.

Bley, N., & Thornton, C. (1981). Teaching mathematicsto the learning disabled. Rockville: Aspen Systems.

Boehm, A. E. (1979). Boehm resource guide for basic concept learning. New York: Psychological Corp.

Cawley, J. F., (1984). Developmental teaching of mathematics for the learning disabled. Austin, TX: PRO-ED, Inc.

Curriculum and evaluation standards for school mathematics. (1989). Reston, VA: The National Council of Teachers of Mathematics.

Dictionary of occupational titles (4th ed.). (1977). Washington, DC: U.S. Government Printing Office.

Evans, S. S., Evans, W. H., & Mercer, C. D. (1986). Assessment for instruction. Boston: Allyn & Bacon.

Glennon, V. J. (1981). The mathematical education of exceptional children and youth. Reston: National Council of Teachers of Mathematics.

Gorman, J., & Hughes, C. A. (1988). <u>Mathematics</u>. In P. J. Schloss, C. A. Hughes, & M. A. Smith (Eds.), <u>Community integration for persons with mental retardation</u> (pp. 17-76). Boston: College-Hill.

Langone, J. (1986). <u>Teaching retarded learners: Curriculum and methods for improving instruction</u>. Boston: Allyn and Bacon, Inc.

Matulis, R. & Jacobs, K., (Eds.) (1991). <u>Diagnostic and prescriptive mathematics</u>. Harrisburg: Pennsylvania Department of Education.

<u>The mathematical education of exceptional children and youth</u>. (1981). Reston, VA: National Council of Teachers of Mathematics.

Mueller, J., (Ed.) (1988). <u>Mathematics content in elementary school grades K-3</u>. Harrisburg: Pennsylvania Department of Education.

<u>Professional standards for teaching mathematics</u>. (1991). Reston, VA: The National Council of Teachers of Mathematics.

Reisman, F. K. (1982). <u>A guide to the diagnostic teaching of arithmetic</u>. Columbus: Merrill.

Reisman, F. K., Kauffman, M. D., & Samuel H. (1980). <u>Teaching mathematics to children with special needs</u>. Columbus: Merrill.

Richardson, L. I., Goodman, K. L., Hartman, N. N., & Lepique, H. C. (1980). <u>A mathematics activity curriculum for early childhood and exceptional children</u>. New York: Macmillan.

Silbert, J., Carnine, D., & Stein, M. (1981). <u>Direct instruction mathematics</u>. Columbus: Merrill.

<u>The slow learner in mathematics</u>. (1972). Reston: VA: National Council of Teachers of Mathematics.

Thornton, C. A., Tucker, B. F., Dorsey, J. A., & Bazik, E. P. (1983). <u>Teaching mathematics to children with special needs</u>. Menlo Park: Addison-Wesley.

Underhill, R. G., Uprichard, A. E., & Heddens, J. W. (1980). <u>Diagnosing mathematical abilities</u>. Columbus: Merrill.

Van de Walle, J. A., (1990). <u>Elementary school mathematics: Teaching developmentally</u>. New York: Longman.

White, J. P. (1990). <u>Materials and strategies for the education of trainable mentally retarded learners</u>. New York: Garland Publications.

PART III. LETTERS OF SUPPORT OR ACKNOWLEDGEMENT

From: Joseph W. Domaracki ,Ph.D.
To: Mary Lou Metz
Sent: Wednesday, October 06, 2010 12:34 PM
Subject: Re: EDEX 211

Mary Lou,

   Our program committee has reviewed the revisions to EDEX 221 Methods of Teaching Mathematics to Persons with Specail Needs. The EDEX Program faculty support the inclusion of EDEX 221 in the sequence of courses for teacher candidates seeking grade 7-12 Special Education Certification.
Joe

On 10/6/2010 10:27 AM, Mary Lou Metz wrote:
Thanks JOe. Can you send me an email saying you support the course revision so that I can include it with the proposal?

Thanks
ML

"No one gets rich teaching, but no one lives a richer life." ~Unknown

Mary Louise Metz, Ed. D.
Assistant Professor of Mathematics
Assistant Chairperson Mathematics Department
236 Stright Hall
Indiana University of PA
Indiana, PA 15705
(724) 357-4759