CUIN - 2320 - Mathematics for EC-6 Teachers
3d. UH Core - Create New Course and add to Core (UGRD only)

1. Course Ownership/Implementation/Justification

Department*	**Curriculum and Instruction**

Required Approval Steps*
- ☑ Undergraduate Studies Department Committee Review
- ☑ Undergraduate Studies Department Chair/Program Director
- ☑ Undergraduate Studies College Curriculum Committee

Will the course be cross-listed with another area?*
- ○ Yes
- ◉ No

If yes, has an agreement with department(s) been reached?
- ○ Yes
- ◉ No

Department(s) and Course(s) that will be cross-listed with this course

Catalog year of implementation*
- ◉ 2016 - 2017
- ○ 2017 - 2018

Term(s) Course will be TYPICALLY Offered:*
- ☑ Fall (including all sessions within term)
- ☑ Spring (including Winter Mini all sessions within term
- ☐ Summer (including Summer Mini and all sessions within term)
- ☐ Contact Your Academic Advisor

Justification(s) for Adding Course*   **c. To meet professional/accreditation standards**

Justification - if "other" selected above:

State the rationale for creating this new course:*	Accreditation standards support development of mathematics courses that are particularly targeted at the critical mathematical concepts necessary for teachers to know in order to support children's developmental acquisition of mathematics.

2. Course Catalog Information

Former Selected Topics Course Prefix (Rubric)	
Former Selected Topics Course Code (Number)	
Former Selected Topics Course TOPIC TITLE	
Instructional Area/Course Prefix*	CUIN
Course Number*	2320
Long Course Title*	Mathematics for EC-6 Teachers
Short Course Title (30 character limit)*	Mathematics for EC-6 Teachers
Instruction Type*	

Lecture ONLY

Lecture*	3

Lab*	0

Course Credit Level*	Sophomore

Grade Option*	Letter (A, B, C.....)

Can this course be repeated for credit?*	◯ Yes ⦿ No

If Yes, how often and/or under what conditions may the course be repeated?	

Number of credit hours required of this course in degree plan*	3.0

Number of course completions (attempts) allowed*	3

Are multiple enrollments allowed for course within a session or term?*	◯ Yes ⦿ No

CIP Code*	13 .1202 .00

Prerequisite(s):*	Math 1310 or 1311; 1312;

Corequisite(s)	

Requisite Checks in PeopleSoft*
- ○ Need to adjust requisite checks already in place - Begin enforcement Fall
- ○ Need to adjust requisite checks already in place - Begin enforcement Spring
- ○ Need to create requisite checks for course - Begin enforcement Fall
- ○ Need to create requisite checks for course - Begin enforcement Spring
- ○ No adjustment required - requisites not being changed
- ● No requisite check desired for course at this time

Course Description* Prepares students to teach mathematics at the elementary level. Emphasis is placed on developing specialized knowledge for teaching mathematics, which includes deep understanding of our base 10 number system, arithmetic, and problem solving. Topics include introduction to problem solving, counting, the four basic operations on whole numbers, decimals, and fractions, number theory, and the integration of algebra into arithmetic.

Course Notes

3. Authorized Degree Program(s)/Impact Study

Is this a required course for any   ○ Yes - enter additional information in field below

program (degree, certificate, or minor)?* ⦿ No

If yes, for which program(s)?

Does this change cause a change in any program?* ◯ Yes - attach copy of program plan
⦿ No

If yes, to which program(s)?

Does this change force changes in prerequisites for other courses?* ◯ Yes - enter additional information in field below
⦿ No

If yes, which course(s) and is a proposal being submitted to reflect the change?

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4. Core Curriculum Information

Learning Outcomes*

The **competency areas** addressed by the course are **communication skills**, **critical thinking**, and **empirical and quantitative skills.**

: Students will demonstrate mastery of the following TexEs competencies, aligned to the state certification exam:

Competency 014 (number concepts and operations): The teacher understands concepts related to numbers, operations and algorithms, and the properties of numbers.

The beginning teacher:

- Analyzes, describes, and models relationships between number properties, operations, and algorithms for the four basic operations involving integers, rational numbers, and real numbers.
- Demonstrates an understanding of equivalency among different representations of rational numbers.
- Selects appropriate representations of real numbers (e.g., fractions, decimals, percents) for particular situations.
- Demonstrates an understanding of ideas from number theory (e.g., prime factorization, greatest common divisor) as they apply to whole numbers, integers, and rational numbers, and uses those ideas in problem situations.
- Understands the relative magnitude of whole numbers, integers, rational numbers, and real numbers.
- Demonstrates an understanding of a variety of models for representing numbers (e.g., fraction strips, diagrams, patterns, shaded regions, number lines).
- Uses a variety of concrete and visual representations to demonstrate the connections between operations and algorithms.
- Applies knowledge of counting techniques, including combinations, to quantify situations and solve problems.
- Applies knowledge of place value and other number properties to perform mental mathematics and computational estimation.

Competency 015 (patterns and algebra): The teacher understands concepts related to patterns, relations, functions, and algebraic reasoning.

The beginning teacher:

- Knows how to identify, extend, and create patterns using concrete models, figures, numbers, and algebraic expressions.
- Translates problem-solving situations into expressions and equations involving variables and unknowns.
- Models and solves problems, including those involving

models and solve problems, including those involving proportional reasoning, using concrete, numeric, tabular, graphic, and algebraic methods.
- Understands the concept of and relationships among variables, expressions, equations, inequalities, and systems in order to analyze, model, and solve problems.

Competency 018 (mathematical processes): The teacher understands mathematical processes and knows how to reason mathematically, solve mathematical problems, and make mathematical connections within and outside of mathematics.

The beginning teacher:

- Understands the role of logical reasoning in mathematics and uses formal and informal reasoning to explore, investigate, and justify mathematical ideas.
- Applies correct mathematical reasoning to derive valid conclusions from a set of premises.
- Applies principles of inductive reasoning to make conjectures and uses deductive methods to evaluate the validity of conjectures.
- Evaluates the reasonableness of a solution to a given problem.
- Understands connections among concepts, procedures, and equivalent representations in areas of mathematics (e.g., algebra, geometry).
- Recognizes that a mathematical problem can be solved in a variety of ways and selects an appropriate strategy for a given problem.
- Expresses mathematical statements using developmentally appropriate language, standard English, mathematical language, and symbolic mathematics.
- Communicates mathematical ideas using a variety of representations (e.g., numeric, verbal, graphic, pictorial, symbolic, concrete).
- Demonstrates an understanding of the use of visual media such as graphs, tables, diagrams, and animations to communicate mathematical information.
- Demonstrates an understanding of estimation and evaluates its appropriate uses.
- Knows how to use mathematical manipulatives and a wide range of appropriate technological tools to develop and explore mathematical concepts and ideas.

Foundational Component Area for which the course is being proposed (select	Mathematics

one)*

Component Area Option (optional)	Component Area Option (a): Mathematics/Reasoning

UH Core: Single or Double Category Listing	○ List course in BOTH the Foundational Component Area and the Component Area Option
	● List course in ONLY the Component Area Option

Core Objectives addressed by the course*	**Communication Skills**
	Critical Thinking
	Empirical & Quantitative Skills

Critical Thinking, if applicable	The attached example (CUIN 2320 Problem Set 1) illustrates one of many examples that will be used for assessing the chosen competencies.
	Critical thinking skills and empirical and **quantitative skills** are evident as students are required to compare and determine the mathematical correctness of the different representations that emerge during the presentations and subsequent discussions.

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Communication Skills, if applicable	**Communication skills** are addressed in that students are asked to prepare a presentation that depicts an understanding of how concrete models and real-world situations connect to operations with fractions. Students are randomly selected to present in small and whole group. The purpose of the presentation is to serve as a springboard to discuss the content at hand, in this case, the meanings of operations with fractions. This would be a common practice throughout the semester.

Empirical & Quantitative Skills, if applicable	

The attached example (CUIN 2320 Problem Set 1) illustrates one of many examples that will be used for assessing the chosen competencies.

Critical thinking skills and empirical and **quantitative skills** are evident as students are required to compare and determine the mathematical correctness of the different representations that emerge during the presentations and subsequent
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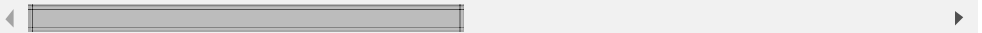
Teamwork, if applicable	**Critical thinking skills and empirical** and **quantitative skills** are evident as students are required to compare and determine the mathematical correctness of the different representations that emerge during the presentations and subsequent discussions
Social Responsibility, if applicable	
Personal Responsibility, if applicable	

Will the syllabus vary across multiple section of the course?* ○ Yes ● No

If yes, list the assignments that will be constant across sections

5. Supporting Documentation

Type of Attachments* ☑ Course Syllabus

☐ Degree Plan

☐ Memo

☐ Other Document(s)

"Other" documents:

6. Additional Information Regarding This Proposal

Contact person for questions about proposal:*	**Burridge, Andrea - aburridge@uh.edu**

Comments:	

Administrative Use Only

(Administrative Use Only) Proposal ID#	

UNIVERSITY of **HOUSTON** | EDUCATION

Course Name: CUIN 23??: Mathematics for EC-6 Teachers
Semester/Year: Spring 2016

Instructor: TBD
Office Room Number: TBD
Office Hours: TBD
Phone: TBD
Email: TBD

Course Description This course is aimed at preparing students to teach mathematics at the elementary level. Emphasis is placed on developing specialized knowledge for teaching mathematics, which includes deep understanding of our number system, arithmetic, and problem solving. Topics include introduction to problem solving, counting, the four basic operations on whole numbers, decimals, and fractions, number theory, and the integration of algebra into arithmetic.

Student Learning Outcomes: Students will demonstrate mastery of the following TexEs competencies, aligned to the state certification exam:

Competency 014 (number concepts and operations): The teacher understands concepts related to numbers, operations and algorithms, and the properties of numbers.
The beginning teacher:

- Analyzes, describes, and models relationships between number properties, operations, and algorithms for the four basic operations involving integers, rational numbers, and real numbers.
- Demonstrates an understanding of equivalency among different representations of rational numbers.
- Selects appropriate representations of real numbers (e.g., fractions, decimals, percents) for particular situations.
- Demonstrates an understanding of ideas from number theory (e.g., prime factorization, greatest common divisor) as they apply to whole numbers, integers, and rational numbers, and uses those ideas in problem situations.
- Understands the relative magnitude of whole numbers, integers, rational numbers, and real numbers.
- Demonstrates an understanding of a variety of models for representing numbers (e.g., fraction strips, diagrams, patterns, shaded regions, number lines).
- Uses a variety of concrete and visual representations to demonstrate the connections between operations and algorithms.
- Applies knowledge of counting techniques, including combinations, to quantify situations and solve problems.
- Applies knowledge of place value and other number properties to perform mental mathematics and computational estimation.

NOTE: Information contained in this class syllabus is subject to change without notice. Students are expected to be aware of any additional course policies presented by the instructor during the course.

Competency 015 (patterns and algebra): The teacher understands concepts related to patterns, relations, functions, and algebraic reasoning.
The beginning teacher:
- Knows how to identify, extend, and create patterns using concrete models, figures, numbers, and algebraic expressions.
- Translates problem-solving situations into expressions and equations involving variables and unknowns.
- Models and solves problems, including those involving proportional reasoning, using concrete, numeric, tabular, graphic, and algebraic methods.
- Understands the concept of and relationships among variables, expressions, equations, inequalities, and systems in order to analyze, model, and solve problems.

Competency 018 (mathematical processes): The teacher understands mathematical processes and knows how to reason mathematically, solve mathematical problems, and make mathematical connections within and outside of mathematics.
The beginning teacher:
- Understands the role of logical reasoning in mathematics and uses formal and informal reasoning to explore, investigate, and justify mathematical ideas.
- Applies correct mathematical reasoning to derive valid conclusions from a set of premises.
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- Evaluates the reasonableness of a solution to a given problem.
- Understands connections among concepts, procedures, and equivalent representations in areas of mathematics (e.g., algebra, geometry).
- Recognizes that a mathematical problem can be solved in a variety of ways and selects an appropriate strategy for a given problem.
- Expresses mathematical statements using developmentally appropriate language, standard English, mathematical language, and symbolic mathematics.
- Communicates mathematical ideas using a variety of representations (e.g., numeric, verbal, graphic, pictorial, symbolic, concrete).
- Demonstrates an understanding of the use of visual media such as graphs, tables, diagrams, and animations to communicate mathematical information.
- Demonstrates an understanding of estimation and evaluates its appropriate uses.
- Knows how to use mathematical manipulatives and a wide range of appropriate technological tools to develop and explore mathematical concepts and ideas.

Materials / Required Readings:
Beckmann, S. (2014). *Mathematics for Elementary Teachers with Activities*. Pearson Publications.

Technology Requirements:
This face-to-face course uses a learning management system called Blackboard to post

assignment details, announcements, and provide collaborative opportunities. This course is best viewed through the use of a full desktop or laptop computer. The use of mobile devices may prevent course materials to not display or work properly. Below are the minimum technology requirements to be successful in this course:

- Supported operating system (e.g. Windows/PC or Apple/MAC computer)
- USB Flash Drive (at least 1 GIG)
- Stable internet connection (ethernet connection preferred over wireless)
- CougarNet Login credentials http://accessuh.uh.edu
- Email account (UH alias or personal)
- Microsoft Office 2007 or later
- Adobe PDF Reader http://get.adobe.com/reader/
- Two supported internet browsers (e.g. Mozilla Firefox, Google Chrome)
- Pop-up blockers disabled for trusted sites (e.g UH, Blackboard)
- Cookies enabled for trusted sites (e.g UH, Blackboard)
- Java plug-in http://www.java.com/en/download/installed.jsp

Support Services:

Student assistance for Blackboard can be found by visiting http://www.uh.edu/blackboard/help/ , calling 713-743-1411, or emailing support@uh.edu. If you cannot purchase or download the suggested software programs, utilize the CITE computer lab for available computers (http://www.coe.uh.edu/cite). CITE is located on the third floor of Farish Hall in the suite 300N rooms. Software or hardware can be purchased at the UH Bookstore or UH CougarByte Discount website (http://www.cougarbyte.com/) . Additional UH computer labs are available all over campus. Learn more by visiting http://www.uh.edu/infotech-new/services/facilities-equipment/comp-labs/index.php

Technology Competencies/Skills:
Students enrolled in the course must be prepared to perform the basic tasks below.
1. Send and receive email;
2. Attach files to an email message;
3. Locate system information (e.g. browser version, operating system, etc) for trouble shooting;
4. Recognize, use, and create hyperlinks;
5. Use of basic Microsoft Office programs;
6. Download and install software (including utilities, plug-ins, and/or apps);
7. Copy and paste text using a computer;
8. Scan and remove computer viruses;
9. Plug in external devices to a computer ;
10. Save files to an external device (e.g. flash drive, CD, or DVD);
11. Use an internet search engine to locate online credible resources;
12. Post and reply to discussion forums or chat via instant messaging tool;
13. Send computer screenshot for technical assistance.

NOTE: Information contained in this class syllabus is subject to change without notice. Students are expected to be aware of any additional course policies presented by the instructor during the course.

Participation/Attendance:

Attendance and participation: Class attendance and <u>full</u> participation are expected and are imperative to your understanding of the class content.

- Class attendance is important to your learning. Thus, attendance in every class meeting is expected. If there is a reason that you cannot attend class, the instructor should be notified via e-mail <u>BEFORE</u> the class session. For an absence to be excused, you must notify the instructor <u>before</u> class and provide DOCUMENTATION (I.E. doctor's note, etc.).
- It is your responsibility to remember to sign in each day. If you are tardy you will be asked to note the time of arrival. If you leave early you will also need to note the time you leave. NOTE: Do not sign in until you are in class and ready to learn. For example, do not sign in and then leave to print, use the restroom, etc.
- You are expected to be on time to class, and will be considered tardy if you are more than 10 minutes late. Points will be deducted from your Professional Attribute score for each tardy.
- When in attendance, attention should be given to the course content and not to off-task activities, holding private conversations or focusing on text messages.
- Participation in small and large group discussions is expected, as it is a vital part of the learning process. Your participation should be collegial, respectful, and should evidence that you have prepared for class by completing assignments and required readings.
- **Turn off all cell phones during class meetings**. Avoid stepping out of class to make phone calls or receive phone calls.
- All assignments and class notes are the responsibility of the student. **If you are not able to be in class, you are responsible for obtaining all needed handouts, information and assignments.**

Students are responsible for knowing and adhering to all university and college dates and deadlines. Such dates and deadlines include those for enrollment (registration), adding and dropping of courses, academic holidays, payment and refunds, and applying for graduation. Visit the following website for specific dates: http://www.uh.edu/academics/catalog/academic-calendar/

In a case of emergency, it is the student's responsibility to keep posted on all official University alerts or closures by visiting: http://www.uh.edu/emergency.

Assignment details and points:

Assignments	Point Value
Professional Attributes	10
Weekly Homework	20

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Quizzes	20
Midterm Exam	25
Final Exam	25

When submitted electronically, assignments are expected to be turned into Blackboard by the assigned due date. Technology failures will not be accepted as reason for missed assignment due dates. Therefore, do not leave anything to the last minute. Back up files frequently and in various locations so work is not lost. It is the student's responsibility to identify alternative ways to complete or submit an assignment. For example, if the Blackboard Learn system is offline consider emailing the assignment before the due date. Students are required to follow all UH deadlines: http://www.uh.edu/academics/catalog/academic-calendar/

Weekly Schedule:
This is a tentative, rough outline of the topics that will be covered in this course.

Week	Topics
1	Numbers and the Decimal System
2	Fractions: Meaning of/Equivalence
3	Fractions: Comparing/Connecting to Decimals and Percents
4	Addition and Subtraction: Whole Numbers
5	Addition and Subtraction: Fractions, Decimals and Percents
6	Multiplication: Whole Numbers
7	Multiplication: Fractions, Decimals and Percents
8	Division
9	Proportional Reasoning
10	Proportional Reasoning
11	Number Theory
12	Number Theory
13	Algebra: Expressions and Equations

Evaluation:
Grades are final once given by the instructor. There are no opportunities for re-doing assignments once they have been completed and turned into the instructor. I do not offer extra credit. Based on a 100-point scale, final grades will be assigned on the following basis:

Point Range	Grade
95-100	A
90-94	A-
87-89	B+
84-86	B
80-83	B-
77-79	C+

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74-76	C
70-73	C-
67-69	D+
64-66	D
60-63	D-
Below 60	F
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This course follows all UH grade regulations, policies, and standards as stated in the student handbook. Review the catalog for conditions under which an incomplete may be granted. http://www.uh.edu/dos/studenthandbook/
and http://catalog.uh.edu/content.php?catoid=6&navoid=1077

Academic Honesty:

Plagiarism or cheating will not be tolerated. Notification to all concerned parties will be made immediately. http://catalog.uh.edu/content.php?catoid=6&navoid=1025

Accommodating Students:

In accordance with 504/ADA guidelines, reasonable academic accommodations will be provided to students who request and require them. Please call 713-743-5400 (http://www.uh.edu/csd/) for more assistance.

Student Responsibility:

A responsible student is a successful student. At the University of Houston, students are expected to conduct themselves in a mature and responsible manner, respect the opinions, rights, and personal property of others, and meet their financial obligations. Students are responsible for seeking help and guidance from all of the resources that the university makes available to them. They are expected to be proactive and remain informed about university dates and deadlines, and understand academic and disciplinary policies. They are responsible for communication with their professors, advisors, and university staff, and the commitment to being organized and prepared to learn. Above all, our students are expected to strive for honesty and academic integrity throughout their period of study at the University of Houston. http://catalog.uh.edu/content.php?catoid=6&navoid=1082

NOTE: Information contained in this class syllabus is subject to change without notice. Students are expected to be aware of any additional course policies presented by the instructor during the course.

CUIN 23XX Problem Set 1

Instructions: Respond to the following. Take pictures/create ppts that will help to illustrate your thinking to others. In some cases, your responses should be posted on the Discussion Board, as indicated.

View: http://learner.org/resources/series171.html# **Video 8. Rational Numbers and Proportional Reasoning**

- Take notes for your own reference. If you do not have your own Cuisenaire Rods, use the Cuisenaire Rod Template, or use virtual manipulatives: here are possible websites: http://nrich.maths.org/4348 ; http://mathtoybox.com/numblox/NumBlox.html#.U_4HH03VDIU

Use the models to illustrate the expressions below. Then write a story problem (that involves a context relevant to children) for each expression.

By 5:00 pm., XXXX, post your story problems on the Discussion Board, where indicated.

$$\frac{1}{3} + \frac{1}{4}$$

$$\frac{1}{3} - \frac{1}{4}$$

$$\frac{1}{3} \times \frac{1}{4}$$

$$\frac{1}{3} \div \frac{1}{4}$$