UWUCC/LSC via COE 4/09

LSC Use Only No:	LSC Action-Date:	UWUCC USE Only No.	UWUCC Action-Date:	Senate Action Date:
		09-24i	AP-10/27/09	App-12/1/09

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

Contact Person	Email Address
John D. Baker	jdbaker@iup.edu
Proposing Department/Unit	**Phone**
Mathematics	724-357-3795

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)

__X__New Course _____Course Prefix Change _____Course Deletion

_____Course Revision _____Course Number and/or Title Change _____Catalog Description Change

Current Course prefix, number and full title	*Proposed* course prefix, number and full title, if changing
	MATH 413 Methods of Teaching Mathematics at the Middle Level

2. Additional Course Designations: check if appropriate

_____ This course is also proposed as a Liberal Studies Course.

_____ This course is also proposed as an Honors College Course.

_____ Other: (e.g., Women's Studies, Pan-African)

3. Program Proposals

_____Catalog Description Change _____Program Revision

_____New Degree Program _____Program Title Change _____Other

_____New Minor Program _____New Track

Current program name	*Proposed* program name, if changing

4. Approvals		**Date**
Department Curriculum Committee Chair(s)	John D. Baker	3.26.9
Department Chair(s)	Dan Stowe	3-27-09
College Curriculum Committee Chair	John D. Eck	4/03/09
College Dean	John D. Eck	4/7/09
Director of Liberal Studies *		
Director of Honors College *		
Provost *		
Additional signatures as appropriate: (include title)	Joseph Domaracki TECC	9-1-09
	Mary Ann Rafoth COE-ET Dean	9-2-09
UWUCC Co-Chairs		
	Gail S Sechrist	10/30/09

* where applicable

Received
OCT 30 2009
Liberal Studies

Received
OCT 21 2009
Liberal Studies

Part II. Description of Curricular Change

1. Syllabus of Record

I. Catalog Description

MATH 413 Methods of Teaching Mathematics at the Middle Level — 3 lecture hours, 0 lab hours, 3 credits (3c-01-3cr)

Prerequisite MATH 152, MIDL 310

Examines the current curricula and methods of instruction used in middle level classrooms. Follows an investigative approach to middle level mathematics instruction through hands-on activities that are standards based. Explores methods of teaching in diverse classrooms and teaching students with special needs.

II. Course Outcomes

RELATIONSHIP OF COURSE TO COLLEGE CONCEPTUAL FRAMEWORK:
The College of Education has developed a teacher education program based upon a pre-service teacher who is competent in content and pedagogy. MATH 413 is a methods course which utilizes the student's knowledge of the mathematics content of the elementary and middle level grades as a vehicle to develop a pedagogical framework for learning to teach mathematics. In the course, students use a variety of materials for teaching, observe exemplary teachers, plan lessons, work with elementary and middle level children, and make journal entries. These activities help pre-service teachers become reflective practitioners who are capable of inquiry into a variety of methods of teaching mathematics while learning to collaborate and interact with their peers and with experienced teachers.

Students will:

1. examine and demonstrate an understanding of the scope and sequence of the elementary/middle level mathematics curriculum. *(PDE Guidelines II.B.1.e)*
2. investigate learning theories and methodology used in teaching mathematics in the elementary/middle level grades.*(PDE Guidelines II.B.1.b)*
3. prepare and teach lessons that implement a concrete and visual to abstract approach of teaching mathematics in the elementary/middle level grades. *(PDE Guidelines II.B.1.c)*
4. provide ways in which mathematics can be applied to a variety of real-world situations.*(PDE Guidelines II.B.6.b)*
5. make mathematical connections, enabling middle level students to recognize and use connections among ideas in mathematics, apply math in contexts outside of mathematics, and demonstrate their understanding of how mathematical ideas interconnect within and outside the discipline.*(PDE Guidelines II.B.1.e)*
6. examine the appropriate use of technology to develop number awareness and concepts in mathematics instruction and learning. *(PDE Guidelines II.B.6.f)*
7. illustrate awareness of multicultural and individual differences in mathematics and the benefits these differences can bring. *(PDE Guidelines I.E.2)*
8. examine assessment issues, options, and tools. *(PDE Guidelines II.F.8)*
9. examine the role of equity (high expectations and strong support for all students) including multicultural and individual differences. *(PDE Guidelines I.E.2)*

Course Outcome	College Conceptual Framework / Danielson	INTASC Standard/ Principle	NCATE/NCTM— Standards for Middle Level Mathematics Teachers	Course Assessment Measuring Outcome
1	1	1 – 4, 8	2.3, 1-5, 9-15	Quizzes, Projects, and Tests
2	1	1 – 4, 8	2.3, 8	Quizzes, Projects, and Tests
3	1, 2, 3, 4a	6-9	2.3, 3.1 - 3.5, 16	**Key Assessment: Practice Teaching Project**
4	1	1, 7	2.3, 1 4	Quizzes, Projects, and Tests
5	1	1, 7	2.3, 4	Quizzes, Projects, and Tests
6	1		2.3, 6	Quizzes, Projects, and Tests
7	2	3-5	3.2, 8.1	Projects
8	3	8	2.3, 4.0, 7.7	Quizzes, Projects, and Tests
9	1, 2	3	3, 7	Quizzes, Projects, and Tests

III. Course Outline/Time Schedule

A. Development of Pedagogy *(Outcome #1, #5,#6, #7, #8, #9)* 12 hrs

1. Constructivism and instruction via problem solving
2. Assessment in the middle-level mathematics classroom
3. The role of affect and culture in learning mathematics
4. Working with diverse populations including students with special needs and English Language Learners (Students with special needs 3 hours; English Language Learners 3 hours)
   The general methods in the text are appropriate for learners with special needs and for English-Language Learners (ELL). The text addresses specific issues in teaching on pp. 20-29. Additional curriculum will be drawn from the other two required textbooks and from references marked with an asterisk.
5. Cooperative learning in the middle-level mathematics classroom
6. Current trends in teaching mathematics
7. Standards at the state and national level
8. Various curricula used in middle-level classrooms
9. Technology in the middle-level mathematics classroom

B. Methods in Teaching Number Concepts *(Outcome #2, #4)* 12 hrs

1. Mathematical operations with real numbers
2. Patterns and functions
3. Variables and equations

4. Rational and irrational numbers
5. Proportional reasoning
6. Fractions, decimals, and percents
7. Teaching number concepts to students with special needs and ELL students (*3 hours*)

   From Bresser, R., Melanese, K., & Sphar, C. *Supporting English Language Learners in Math Class, Grades 3-5*, the following chapters will be assigned: Chapter 6 pps. 81-104, Chapter 8 pps.130-137, and Chapter 9 pps. 138-162.
   Montague, M. & Jitendra, A. K. *Teaching mathematics to middle school students with learning difficulties*, the following chapters will be assigned: Chapter 3 pps. 51-71 and Chapter 4 pps. 72-88.

C. Methods in Teaching Non-Number Concepts *(Outcome #2, #4)* 12 hrs
1. Measurement concepts
2. Geometric thinking and geometric concepts
3. Similarity and congruence
4. The Pythagorean Theorem
5. Data Analysis and Probability
6. Coordinate geometry
7. Teaching non-number concepts to students with special needs and ELL students (*3 hours*)

   From Bresser, R., Melanese, K., & Sphar, C. *Supporting English Language Learners in Math Class, Grades 3-5*, the following chapters will be assigned: Chapter 2 pps. 18-36, Chapter 3 pps. 37-49, Chapter 4 pps. 50-57, Chapter 5 pps. 58-80, and Chapter 7 pps. 105-129.
   Montague, M. & Jitendra, A. K. *Teaching mathematics to middle school students with learning difficulties*, the following chapters will be assigned: Chapter 5 pps. 89-107 and Chapter 7 pps. 133-153.

D. Teaching a Mathematics Lesson *(Outcome #3)* 3 hrs
1. Planning for developmental instruction.
2. Examining teacher resources and classroom textbooks.
3. Teaching a mathematics lesson.

This syllabus covers 39 hours leaving 3 hours for testing and/or review. The final is an additional 2 academic hours.

IV. Evaluation Methods

Class work / participation / daily work		30%
Presentations / projects / portfolios / journals		20%
Practice Teaching Project	***(Key Assessment)***	20%
Midterm and final exams		30%

The Practice Teaching Project is the key assessments and shall be required of all instructors.

V. Grading Scale

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

VI. Attendance Policy

The course attendance policy is consistent with the university policy.

VII. Required Textbooks

Bresser, R., Melanese, K., & Sphar, C. (2008). *Supporting English Language Learners in Math Class, Grades 3-5*. Sausalito, CA: Math Solutions Publications.

Johnson, A., & Norris, K. (2006). *Teaching today's mathematics in the middle grades*. Boston: Pearson Education.

Montague, M. & Jitendra, A. K. (2006). *Teaching mathematics to middle school students with learning difficulties*. New York: The Guildford Press.

VIII. Special Course Requirement

None.

IX. Bibliography

Brahier, D. J. (2001). *Assessment in middle and high school mathematics: A teacher's guide.* Larchmont, NY: Eye on Education.

Bassarear, T. (2001). *Mathematics for Elementary School Teachers*. Boston: Houghton Mifflin.

Bennett, A. B & Nelson, L. T. (2004). *Mathematics for elementary teachers: A conceptual approach*. Boston: McGraw-Hill.

*Bley, N.S. & Thornton, C.A. (2001). *Teaching mathematics to students with learning disabilities, 4th Edition*. Austin, TX: ProEd.

Brumbaugh, D. K., Ortiz, E., & Gresham, R. H. (2006). *Teaching middle school mathematics*. Mahwah, NJ: Lawrence Erlbaum Associates.

Burns, M. (2000). *About teaching mathematics: A K-8 resource*. Sausalito, CA: Math Solutions Publications.

Driscoll, M. J. *Research within Reach*. Reston, VA: NCTM.

Cangelosi, J. S. (2003). *Teaching mathematics in secondary and middle school: An interactive approach.* Upper Saddle River, NJ: Prentice Hall.

*Coggins, D., Kravin, D., Coates, G., & Carroll, M. (2007). *English language learners in the mathematics classroom.* Thousand Oaks, CA: Corwin Press.

Cooney, T. & Hirsch, C. R. (Eds.) (1990). *Teaching and learning mathematics*. Reston, VA: NCTM.

* Echevarria, J., Vogt, M., & Short, D. (2008). *Making content comprehensible for English learners: The SIOP model.* Boston: Pearson.
*Huerta-Macias. (2005). *Working with English language learners: Perspectives and practice.* Dubuque, IA: Kendall/Hunt Publishing.
Johnson, A., & Norris, K. (2006). *Teaching today's mathematics in the middle grades.* Boston: Pearson Education.
* Kersaint, G., Thompson, D., & Petkova, M. (2009). *Teaching mathematics to English language learners.* NY: Routledge.
Krulik, S., Rudnick, J. A., Milou, E. (2002). *Teaching mathematics to middle school students.* Boston: Allyn & Bacon.
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Kulm, G. (2008). *Teacher knowledge and practice in middle grades mathematics.* Rotterdam, Netherlands: Sense Publishers.
National Council of Teachers of Mathematics. *Teaching Children Mathematics.* Reston, VA: NCTM.
National Council of Teachers of Mathematics. (2008). Mathematics for every student: Responding to diversity, grades 6-8. Reston, VA: NCTM.
National Council of Teachers of Mathematics. (2000). *Mathematics assessment: A practical handbook for grades 6-8.* Reston, VA: NCTM.
National Council of Teachers of Mathematics. *Yearbooks.* Reston, VA: NCTM.
National Council of Teachers of Mathematics. *Mathematics Teaching in the Middle School.* Reston, VA: NCTM.
National Council of Teachers of Mathematics. *Principles and Standards for School Mathematics, Navigations Series.* Reston, VA: NCTM.
National Council of Teachers of Mathematics. (2000) *Principles and standards for school mathematics.* Reston, VA: NCTM.
Tucker, B. F, Singleton, A. H., & Weaver, T. L (2002). *Teaching mathematics to all children: Designing and adapting instruction to meet the needs of diverse learners.* Upper Saddle River, NJ: Pearson Education, Inc.
Rubenstein, R. N., Beckmann, C. E., and Thompson, D. R. (2008). *Teaching and Learning Middle Grades Mathematics* (2nd ed.). New York: Key Curriculum Press.
Sherman, H. J., Richardson, L. I, & Yard, G. J. (2009). *Teaching learners who struggle with mathematics,* (2nd ed.). Upper Saddle River, NJ: Pearson Education, Inc.
Van De Walle, J. (2010). *Elementary and middle school mathematics: Teaching developmentally* (7th ed.). New York: Pearson – Allyn and Bacon.
* Vogt, M. & Echevarria, J. (2008). *99 ideas and activities for teaching English learners: The SIOP model.* Boston: Pearson.

2. Course Analysis Questionnaire

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 is one of the Professional Core courses for the Middle Level Grade 4-8 certification program. All students in this course should be seeking certification as a middle level teacher. This content is the only math methods course in the Middle Level Program.

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 is a newly-developed course to satisfy the PDE requirements for middle level teachers.

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).

No.

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

This 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 is a three-credit course that cannot be taken for variable credit.

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

Other higher education institutions may be offering a similar math methods course to meet the PDE requirements for teacher certification, but not this one.

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.

The Pennsylvania Department of Education is changing the requirements for certification. This course would prepare teachers to assist learners in grades 4-8 with math skills.

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 be delivered by instructors from the Mathematics 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).

This course does not conflict with any other math methods or content course offered by any other department.

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 with any other department. The course will only be taken by undergraduate students pursuing a teaching certification in Middle Level Grades 4-8.

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 to teach this course are adequate.

Currently the Mathematics Department offers six Elementary Education "Mathematics Concentrate" courses per year (three per semester). Under the proposed Middle School Mathematics Certification program, students are required to take six of these concentrate courses, along with two new courses, MATH 153 and MATH 413, during their last five semesters of study (not including the student teaching semester). By offering four concentrate courses per year, along with MATH 153 and MATH 413 once per year, Middle School Certification students can meet their requirements, and so can our current M.Ed. in Elementary and Middle School students. This rotation plan should also ensure adequate enrollment in the concentrate courses. It is anticipated that there would be no more than 60 Middle School Mathematics Certification students at IUP at any given time, although if this number should increase significantly, additional resources would be required. This plan to substitute six concentrate courses per year with four concentrate courses plus the two new courses keeps the resources needed the same as we use now.

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? Reply in terms of the following:

*Space
*Equipment
*Laboratory Supplies and other Consumable Goods
*Library Materials
*Travel Funds

No other resources would be needed to teach this course.

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.)

There are no grant resources allocated for this course.

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

It is possible for at least one section of this course to be offered each year.

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

One section of the course may be offered in any one 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?

It is anticipated that there would be 10-20 students in one section of the course. For hands-on activities and other interactive teaching strategies, for presentations and field experiences, 20 is an ideal number.

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.

There is no professional society that limits the enrollment of this course.

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.

Part III. Letters of Support or Acknowledgement

Professional Studies

Professional Studies in Education Department
303 Davis Hall
Indiana, Pennsylvania 15705
724-357-2400

March 30, 2009

To Whom It May Concern:

I am writing in reference to two proposed new courses (i.e., MATH 153 and MATH 413) in the Department of Mathematics that will be an integral part of the newly designed Middle Level certification and degree program, with specialization in Mathematics, in our department.

The Professional Studies in Education faculty has collaborated successfully during the past year to develop this program and we are very familiar with the courses and the proposed changes. The program will offer a new degree program in Middle Level Education with a specialization in Mathematics and certification to teach at the middle level (i.e., 4th Grade through 8th Grade). This program and the courses in it, including MATH 153 and MATH 413) have been developed in response to the teacher certification changes dictated by the Pennsylvania Department of Education. The proposed new program and these courses are necessary for IUP to maintain its position as the pre-eminent preparation institution for new teachers in Pennsylvania.

The proposed new courses have the full and unqualified support of the Department of Professional Studies in Education, and we encourage all relevant entities (i.e., UWUCC and the University Senate) to approve the proposed revisions.

Please feel free to contact me if you have a need for additional information, or if you have any questions.

Sincerely,

George R. Bieger

George R. Bieger, Ph.D.
Professor and Acting Chairperson