

MATH 440/540

Mathematics Education Standards

Summer 2021 July Session (07/05/21 - 07/30/21)

Chadron State College



Part 1: Course Information

Instructor Information

Instructor: Dr. Jung Colen

E-mail: jcolen@csc.edu (Make sure to indicate course name and section number on the subject line: MATH 238)

Credit hours

3 hours

Course Description

An integrated content/pedagogy course on mathematics teaching, assessment, and curriculum standards, based on major content areas of the K-12 curriculum.

Textbook & Course Materials

- No textbook is required to purchase for this course
- Common Core State Standards for Mathematics (<http://www.corestandards.org/Math/>)
- Your own state's standards for mathematics (e.g., For Nebraska: <https://www.education.ne.gov/math/>)
- All other readings will be available on CSC Online Resources by the instructor.

Method(s) of Instruction

The method of instruction will consist of readings, homework, online discussion, and major assignments.

Course Requirements

Discussion Forums: Participation in the discussion forums is critical for maximizing student learning in this course, both because your participation is graded and because it's a chance to engage in a dialogue about course material. In this course, students are required to be a part of an online community of learners who collectively interact, through discussion, to enhance and support the professional performance of each other. Part of the assessment criteria for the course includes evaluating the quality and quantity of your participation in the discussion forum.

Submit an initial post(s) responding to the prompts a day before the due date and post your reflections on at least one other person's posts before 11:59pm on the due date. You will not be able to see others' postings until you have posted something of your own.

Some characteristics I consider to be part of excellent discussion contributions are outlined below. I will consider these characteristics when assessing the quality and level of student participation.

- Make certain that all posts and responses address the question, problem, or situation as presented for discussion. This does not mean you should not extend the topic, but do not stray from the topic.
- Posts should be within a range of 75-150 words.
- Posts and responses should be thorough and thoughtful. Just posting an "I agree" or "Good ideas" will not be considered adequate. Support statements with examples, experiences, or references. Be brief — keep each post and response to one or two short paragraphs. Keep in mind that fellow learners will be reading and responding to you, too.
- Discussions occur when there is dialogue; therefore, you need to build upon the posts and responses of other learners to create discussion threads. Make sure to revisit the discussion forum and respond (if necessary) to what other learners have posted to your initial responses.
- When relevant, add to the discussion by including prior knowledge, work experiences, references, web sites, resources, etc.
- Contributions to the discussions (posts and responses) should be complete and free of grammatical or structural errors.

Major Course Assignments And Components

This semester you will complete two following required assignments.

Assignments are due on the dates listed (11:59 pm Mountain Time). Details of these assignments will be provided as the semester progresses, but here is some information that may be helpful as you plan:

Assignments	Due	What You Need to Know Now
1. Comparison of CCSSM Practice Standards and Principles to Actions	July 18	<ol style="list-style-type: none"> 1. <u>Compare and contrast</u> the CCSSM Practice Standards and Principles to Actions. 2. There are some connections between the CCSSM Practice Standards and Principles to Actions. <u>Address the connections</u> with a short <u>reasoning</u> and <u>examples</u>. 3. Pick <u>one standard that you want to do more</u> in your teaching and discuss your plan to improve the standard with concrete examples.
2. Short Lesson Plan	August 1	<ol style="list-style-type: none"> 1. Design a <u>lesson plan</u> for middle/high school (Grade 5-12) using the given template. 2. Choose one <u>content standard by Domain</u> defined by the standard your state has adopted. Identify which standard is aligned with your lesson goal.

		<p>Standards by Domain</p> <ul style="list-style-type: none"> Counting & Cardinality Operations & Algebraic Thinking Number & Operations in Base Ten Number & Operations—Fractions Measurement & Data Geometry Ratios & Proportional Relationships The Number System Expressions & Equations Functions Statistics & Probability <p>E.g., Measurement and Data. Grade 5 Geometric measurement: understand concepts of volume. <u>CCSS.MATH.CONTENT.5.MD.C.3</u>: Recognize volume as an attribute of solid figures and understand concepts of volume measurement. <u>CCSS.MATH.CONTENT.5.MD.C.3.A</u>: A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.</p> <p>3. Choose one <u>practice standard</u> (either from CCSSM or Principles to Actions). in your lesson plan, address and highlight which standard you are focusing on. Throughout the lesson plan, this standard has to be displayed.</p>
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Nebraska State College Board Policy 4141

For a 1-credit hour course, Nebraska State College Board Policy 4141 (<http://www.nscs.edu/Policy%20Manual/Policy%20Manual%20Master/Policy%204141.pdf>) suggests that you spend at least 45 hours per credit hour in learning activities. Since MATH 440/540 is a 3-credit hour course, you should plan to spend a minimum of 135 hours in learning activities.

Learning Activity	Hours Per Week	Total for Course
Readings	10	40
Homework	7	28
Major Assignments/Projects	10	40
Discussion	8	32
Total		140

The actual hours spent on individual learning activities will vary from student to student depending on prior knowledge; however, 135 hours represents the minimum expectation for any student.

****Disclaimer:** The completion of the minimum time commitment does not ensure a passing grade. Achievement of the course competencies must be demonstrated.

Part 2: Student Learning Outcomes

Math students at Chadron State College will:

- Develop mathematical ability and knowledge of the depth and breadth of mathematics.
- Communicate about and with mathematics.
- Use technology to support problem solving and promote understanding.
- Apply the mathematical sciences, including statistics, in other academic disciplines.

Upon completion of this course, you will be able to:

- Recall and describe the K-12 standards from the perspectives of content, assessment and pedagogy, with particular emphasis on the 7-12 area.
- Describe some of the following major content strands: algebra, geometry, discrete mathematics, probability and statistics, advanced topics, and the generic areas of problem solving, reasoning, connections, and communication.
- Recall and describe the above topics in terms of articulation with pre- and post-7-12 level work, technology, assessment, accommodation of learning styles, and discourse.

CSC Education Unit Intended Program Outcomes: The intended program outcomes are as follows:

- 1) CSC/InTASC Standard #1: Learner Development. The teacher candidate understands how learners grow and develop, recognizing that patterns of learning and development vary individually within and across the cognitive, linguistic, social, emotional, and physical areas, and designs and implements developmentally appropriate and challenging learning experiences. (Methodology/Technology)
- 2) CSC/InTASC Standard #2: Learning Differences. The teacher candidate uses understanding of individual differences and diverse cultures and communities to ensure inclusive learning environments that enable each learner to meet high standards. (Human Relations/Diversity)
- 3) CSC/InTASC Standard #3: Learning Environments. The teacher candidate works with others to create environments that support individual and collaborative learning, and that encourage positive social interaction, active engagement in learning, and self motivation. (Human Relations/Diversity)
- 4) CSC/InTASC Standard #4: Content Knowledge. The teacher candidate understands the central concepts, tools of inquiry, and structures of the discipline(s) he or she teaches and creates learning experiences that make the discipline accessible and meaningful for learners to assure mastery of the content. (Specialty Studies)
- 5) CSC/InTASC Standard #5: Application of Content. The teacher candidate understands how to connect concepts and use differing perspectives to engage learners in critical thinking, creativity, and collaborative problem solving related to authentic local and global issues. (Thinking Skills)
- 6) CSC/InTASC Standard #6: Assessment. The teacher candidate understands and uses multiple methods of assessment to engage learners in their own growth, to monitor learner progress, and to guide the teacher's and learner's decision making. (Assessment)










- 7) CSC/InTASC Standard #7: Planning for Instruction. The teacher candidate plans instruction that supports every student in meeting rigorous learning goals by drawing upon knowledge of content areas, curriculum, cross-disciplinary skills, and pedagogy, as well as knowledge of learners and the community context. (Methodology/Technology)
- 8) CSC/InTASC Standard #8: Instructional Strategies. The teacher candidate understands and uses a variety of instructional strategies to encourage learners to develop a deep understanding of content areas and their connections, and to build skills to apply knowledge in meaningful ways. (Methodology/Technology)
- 9) CSC/InTASC Standard #9: Professional Learning and Ethical Practice. The teacher candidate engages in ongoing professional learning and uses evidence to continually evaluate his/her practice, particularly the effects of his/her choices and actions on others (learners, families, other professionals, and the community), and adapts practice to meet the needs of each learner. (Professionalism)
- 10) CSC/InTASC Standard #10: Leadership and Collaboration. The teacher candidate seeks appropriate leadership roles and opportunities to take responsibility for student learning, to collaborate with learners, families, colleagues, other school professionals, and community members to ensure learner growth, and to advance the profession. (Leadership)

CCSSO's Interstate Teacher Assessment and Support Consortium (InTASC). (2013). *InTASC model core teaching standards and learning progressions for teachers 1.0*. Washington, DC: Council of Chief State School Officers.

Part 3: Course Topic Schedule/Outline

Topics

1. Unit 1: Brief history and background of mathematics standards
2. Unit 2: Practice standards
3. Unit 3: Content standards
4. Unit 4: Standards based Curriculum + Assessment

Date	Unit	Discussion/ Assignment	Due Dates						
7/5		HW 1 Introduce yourself in the Forum and greet others.	7/6						
7/5	Unit 1	<ol style="list-style-type: none"> 1. Read http://www.csun.edu/~vcnth00m/AHistory.html#:~:text=In%201986%20the%20NCTM%20established,the%20NCTM%20at%20that%20time 2. HW 2: 1) Summarize "History of American K-12 Mathematics Education in the 20th Century" in one page by the important standards in a periodical order. 2) Discuss why standards for mathematics education is needed in your own words (½ pages). 	7/8						
7/8	Unit 1	<ol style="list-style-type: none"> 1. Read: https://www.nctm.org/Standards-and-Positions/Principles-and-Standards/Principles,-Standards,-and-Expectations/ 2. Watch: https://www.youtube.com/watch?v=JsEfsVlyLAI 3. HW 3: 1) Summarize NCTM six principles in 1 page. 4. Watch and listen to the developers of the CCSSM: https://www.youtube.com/watch?v=dnjbwJdcPjE 5. HW 3: 2) Discuss: List 2-5 things that the CCSSM developers focused on. Do you advocate or oppose the ideas? Why? 6. Watch and read (click + to access to the reading for each Focus, Coherence, and Rigor): https://achievethecore.org/page/900/college-and-career-ready-shifts-in-mathematics <table border="0" style="width: 100%; margin-top: 10px;"> <tr> <td style="text-align: left;"> Focus</td> <td style="text-align: right;">+</td> </tr> <tr> <td style="text-align: left;"> Coherence</td> <td style="text-align: right;">+</td> </tr> <tr> <td style="text-align: left;"> Rigor</td> <td style="text-align: right;">+</td> </tr> </table> 7. HW 3: 3) Summarize CCSS three shifts: Focus, Coherence, Rigor in 2-3 sentences per shift. 	 Focus	+	 Coherence	+	 Rigor	+	7/12
 Focus	+								
 Coherence	+								
 Rigor	+								
7/12	Unit 2	<ol style="list-style-type: none"> 1. Read: The Standards for Mathematical Practice: http://www.corestandards.org/Math/Practice/ 2. HW 4: 1) There are 8 practice standards. Highlight 1-2 sentences that are important per practice. 2) Write 1) your own experience of implementing any of the eight practice standards (e.g., successful story of classroom discussion, hard time providing students appropriate tools, etc.) 2) How would you do it better if you were to teach the same lesson again? 	7/14						
7/14	Unit 2	<ol style="list-style-type: none"> 1. Read Principles to Actions (pp.7-57). 2. HW 5: 1) Summarize 8 Mathematics Teaching Practices in your own words (½ page per practice). Make sure to include an example of teaching mathematics for each practice. Talk both 	7/16						

		<p>about teacher and students actions with some examples of teaching / learning mathematics.</p> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center; background-color: #0056b3; color: white; margin: 0;">Mathematics Teaching Practices</p> <p>Establish mathematics goals to focus learning. Effective teaching of mathematics establishes clear goals for the mathematics that students are learning, situates goals within learning progressions, and uses the goals to guide instructional decisions.</p> <p>Implement tasks that promote reasoning and problem solving. Effective teaching of mathematics engages students in solving and discussing tasks that promote mathematical reasoning and problem solving and allow multiple entry points and varied solution strategies.</p> <p>Use and connect mathematical representations. Effective teaching of mathematics engages students in making connections among mathematical representations to deepen understanding of mathematics concepts and procedures and as tools for problem solving.</p> <p>Facilitate meaningful mathematical discourse. Effective teaching of mathematics facilitates discourse among students to build shared understanding of mathematical ideas by analyzing and comparing student approaches and arguments.</p> <p>Pose purposeful questions. Effective teaching of mathematics uses purposeful questions to assess and advance students' reasoning and sense making about important mathematical ideas and relationships.</p> <p>Build procedural fluency from conceptual understanding. Effective teaching of mathematics builds fluency with procedures on a foundation of conceptual understanding so that students, over time, become skillful in using procedures flexibly as they solve contextual and mathematical problems.</p> <p>Support productive struggle in learning mathematics. Effective teaching of mathematics consistently provides students, individually and collectively, with opportunities and supports to engage in productive struggle as they grapple with mathematical ideas and relationships.</p> <p>Elicit and use evidence of student thinking. Effective teaching of mathematics uses evidence of student thinking to assess progress toward mathematical understanding and to adjust instruction continually in ways that support and extend learning.</p> </div> <p>Assignment #1</p>	
7/19	Unit 3	<p>Read the math content standards from your state and make sense of the standards (e.g., Nebraska Mathematics Standards, CCSSM: <u>http://www.corestandards.org/Math/</u>, etc.) If you currently do not teach, choose to read Common Core State Standards for Mathematics.</p> <p>I know it is a lengthy document, but it is important for you to understand the standards.</p> <p>HW 6: 1) Choose at least 2 consecutive grade levels for elementary and middle school. If you choose high school math, choose one subject instead (e.g., Number and Quantity). 2) Write how the standards help or not help students improve/increase their mathematical knowledge (e.g., talk about the concept connections, coherence, sequence, flow, using prior knowledge, spiral approach, application of knowledge, etc.). Provide concrete examples to support your claim.</p>	7/18 7/21
7/21	Unit 3	<p>Continue to read/re-read the <u>content standards</u> from your state and make sense of the standards (e.g., Nebraska Mathematics Standards or CCSSM: <u>http://www.corestandards.org/Math/</u>) and practice standards.</p> <p>HW 7: Write how to connect Content Standards with Practice Standards in actual teaching. Provide at least two concrete examples of connections between content and practice standards in your own words. Specify grade level and math topic in your examples.</p>	7/25
7/26	Unit 4	<p>Watch: https://www.nctm.org/Standards-and-Positions/Common-Core-State-Standards/Teaching-and-Learning-Mathematics-with-the-Common-Core/#8</p>	7/28

		<p>At the end of the webpage, you will find Part 5: Assessments and The Common Core Standards.</p> <p>HW 8: 1) Summarize what Dr. Briars and Dr. Friedberg discuss in the video. 2) Write (a) your thoughts about the current status of assessments in school (e.g., standardized assessment, formative/summative assessment, etc.) (b) what state/school district/school have been doing/supporting teachers and to implement a CCSSM-based assessment and (c) what more should be done and how.</p> <div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>Part 5: Assessments and The Common Core Standards</p> <p>▶ 14:15 ◀ ⚙ 📺</p> </div>	
7/28		<p>HW 9: Due to the short-term course, there are so many topics about standards that we could not discuss. Choose one topic that we did not cover or that you want to talk more about (e.g., equity, standards-aligned textbook, professional development, parents' perspective, etc.) and discuss it in relation to mathematics standards.</p> <p>Assignment #2</p>	7/30 8/1

Part 4: Grading Policy

Graded Course Activities and Letter Grade Assignment

Assignments	Percentage Breakdown
Homework	40%
Major Assignments	30%
Forum Discussions (participation)	30%
Total	100%

Letter Grade	Percentage
A	90% - 100%
B	80% - 89%
C	70% - 79%
D	60% - 69%
F	Less than 60%

Viewing Grades in CSC Online

Grades will be posted in [CSC Online](#). Check your grades frequently and let me know if you see anything inaccurate.

Part 5: Course & Institution Policies

Academic policies, including the selected policies detailed in this syllabus section, can be found on [Chadron State College's Policy Website](http://www.csc.edu/policy/category/index.csc).
(<http://www.csc.edu/policy/category/index.csc>)

Student Behavior

Academic Honesty

Students are encouraged and expected, with the assistance of the faculty, to conduct themselves in conformity with the highest standards with regard to academic honesty. Violation of college, state, or federal standards with regard to plagiarism, cheating, or falsification of official records will not be tolerated. Students violating such standards will be advised and disciplined. Violations of these standards may result in course failure, suspension, or dismissal from the college. Students are encouraged to seek the advice of instructors as to the proper procedures to avoid such violations.

The following acts are examples of academic dishonesty:

1. Cheating – intentionally using or attempting to use unauthorized materials, information, or study aids in any academic exercise.
2. Fabrication – intentional and unauthorized falsification or invention of any information or citation in an academic exercise.
3. Facilitating Academic Dishonesty – intentionally or knowingly helping or attempting to help another in an act of academic dishonesty.
4. Plagiarism – appropriating or imitating language, ideas, and thoughts of another author, representing them as one's own original work. The following acts are examples of plagiarism:
 1. Submitting an assignment that someone else has written and claiming the work as one's own.
 2. Submitting an assignment that contains sections, paragraphs, sentences or key phrases that someone else has written without appropriately documenting the source(s) for each portion of the assignment not written by the student submitting the assignment.
 3. Submitting an assignment that contains paraphrased ideas from another source, published or unpublished, without appropriately documenting the source for each paraphrase. (Changing around a few words in a sentence from the source is not sufficient to avoid plagiarism.)

Note: "Someone else" in the three statements above may refer to a published author, another student, an internet source, or any person other than the student claiming credit for the assignment. If an individual is unsure in how to document sources used within an assignment, they are encouraged to ask their professor or the reference librarian for assistance.

View the [Academic Honesty Policy](https://app.policyiq.com/ChadronStateCollege/Content/View/3419?Key=c320bad9-cae1-4820-bac1-ec7a3b6d69ba) on CSC's Policy Website.

(<https://app.policyiq.com/ChadronStateCollege/Content/View/3419?Key=c320bad9-cae1-4820-bac1-ec7a3b6d69ba>)

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Equal Education Opportunity Policy/Nondiscrimination Policy

CSC is committed to an equal opportunity program to encourage admission and employment, and to provide procedures which will assure equal treatment of all students and employees. The College administers its academic and employment programs and related supporting services in a manner which does not discriminate on the basis of gender, race, color, national origin, age, religion, disability, sexual orientation, gender identity, or marital status. Its policies are consistent with nondiscriminatory policy, including Title VII of the Civil Rights Act of 1964, as amended; Title IX of the Educational Amendments of 1972, as amended; and Sections 503 and 504 of the Rehabilitation Act of 1973. The College's written policy regarding the Americans with Disabilities Act (ADA) may be reviewed in the office of the Director of Human Resources or in the Library Learning Commons, along with the provisions of the Americans with Disabilities Act, and the rights provided.

View the [Equal Employment and Education Opportunity Policy](#) on CSC's Policy Website.

(<https://app.policyiq.com/ChadronStateCollege/Content/View/3443?Key=c320bad9-cae1-4820-bac1-ec7a3b6d69ba>)

Equal Access

Chadron State College works to ensure that all programs, activities, and services, including electronic and remote services, are accessible to people with disabilities. Upon request, CSC will provide reasonable accommodations to ensure students have equal access to programs, activities, and services. For assistance, contact the Equal Access Coordinator, Deena Kennell, at 308.432.6467 or by email at dkennell@csc.edu.

Disclaimer

This syllabus and schedule is articulated as an expectation of class topics, learning activities, and expected student learning. However, the instructor reserves the right to make changes in this schedule that, within my professional judgment, would result in enhanced or more effective learning on the part of the students. These modifications will not substantially change the intent or outcomes of this course and will be done within the policies and procedures of Chadron State College.

CSC Mission & Master Academic Plan (MAP)

Mission Statement

Chadron State College delivers experiences that foster knowledgeable and engaged leaders and citizens to enrich the High Plains region and beyond.

MAP Priorities, 2019-2023

CSC is committed to the achievement of tasks/projects that align with the following Priorities:

People

Recruitment | Retention | Engagement | Completion Awareness | Commitment | Leadership

Purpose

Student Learning and Growth Pedagogy | Support Services | Wellness

Place

Community Engagement Social Infrastructure & Third Places | Generational Transitions | Building Bridges