Agenda Item #15-128
Effective Fall 2016

Eastern Illinois University
Revised Course Proposal
MAT 2420G, Mathematics for Elementary Teachers II

Banner/Catalog Information (Coversheet)

1. **____New Course or __x___Revision of Existing Course**
2. **Course prefix and number:** MAT 2420G
3. **Short title:** Math for Elem Teachers II
4. **Long title:** Mathematics for Elementary Teachers II
5. **Hours per week:** _3__ Class __0_ Lab _3__ Credit
6. **Terms:** _x__ Fall _x__ Spring ___ Summer ___ On demand
7. **Initial term**: _x__ Fall ___ Spring ___ Summer Year: 2016
8. **Catalog course description:** Study of geometric relationships using a problem solving approach. Topics include geometry and measurement. Open only to early childhood, elementary, middle level, or special education majors. M1 903
9. **Course attributes:**

   General education component: ___Mathematics_____

   ___ Cultural diversity ___ Honors ___ Writing centered ___ Writing intensive ___Writing active

10. **Instructional delivery**
    Type of Course:

    _x__ Lecture ___ Lab ___ Lecture/lab combined ___ Independent study/research

    ___ Internship ___ Performance ___ Practicum/clinical ___ Other, specify: _____

    Mode(s) of Delivery:

    _x__ Face to Face ___ Online ___ Study Abroad

    ___ Hybrid, specify approximate amount of on-line and face-to-face instruction_____

11. Course(s) to be deleted from the catalog once this course is approved. ___None_____
12. **Equivalent course(s):** __None_____

    1. **Are students allowed to take equivalent course(s) for credit?** ___ Yes _x__ No

13. **Prerequisite(s):** MAT 1420, with a grade C or better. This course may not be taken by students with a high school mathematics deficiency that has not been removed.

    1. **Can prerequisite be taken concurrently?** ___ Yes _x__ No
    2. **Minimum grade required for the prerequisite course(s)? _C__**
    3. **Use Banner coding to enforce prerequisite course(s)?** _x__ Yes ___ No

4. **Who may waive prerequisite(s)?**

___ No one _x__ Chair ___ Instructor ___ Advisor ___ Other (specify)

14. **Co-requisite(s):** None

15. **Enrollment restrictions**

1. **Degrees, colleges, majors, levels, classes which <u>may</u> take the course:** Early childhood education, elementary education, middle level education, special education

2. **Degrees, colleges, majors, levels, classes which may <u>not</u> take the course:** Non- Early childhood education, elementary education, middle level education, special education majors

16. **Repeat status:** _x__ May not be repeated ___ May be repeated once with credit

17. **Enter the limit, if any, on hours which may be applied to a major or minor:** ___

18. **Grading methods:** _x__ Standard ___ CR/NC __ Audit ___ ABC/NC

19. **Special grading provisions:**

___ Grade for course will <u>not</u> count in a student's grade point average.

___ Grade for course will <u>not</u> count in hours toward graduation.

___ Grade for course will be removed from GPA if student already has credit for or is registered in: _____

___ Credit hours for course will be removed from student's hours toward graduation if student already has credit for or is registered in: _____

20. **Additional costs to students:**
Supplemental Materials or Software_____None_____

Course Fee _X_No ___Yes, Explain if yes_____

21. **Community college transfer:**

_x__ A community college course may be judged equivalent.

___ A community college may <u>not</u> be judged equivalent.

Note: Upper division credit (3000+) will <u>not</u> be granted for a community college course, even if the content is judged to be equivalent.

Rationale, Justifications, and Assurances (Part I)

1. _x__Course is required for the major(s) of _ Early childhood education, elementary education, middle level education, special education

   ___Course is required for the minor(s) of _____

   ___Course is required for the certificate program(s) of _____

   ___ Course is used as an elective

2. **Rationale for proposal**: The state of Illinois has issued new mathematics requirements for future elementary and future middle level teachers. In addition to additional geometry topics, a range of statistical and probability topics will now be required. Currently, MAT 2420G does not deal with all the geometry content it needs to in order to meet state requirements. Additionally, MAT 2420G currently includes some topics from probability and statistics. In order to meet state requirements, all statistics and probability topics are being removed from MAT 2420G to make room for the additional geometry content. Those topics comprise part of the New Course Proposal for MAT 2620.

3. **Justifications for (answer N/A if not applicable)**

   Similarity to other courses: N/A

   Prerequisites: The state of Illinois requires all teacher candidates to earn grades of 'C' or better in all degree coursework. MAT 1420 provides the foundation in number sense and lays the groundwork for discussing mathematical content in the context of preparing elementary teachers.

   Co-requisites: N/A

   Enrollment restrictions: N/A

   Writing active, intensive, centered: N/A

4. **General education assurances (answer N/A if not applicable)**

   General education component:

   Critical Thinking – Students will

   - work with geometric ideas from diverse perspectives, especially as it relates to the parallel postulate for Euclidean geometry (CT-1).
   - gather information about geometric ideas from a variety of sources that represent a variety of grade levels (CT-2).
   - interpret and develop definitions of core geometric ideas (CT-3).
   - synthesize their knowledge of geometry through experiences with content using a variety of tools (CT-4).
   - recognize that geometric ideas build on each other to create a complete logical system of study (CT-5).
   - produce and create proofs of geometric propositions (CT-6).

Writing and Critical Reading – Students will

- analyze work samples, articles, and other related documents to evaluate the usefulness and appropriateness of the work as it relates to geometric reasoning (WR-2).
- Solve problems in geometry and justify their ideas in written form (WR-2)
- Write a coherent geometric argument or proof using appropriate diagrams and symbols that is clear and well-organized (WR-3)
- differentiate between the language of geometry at the collegiate level and at the elementary level (WR-4).
- write about their reasoning using proper geometric terminology (WR-4).
- Interpret geometric shapes and diagrams, identifying key features and properties (WR-5)
- Interpret formulas from both geometric and algebraic perspectives (WR-6)

Speaking and Listening – Students will

- use varying standards for justification and proof as they are appropriate for different grade levels (SL-2)
- support their reasoning about geometric ideas by supporting those ideas with relevant theorems and other facts (SL-3).
- Use precise language and definitions when discussing geometric ideas (SL-4)
- Interpret, question and debate other students' geometric reasoning and proofs (SL-7)

Quantitative Reasoning – Students will

- calculate and measure a variety of attributes using a variety of tools (QR-1).
- solve problems using appropriate geometric methods, assumptions, propositions, formulas, propositions, and theorems (QR-2).
- produce and use different representations of geometric ideas and do so using a variety of tools (QR-3).
- read, experience, and analyze student work samples (QR-4).
- produce correct proofs and results based on geometric principles (QR-5).
- use a variety of tools to explore several different geometric ideas and topics (QR-6).

Responsible Citizenship – Students will

- connect what they have experienced to the current set of state mathematics standards (RC-4).
- engage with different tools for learning and show how each tool contributes to a different understanding of what is learned (RC-4);
- experience what is developmentally appropriate concerning geometric ideas at different grade levels (RC-4).

Curriculum: The curriculum of the course is centered on topics in geometry that both are relevant to the pre-service elementary teacher and attempt to extend understanding of geometry learned in high school. To that end, the curriculum is based on investigation and non-passive engagement with course topics. The book adopted for the course comes with an activities and explorations manual. Critical thinking and quantitative literacy are well represented in the curriculum through these explorations and activities. Additional learning goals are reflected in the work and explanations required for course activities.

Instruction: The instructional philosophy of the course is somewhat driven by the current state standards which include a set of mathematical practices. The mathematical practices are a set of tools for teaching and learning mathematics content and appear to be closely related to the general education learning goals. The mathematical practices are – (a) make sense of problems and persevere in solving them, (b) reason abstractly and quantitatively, (c) construct viable arguments and critique the reasoning of others, (d) model with mathematics, (e) Use appropriate tools strategically, (f) attend to precision, (g) look for and make use of structure, and (h) look for and express regularity in repeated reasoning. Students are made aware of these practices and many, if not all, course activities and assignments address these practices to varying degrees throughout the course.

Assessment: Assessments will mostly reflect the quantitative literacy and critical thinking learning goals through standard types of problems and problem solving activities one might expect in a mathematics class. However this class also assesses the ability of students to synthesize course experiences so that they may reflect upon themselves as future educators. Assessments of this nature may take the form of article analysis, presentations, and analysis of student work samples. The composition of a course grade will naturally vary from one instructor to another, but it is quite common for assessments to comprise at least a one-third of a student's course grade.

Online/Hybrid delivery justification & assurances (answer N/A if not applicable)

Online or hybrid delivery justification: N/A

Instruction: N/A

Integrity: N/A

Interaction: N/A

Model Syllabus (Part II)

1. **Course number and title:**

   MAT 2420G Mathematics for Elementary Teachers II

2. **Catalog description:**

   Study of geometric relationships using a problem solving approach. Topics include geometry and measurement. Open to early childhood, elementary, middle level, or special education majors. M1 903

3. **Learning objectives:**

Students will be able to-

- Apply facts about angles produced by configurations of lines to find angles
- Give the definition of circles, spheres, triangles, quadrilaterals, polyhedra, and more
- Investigate relationships with compass & straightedge (or technological equivalent) constructions
- Determine the location of a shape after a transformation has been applied

- Create designs that have specified symmetries
- Describe and apply criteria for congruence
- Explain and use the process for calculating perimeter, area, and volume of various shapes
- Recognize and graph conic sections

4. Course materials:

Mathematics for Elementary School Teachers, 5th Edition **by Thomas Bassarear**

5. Weekly outline of content:

Week 1
Angles, Circles, and Spheres
Week 2
Triangles, Quadrilaterals, and Other Polygons
Week 3
Constructions with Straightedge & Compass/Technological tools
Week 4
Polyhedra and Other Solid Shapes
Week 5
Transformational Geometry
Week 6
Transformational Geometry
Week 7
Symmetry
Week 8
Similarity
Week 9
Congruence
Week 10
Measurement, Dimension
Week 11
Length, Perimeter
Week 12
Areas of triangles and quadrilaterals, Cavalieri's Principle
Week 13
Area and Volume
Week 14
Pythagorean Theorem
Week 15
Conic sections
Week 16
Final Exam

6. Assignments and evaluation, including potential weights for final course grade.

Explorations/Homework (30%)
Quizzes/Tests (30%)
Final Exam (40%)

7. Grading Scale:

Final grades will be given on a A, B, C, D, F Scale.

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

8. Correlation of learning objectives to assignments and evaluation.

	Explorations/Homework (30%)	Quizzes/Tests (30%)	Final Exam (40%)
Apply facts about angles produced by configurations of lines to find angles	✓	✓	✓
Give the definition of circles, spheres, triangles, quadrilaterals, polyhedra, and more	✓	✓	✓
Investigate relationships with compass & straightedge (or technological equivalent) constructions	✓		
Determine the location of a shape after a transformation has been applied	✓	✓	✓
Create designs that have specified symmetries	✓	✓	
Describe and apply criteria for congruence	✓	✓	✓
Explain and use the process for calculating perimeter, area, and volume of various shapes	✓	✓	✓
Recognize and graph conic sections	✓	✓	✓

Date approved by the department or school: April 6, 2015
Date approved by the college curriculum committee: September 4, 2015
Date approved by the Honors Council *(if this is an honors course):*
Date approved by CAA: September 24, 2015 **CGS:** Not Applicable