

Term Information

Effective Term Autumn 2014

General Information

Course Bulletin Listing/Subject Area Mathematics
Fiscal Unit/Academic Org Mathematics - D0671
College/Academic Group Arts and Sciences
Level/Career Undergraduate
Course Number/Catalog 4407
Course Title Geometry for Teaching
Transcript Abbreviation Geometry for Teach
Course Description Algebra connections between school mathematics and undergraduate mathematics, focusing on the algebra in the Common Core State Standards for Mathematics.
Semester Credit Hours/Units Fixed: 2

Offering Information

Length Of Course 14 Week, 7 Week
Flexibly Scheduled Course Never
Does any section of this course have a distance education component? No
Grading Basis Letter Grade
Repeatable No
Course Components Lecture
Grade Roster Component Lecture
Credit Available by Exam No
Admission Condition Course No
Off Campus Never
Campus of Offering Columbus

Prerequisites and Exclusions

Prerequisites/Corequisites Prereq: Enrollment in the M.Ed. program for secondary mathematics, or permission of instructor. Prereq or concur: Math 4507.
Exclusions

Cross-Listings

Cross-Listings

Subject/CIP Code

Subject/CIP Code 27.0101
Subsidy Level Baccalaureate Course
Intended Rank Junior, Senior, Masters

Quarters to Semesters

Quarters to Semesters

New course

Give a rationale statement explaining the purpose of the new course

This is a permanent course request for a 4194 course which has been successfully run. It was created at the request of the Mathematics Education group in EHE and they intend to require this course for all pre-service high school math M.Ed students.

Sought concurrence from the following Fiscal Units or College

Mathematics Education Group in EHE

Requirement/Elective Designation

The course is an elective (for this or other units) or is a service course for other units

Course Details

Course goals or learning objectives/outcomes

- Develop multiple explanations and proofs of key geometry ideas in the Common Core State Standards for secondary mathematics, including the trajectories of those ideas from elementary through undergraduate mathematics.
- Compare Euclidean results across other geometries, including spherical and hyperbolic geometries.
- Distinguish synthetic and analytic approaches to geometry.
- Understand the role of axioms, definitions, undefined terms, and conventions in mathematics.
- Demonstrate geometric reasoning in other areas of mathematics (e.g., calculus, algebra) and vice-versa.

Content Topic List

- Comparing the results of high school mathematics and proofs of those results across spherical, Euclidean, and hyperbolic geometries
- History of geometries
- Dimension in geometry, algebra, and linear algebra
- Synthetic versus analytic approaches
- Transformational geometries and vector approaches
- Constructions with compass and straightedge or by paper folding
- Axiomatic approaches and the roles of definitions, notation, and conventions
- Axiom sets for Euclidean geometry
- Elaborating the Common Core State Standards, including transformational approaches to congruence and similarity, and the role of proof in school mathematics
- Geometry as a way of thinking about number, algebra, calculus, probability, etc

Attachments

- MathDeptCourseRequest.pdf: Concurrence
(Concurrence. Owner: Husen, William J)
- 4407_Geometry_for_Teaching_syllabus_update.pdf: Syllabus (updated)
(Syllabus. Owner: Husen, William J)
- Re_ Math for Teaching Courses.txt: Course level support
(Other Supporting Documentation. Owner: Husen, William J)

Comments

- An updated syllabus is attached and a letter of support from EHE for 4000-level. Subsidy level and student ranks have been adjusted. *(by Husen,William J on 01/23/2014 01:32 PM)*
- -This is an undergraduate course so neither the subsidy level nor the intended rank can be master's.
-Please see p. 13 of curriculum manual: http://ascas.osu.edu/files/ASC_CurrAssess_Operations_Manual.pdf
In particular, syllabus should address points 7 (texts), 8 (detailed information about assignments), 9 (grading information), and 13 (weekly topical outline w/ topics, readings, hw). *(by Vankeerbergen,Bernadette Chantal on 07/03/2013 04:07 PM)*

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Husen,William J	07/01/2013 11:29 AM	Submitted for Approval
Approved	Husen,William J	07/01/2013 11:31 AM	Unit Approval
Approved	Hadad,Christopher Martin	07/01/2013 12:33 PM	College Approval
Revision Requested	Vankeerbergen,Bernadette Chantal	07/03/2013 04:08 PM	ASCCAO Approval
Submitted	Husen,William J	01/23/2014 01:32 PM	Submitted for Approval
Approved	Husen,William J	01/23/2014 01:34 PM	Unit Approval
Approved	Hadad,Christopher Martin	01/24/2014 09:14 AM	College Approval
Pending Approval	Vankeerbergen,Bernadette Chantal Nolen,Dawn Jenkins,Mary Ellen Bigler Hogle,Danielle Nicole Hanlin,Deborah Kay	01/24/2014 09:14 AM	ASCCAO Approval

Geometry for Teaching

Math 4407

Math 4407 is designed to connect geometry, as learned in undergraduate mathematics, with school geometry. In particular, students will learn how topics in undergraduate-level geometry can provide understanding in the teaching of geometry in school.

Math 4407: Geometry for Teaching

Catalog Description: Geometry connections between school mathematics and undergraduate mathematics, focusing on the geometry in the Common Core State Standards for Mathematics. This is a 2-credit course to be required in the M.Ed. for students intending to be secondary mathematics teachers. (Note: The course may also be included in the B.S.Ed. program that is under development.)

Credits: 2

Purpose of Course: To promote deep understanding of geometry topics in school mathematics with strong connections to undergraduate mathematics. To develop multiple explanations of key ideas in school mathematics, and to compare results across geometries. Knowing the mathematics for you is not the same as knowing the mathematics for teaching.

Follow-up Courses: None.

Textbook: Notes for Math 4507 (no official text) and additional class notes.

Prerequisite: Enrollment in the M.Ed. program for secondary mathematics, Math 4507 (may be taken concurrently), or permission of instructor.

Grading: Problem sets and exams. Students are expected to do all of the problems and are asked to write up careful solutions and explanations for some of the problems. Their responses are graded based on their quality as instructional explanations. They are encouraged to typeset these responses using, for example, a word processor with an equation editor. Grades will be based on 40% homework, 30% midterm exams and 30% final exam. Standard percentage cut-off scores will be used to determine letter grades.

Learning Goals:

- Develop multiple explanations and proofs of key geometry ideas in the Common Core State Standards for secondary mathematics, including the trajectories of those ideas from elementary through undergraduate mathematics.
- Compare Euclidean results across other geometries, including spherical and hyperbolic geometries.
- Distinguish synthetic and analytic approaches to geometry.
- Understand the role of axioms, definitions, undefined terms, and conventions in mathematics.
- Demonstrate geometric reasoning in other areas of mathematics (e.g., calculus, algebra) and vice-versa.

Topics:

- (3 weeks) Comparing the results of high school mathematics and proofs of those results across spherical, Euclidean, and hyperbolic geometries.
- (1 week) History of geometries.
- (1 week) Dimension in geometry, algebra, and linear algebra.
- (1 week) Synthetic versus analytic approaches.
- (1 week) Transformational geometries and vector approaches.
- (1 week) Constructions with compass and straightedge or by paper folding
- (1 week) Axiomatic approaches and the roles of definitions, notation, and conventions.
- (1 week) Axiom sets for Euclidean geometry.
- (3 weeks) Elaborating the Common Core State Standards, including transformational approaches to congruence and similarity, and the role of proof in school mathematics.
- (1 week) Geometry as a way of thinking about number, algebra, calculus, probability, etc.

Disability Statement:

Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated, and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone (614) 292-3307 and VRS (614) 429- 1334; webpage <http://www.ods.ohio-state.edu>.

Academic Misconduct Statement:

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term academic misconduct includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee. For additional information, see the Code of Student Conduct: http://studentaffairs.osu.edu/resource_csc.asp

From: "Brosnan, Patricia" <brosnan.1@osu.edu>
Subject: Re: Math for Teaching Courses
Date: December 19, 2013 5:54:40 PM EST
To: "Findell, Bradford R." <findell.2@osu.edu>
Cc: "Husen, William J." <husen@math.ohio-state.edu>, "Garner, Mark" <mwgarner@math.ohio-state.edu>, "Manouchehri, Azita" <manouchehriazita@gmail.com>, "Battista, Michael" <battista.23@osu.edu>

Hi Brad,

Thanks for the information as provided below. And yes, we do want these courses to be offered as follows:
4480 for Autumn 2014 and
4407 for Spring of 2015 and in a similar rotation in the subsequent years.

Bill, please do put these in for official approval and all the other information is also correct.

Thanks all,

Patti

Patti Brosnan, PhD
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Mathematics Education
Director Mathematics Coaching Program
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614-292-8060
Brosnan.1@osu.edu
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From: <Findell>, Brad_Findell <Findell.2@osu.edu>
Date: Thursday, December 19, 2013 at 2:57 PM
To: Patti Brosnan <brosnan.1@osu.edu>
Cc: "Husen, William J." <husen@math.ohio-state.edu>, Garner <mwgarner@math.ohio-state.edu>
Subject: Math for Teaching Courses

Dear Patti,

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I am writing to follow up on some previous conversations and e-mails about the Mathematics for Teaching Courses.Â

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The course numbers that have been identified are as follows:Â

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Math 4407 Geometry for Teaching

Math 4480 Algebra for Teaching

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As I mentioned, the course approvals were delayed by the request that they be offered at the 5000 level.Â The undergraduate committee approved the courses at the 4000 level, and it would be a much more difficult for the graduate committee to approve the courses at the 5000 level.Â

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Nonetheless, university policy allows 4000-level courses to be taken for graduate credit outside the offering department.Â So it seems that the 4000 level will be sufficient for both your M.Ed. students and your B.S.Ed.

students, as that program gears up. And it appears that the 4000 level is even sufficient for your Ph.D. students from your program.

If this is sufficient, then please let Bill Husen (copied on this e-mail) know in some official way. He will then restart the process for full approval.

In addition, would you please confirm that you next want this courses offered in Autumn 2014 and Spring 2015, for the M.Ed. cohort that begins in Summer 2014. I am copying Mark Garner, who handles course scheduling, so that he is aware of the plans.

Thanks. And have happy holidays!

Best regards,
Brad Findell



Professor Caroline Clark, Chair
Department of Teaching and Learning
1945 N High Street
Columbus, Ohio 43210

To Whom It May Concern:

I am writing to support and request the offering of the two Mathematics for Teaching courses, namely Math 4194 Geometry for Teaching (Summer 2013) and Math 4194 Algebra for Teaching (Autumn 2013). These two courses were developed collaboratively between the Department of Mathematics and the Mathematics Education faculty as a natural outcome of the Woodrow Wilson Program. With the onset of the Common Core State Standards, that are now part of secondary mathematics teacher licensure requirements, along with a national Science and Mathematics Teacher Imperative (SMTI), it is essential that our pre-service teachers become proficient at the mathematics knowledge base necessary for successful teaching of mathematics at the secondary level.

After running these two courses this past year as pilot courses and with the successful student outcomes and positive feedback, our department has decided to make these two courses requirements for all secondary mathematics pre-service teachers. We have at least 22 students ready to enroll for this summer's offering and plan to require these same two courses for our new BSEd degree program as well. Brad Findell has done a great job in designing, teaching, and providing the leadership on these two experiences for our students and we are in full support of the continued offering of the Mathematics for Teaching classes annually.

Thank you for your consideration,

Caroline Clark, Chair
Department of Teaching and Learning

Patti Brosnan

Patti Brosnan
Mathematics Education, MED Coordinator