MATH-155: MATHEMATICS FOR ELEMENTARY TEACHING I

Effective Term
Fall 2026

BOT Approval Date
01/15/2026

Discipline
MATH - Mathematics

Course Number
155

Course Title
Mathematics for Elementary Teaching I

Short Title
Math for Elementary Teaching I

Credit Status (CB 04)
D - Credit - Degree applicable

Units

Lecture Units
3.00

Total Units
3.00

Hours

Lecture Contact Hours
48-54

Out of Class Hours Lecture
96-108

Total Contact Hours
48 - 54

Total Out of Class Hours
96 - 108

Total Student Learning Hours
144 - 162

Distance Education
Yes

Distance Education

Distance Education Type
Hybrid Only

What will be done in face-to-face meetings
In face-to-face meetings, the focus is on engaging activities and collaborative learning rather than long lectures. Here are common things that are done:

Warm-up / Number Talk
Short mental math or problem-solving prompts where everyone shares strategies, showing multiple ways to think about the same problem.

Hands-on Activities
Using manipulatives (like base-ten blocks, counters, pattern blocks, or fraction tiles) to explore mathematical concepts. The idea is to experience math the way elementary students might.

Small Group Work
Working on rich math tasks or problems in groups, then discussing different strategies as a class.

Exploring Concepts Deeply
Focusing not just on how to solve, but why a method works. For example, modeling addition and subtraction with place value blocks rather than just doing standard algorithms.

Are you using publisher content?

No

Regular Substantive Interaction

Instructor-to-student, student-to-student, and student-to-content contact shall be distributed in a manner that will ensure regular substantive interaction (RSI) is maintained not only weekly but also for the duration of the course. Instructor interactions should be equivalent in time, quality and consistency to the engagement students would receive in a face-to-face course—for example, through announcements, discussion participation, personalized feedback, video messages, or other instructional communications. Instructors are expected to be responsive to student inquiries within a 24-72 hour time frame excluding holidays. RSI will be maintained through a variety of methods: • Orientation - Students must be oriented to the online and face-to-face portions at the start of the course. • Announcements - Announcements using the course management system must be posted at least weekly to keep students current on course events, due dates, materials, etc. • Discussion Forums - Content-related discussion forums within the designated CMS will include appropriate instructor participation and will be initiated and maintained, with timely feedback provided. Instructors are required to monitor the discussions and related activities to provide guidance and direction. Open-ended discussion boards may be used to further learning and interaction. • MSJC Communication – Instructor will use MSJC-administered communication tools (such as email or the designated CMS communication tools) to regularly communicate with and provide ease of access to students. • Timely Feedback - Timely feedback on student work will be provided by the instructor, which may include comments and/or rubrics, within the Grades area of the designated CMS. • Scheduled Meetings – Hybrid and synchronous courses will meet at regularly scheduled times. ADA Compliance - All course interactions and content must be designed with accessibility in mind and meet ADA requirements.

Catalog Description

This course focuses on the development of quantitative reasoning skills through integrated exploration of: sets, number systems up to and including real numbers, arithmetic operations, basic number theory, ratio and proportion, and percent. Emphasis is on comprehension and analysis of mathematical concepts and applications.

Requisites

Prerequisite(s)

Prerequisite(s) (must be taken before)
Placement as determined by the college's multiple measures assessment process or completion of a course taught at or above the level of intermediate algebra.

Codes

TOP Code (CB 03)

1701.00 - Mathematics, General

CIP Code

13.1311 - Mathematics Teacher Education.

Repeatability Code

No

Grading Option

Letter grade OR P/NP

Minimum Qualifications

Minimum Qualifications	And/Or
Mathematics (Masters Required)	End

GE Information

Check GE Types Requested

AA/AS G - Math Competency

Learning Objectives

Learning Objectives

Learning Objective
1. Perform calculations with place value systems.
2. Evaluate the equivalence of numeric algorithms and explain the advantages and disadvantages of equivalent algorithms in different circumstances.
3. Apply algorithms from number theory to determine divisibility in a variety of settings.
4. Analyze least common multiples and greatest common divisors and their role in standard algorithm.
5. Explain the concept of rational numbers, using both ratio and decimal representations; analyze the arithmetic algorithms for these two representations; and justify their equivalence.
6. Analyze the structure and properties of whole, rational, and real number systems; define the concept of rational and irrational numbers, including their decimal representation and illustrate the use of a number line representation.
7. Develop and reinforce conceptual understanding of mathematical topics through the use of patterns, problem solving, communication, connections, modeling, reasoning, and representation.
8. Design culturally relevant and equity-centered mathematical activities aligned with the Common Core State Standards.

Learning Outcome Information

Course Learning Outcomes

Learning Outcome
1.Students will design word problems that apply the four basic operations with real numbers.
2. Students will represent quantitative information with correct mathematical notation, visual models, and equivalent forms using real numbers.
3. Students will analyze the Mathematical Practices of the Common Core State Standards as they relate to mathematics curriculum design.

Content

Course Lecture Content

This course provides a comprehensive reexamination of elementary school mathematics with the goal of deepening conceptual understanding and uncovering the reasoning behind mathematical procedures and formulas. Students will actively engage with mathematics through problem-solving, reasoning, and the use of multiple representations. Throughout the course, participants will connect mathematical concepts to the Common Core State Standards (CCSS) and NCTM's Principles to Actions, emphasizing both content and process standards.

Particular focus is given to fostering a growth mindset, developing the habits of mind of productive mathematical thinkers, and implementing effective mathematical practices that support all learners. The course also situates mathematics within current educational contexts, exploring issues of equity, technology integration, and culturally relevant pedagogy.

1. Foundations for Learning Mathematics
    a. Current Issues in Mathematics Education
        i. Examine contemporary challenges in the teaching and learning of mathematics, including the integration of artificial intelligence, ensuring equity and access for diverse learners, addressing the impact of student and teacher mindsets, and balancing procedural fluency with conceptual understanding.
    b. Culturally Relevant and Equity-Centered Teaching

i. Design and evaluate mathematical activities that are culturally responsive and equity-oriented, aligning them with the CCSS and promoting access for all students.

c. Mathematical Processes, Practices, and Standards
   i. Explore what it means to develop an authentic understanding of mathematical ideas versus memorizing procedures without meaning.
   ii. Connect the CCSS Mathematical Practice Standards and NCTM Process Standards to classroom instruction and student learning. Cultivate habits such:
      1. making sense of problems and persevering in solving them.
      2. reasoning abstractly and quantitatively
      3. constructing viable arguments and critiquing the reasoning of others
      4. modeling with mathematics
      5. using appropriate tools strategically
      6. attending to precision
      7. looking for and making use of structure
      8. looking for and expressing regularity in repeated reasoning.

2. Sets
   a. Define the Real Number Set and explore relationships between its subsets.
   b. Explore relationships among number sets and their representations on the number line.
3. Number Systems
   a. Trace the development of numeration systems leading to the modern Hindu-Arabic system, highlighting the evolution of place value.
   b. Define and examine the structure, properties, and representations of whole numbers, integers, rational, and irrational numbers.
   c. Analyze the meaning, structure, and properties of fractions, decimal representation, including equivalence and operations.
4. Number Operations (Up to and Including Real Numbers)
   a. Investigate conceptual and procedural understandings of addition, subtraction, multiplication, and division across number systems.
      i. Include both standard and non-standard algorithms.
      ii. Explain the advantages, disadvantages, and equivalencies of each.
5. Divisibility and Number Properties
   a. Apply divisibility rules, prime and composite numbers, prime factorization, and the Fundamental Theorem of Arithmetic in a variety of contexts.
   b. Apply concepts of greatest common factor (GCF), least common multiple (LCM), and least common multiple in problem-solving contexts.
6. Ratios
   a. Develop understanding of ratio relationships and their applications in mathematical and real-world contexts.

Methods of Instruction

Method

Activity

Integration

Activities can be used to allow students to interact with the content. For example, to address LO8 and LO2, students can design culturally relevant and equity-centered problems involving addition, subtraction, multiplication, or division related to their lived experiences and tied to diverse cultures (e.g., cooking with traditional recipes, sharing resources in community events, budgeting for holidays), then exchange them with peers, who will then solve the problem using two different but equivalant algorithms.

DE Adaptations for MOI

Instructions for each activity can be written and uploaded directly to the CMS for easy student access. A dedicated discussion board should be created within the CMS to allow students to ask questions and seek clarification about the activity in a collaborative space. Student work products can be submitted through the CMS and shared using the Peer Review feature, enabling students to exchange assignments randomly and solve the mathematical problems provided by their peers. To ensure accessibility and inclusivity, all mathematical notation should be formatted in a screen reader–compatible format, and alt text should accompany visual elements

such as number lines or chip models. In addition, audio explanations can be embedded within the CMS to support diverse learning preferences and enhance comprehension.

Method

Discussion

Integration

Discussions, either student-to-student or teacher-to-student, can be used to make claims, consider others' claims, and possibly revise their original claims. For example, a discussion can be started that aligns with LO8, which asks students to identify which Mathematical Practice Standards (part of the CCSS) are present in a culturally relevant and equity-centered activity and explain their reasoning.

DE Adaptations for MOI

Discussions can be structured through discussion boards in the CMS. Accessibility can be increased by creating prompts written in plain language with glossary links for key mathematical terms, along with options for students to post audio or video (with captions and transcripts) in addition to text.

Method

Homework

Integration

Homework can be used for independent practice of concepts covered in class. For example, a homework assignment related to LOs 2 and 3 can be used for students to create and solve problems using both long division and divisibility rules, then reflect on which is more efficient in a real-world context (e.g., budgeting, sharing resources).

DE Adaptations for MOI

The homework assignment can be posted in multiple formats (Word, HTML, PDF), with screen-reader compatibility and alt text for visuals. Students can submit typed, handwritten (uploaded), or audio responses via the CMS.

Method

Lecture

Integration

A lecture can be used to define standard mathematical notation. For example, when working with LO6, each number set has its standard way of representing its elements. The lecture can include demonstrations of the history of current notation by connecting it to the various cultures that contributed to this notation, including numeration systems of the Romans, Mayans, Egyptians, Hindus, Arabs, and Babylonians.

DE Adaptations for MOI

Lectures can be recorded and posted in the CMS with interactive checks (embedded polls or quizzes). All videos can be captioned and provide downloadable notes in accessible formats. Videos in the CMS also allow for comments, for which students can ask for any clarifications.

Methods of Evaluation

Method

Class Participation

Integration

Class participation will serve as a method of evaluation to measure the degree of mastery of specific learning objectives. The results of these evaluations will inform both the instructor and the student about areas that may require correction, reinforcement, or review to support continued growth and understanding.

Participation will occur during lectures and individual practice sessions. For example, to address Learning Objective 8, the instructor may ask students to identify which Common Core State Standards (CCSS) Mathematical Practice(s) are demonstrated in a particular problem and to discuss how students from diverse backgrounds might engage with these practices in different ways when solving the problem.
Student responses may be submitted in written form, orally, or electronically. Participation will be assessed based on the accuracy, depth, and justification of responses, demonstrating both an understanding of mathematical practices and an appreciation for diverse approaches to problem-solving. The instructor will provide timely feedback, typically within three days of submission, to guide reflection, improvement, and ongoing learning.

DE Adaptations for MOE

In an online learning environment, class participation can be facilitated through discussion boards within the CMS. Students will submit their responses to discussion prompts in these forums, engaging in dialogue with peers and the instructor to deepen their understanding of mathematical concepts and practices. A scoring rubric will be provided to clearly outline the expectations for high-quality responses and to promote consistency and transparency in grading..The instructor will provide timely feedback, typically within three days of submission, to support ongoing learning and improvement

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Method

Exams/Tests

Integration

Exams will serve as a method of evaluation to measure the degree of mastery of specific learning objectives. The outcomes of these assessments will inform both the instructor and the student about areas that demonstrate strong understanding as well as those that may require further clarification, review, or targeted support to strengthen mathematical proficiency.
Examinations will assess both conceptual understanding and procedural fluency through a variety of question types, including problem-solving tasks, application-based scenarios, and explanations of mathematical reasoning. For example, to address LO 5, students may be asked to explain the three views of rational numbers, write a fraction as a decimal, and justify their equivalence.

DE Adaptations for MOE

Exams can be administered through the CMS and should offer multiple ways for students to demonstrate understanding, such as written responses, digital submissions, or oral explanations. Grading will be based on both correctness and completion, using a clear rubric established by the instructor. Feedback should be given to students within a week of submission.

Method

Homework

Integration

Homework exercises will serve as a formative method of evaluation designed to help students reinforce and apply newly learned learning objectives. Homework provides an opportunity for students to practice problem-solving, strengthen their understanding, and identify areas that may require further clarification before summative assessments.
Homework will be evaluated based on the accuracy, completeness, and clarity of student responses. Timely instructor feedback will be provided to guide students toward deeper understanding and mastery of the targeted learning objectives.
For example, following an activity addressing LO 4, in which students learn two different methods for finding the Greatest Common Factor of two numbers, a homework assignment may ask students to solve a similar problem using both techniques and explain the reasoning behind each approach.

DE Adaptations for MOE

Homework can be submitted using the CMS by uploading files. Students will be graded on the accuracy of their responses, with clear guidance and support to ensure equitable opportunities for success. Feedback should be given within three days of submission, and students should be allowed to make corrections and resubmit based on the feedback given.

Method

Projects

Integration

Projects will serve as a comprehensive method of evaluation that allows students to integrate multiple learning objectives and demonstrate a deeper understanding of mathematical concepts through application, analysis, and communication. For example, a project can relate LOs 1, 2,and 6 by comparing and contrasting each of the number sets along with their algorithms for each

operation and how place value influences (or does not) the algorithms. Projects may be completed individually or in small groups and submitted digitally through the CMS. Students may be asked to include written explanations, visual representations, or digital media components such as charts, models, or audio explanations.
Evaluation will be based on the accuracy of the mathematics, the depth of conceptual understanding, the clarity and organization of the presentation, and the ability to communicate mathematical reasoning effectively. The instructor will provide constructive and timely feedback, typically within one week of submission, to support continued learning and growth.

DE Adaptations for MOE

Students can submit projects in the CMS through collaborative documents, slide presentations, or video recordings, providing flexibility in how they communicate their ideas.. Student work will be assessed on the correctness of their responses, as well as their ability to clearly communicate reasoning. A scoring rubric will be given to students to ensure clarity of what is expected. Feedback should be given within a week of submission.

Method

Quizzes

Integration

Quizzes will serve as a formative and diagnostic method of evaluation to measure students' ongoing progress toward mastery of specific learning objectives. They provide both students and the instructor with timely feedback about current understanding, allowing for targeted review and reinforcement before major assessments such as exams or projects.
Evaluation will be based on the accuracy, completeness, and clarity of responses, as well as evidence of conceptual understanding and procedural fluency. The instructor will provide prompt feedback, typically within three days of submission, to guide reflection and help students make necessary adjustments in their learning.
For example, after completing lessons related to LO 4 on finding the Least Common Multiple, a quiz might include problems requiring students to apply both the prime factorization method and the listing method, explaining why both approaches yield the same result.

DE Adaptations for MOE

Quizzes can be delivered through the CMS, allowing students to submit responses digitally, with options for multiple attempts, untimed formats, or alternative answer modes to accommodate diverse learning needs. Grading will focus on correctness while ensuring equitable access and opportunities for all learners to succeed. Feedback should be given within three days of submission.

Assignments

Assignment Type

Reading

In-class and/or outside of class

Outside of class

Formative or Summative

Formative

Assignment

Read the college-level articles "Understanding Mathematical Content Knowledge" and "Pedagogical Content Knowledge" from the book Teaching Elementary Mathematics provided by the instructor. These articles examine mathematical content knowledge and contrasts it with pedagogical content knowledge. Notate anything you read that has surprised you or needs clarification. Submit a summary of your notations on the discussion board and prepare to discuss them at the next class meeting.

How assignment will be adapted in online format

This reading can be uploaded into a CMS page and checked for accessibility. Notations can be made by making hard copies for students who need them. The discussion board for submission can allow for text, file upload, audio, or video to ensure all students have a format that is suitable to them.

Assignment Type

Other

In-class and/or outside of class

In-class

Formative or Summative

Summative

Assignment

First, you will need to have access to the Standards for Mathematical Practices. Download Standards for Mathematical Practices.

Next, using at least one of those practices, design an activity that a learner would go through so that not only will the content be learned, but at least one Mathematical Practice will be utilized.

You must choose three content areas listed below and address at least three different practices. Create a video, a narrative (a word processing document), or a slide deck for each lesson and submit via Canvas or an Inbox message to me.

List of Content (choose three):

Addition of Decimals
Subtraction of Decimals
Multiplication of Decimals
Division of Decimals
Converting Fractions to Decimals
Naming and Writing Decimal Numbers
Ordering Decimals
Identifying number sets
Using the Pythagorean Theorem
Plotting Numbers on a number line

So, pick any three content areas along with a Mathematical Practice for each.
Create the lesson and submit. To be clear, there should be three lessons.

You will be graded on:

The clarity of the lesson (1/3 of grade per lesson)
Application of the SMP to the content. Be sure it is clear that the learner is DOING the SMP. (1/3 of grade per lesson)
Mathematical correctness of the lesson. (1/3 of grade per lesson)

How assignment will be adapted in online format

This exam can be posted to the CMS for students to read. A dedicated discussion can be created for students who would like any clarification of the instructions. Submissions can be made by uploading their product through the CMS.

Assignment Type

Writing

In-class and/or outside of class

Outside of class

Formative or Summative

Formative

Assignment

Your task is to choose a culture's numeration system and learn how it works. You may not choose the Hindu-Arabic system (our current system) or any other base-ten system.

Once you've chosen your system:

Teach me how to count using it.

Imagine that I am a blank slate — I know nothing about numbers or counting in any system.

Do not explain by simply saying “this is one” or “this is ten.” Instead, focus on showing me the structure of the system. If I can see the pattern, I should be able to keep counting without your help.

Do not perform arithmetic operations (no addition, subtraction, multiplication, or division). The focus is on understanding the numeration system itself.

Format:

A video is usually the easiest way to teach, but you may also create a slide deck or word processing document.

Your goal is to make it so clear and visual that someone completely new to the system can recognize the counting pattern and continue it independently.

Use the supplied rubric to check your project before you submit it.

How assignment will be adapted in online format

These task instructions can be uploaded into a CMS page and checked for accessibility. Notations can be made by making hard copies for students who need them. The project submissions in the CMS can allow for text, file upload, audio, or video to ensure all students have a format that is suitable for them.

Course Materials

Textbooks

Bassarear, T (2020). Mathematics for Elementary School Teacher 7th Cengage. ISBN: -

Other Resources

1. Principles to Actions (2014)2. California Common Core State Standards (2014)For additional resources go to www.nctm.org and www.cde.ca.gov

Class Size Information

Class Size

40

Class Size Category

A - Lecture/discussion 40

Diversity and Inclusion

Course Design and Materials: Course will incorporate diverse perspectives, authors, and examples that reflect a variety of cultures, identities, and lived experiences. Instructional materials will be reviewed regularly to ensure representation, inclusivity, and alignment with equity-minded practices across disciplines.

Inclusive Learning Environment: Instructors will establish classroom norms and policies that promote respect, civil discourse, and belonging in both online and face-to-face classes. Clear expectations for communication and engagement will support a learning space where all students feel valued and heard.

Accessible Instruction: Course content will be delivered using accessible design. Materials will follow accessibility guidelines within the CMS, including captioned media, readable document formats, and multiple means of engagement to support diverse learning.

Equitable Teaching Practices: Instructors will use transparent and grading criteria, varied assessment methods, and timely feedback to promote fairness and student success. Opportunities for revision, reflection, and multiple demonstrations of learning may be incorporated when appropriate to the discipline.

Culturally Responsive Pedagogies: Instructional strategies will encourage critical thinking about diverse perspectives and systems of power relevant to the course content. Faculty will foster opportunities for students to connect course material to real-world contexts.

Ongoing Reflection and Improvement: Faculty will engage in continuous professional development related to IDEAA principles and reflect on course practices using metacognition to identify opportunities for increased equity, inclusion, and accessibility.

Explain how diversity and inclusion(e.g., gender, culture/race, sexuality, etc.) is infused into the course.

Learning Objective 8 directly integrates diversity and inclusion into the course by requiring students to design culturally relevant and equity-centered mathematical activities aligned with the CCSS. To support this objective, the instructor will guide students in understanding the principles of culturally relevant pedagogy and how to apply them in mathematics instruction. This can be addressed as a standalone objective or, preferably, embedded across other learning objectives to reinforce connections between mathematical content and cultural contexts.

For example, in connection with LO 5, which focuses on ratios, the instructor might incorporate word problems drawn from a variety of cultural, community, or international contexts. Such examples help students view mathematics as a tool for exploring and understanding diverse real-world experiences rather than as a collection of abstract rules. Similarly, in Learning Objectives 2 and 3, which emphasize the analysis and evaluation of standard and non-standard algorithms, instructors can highlight the cultural and historical origins of different computational methods that have emerged from various parts of the world. This approach allows students to appreciate mathematics as a human endeavor shaped by many cultures, fostering inclusivity, relevance, and global awareness

Describe how assignments, instruction, evaluation, course content, and interactions are contextualized for diverse learners promoting an equitable course.

Assignments: Assignments are designed with multiple entry points to accommodate diverse learners, including those with different cultural backgrounds, language proficiencies, and learning styles. For example, word problems incorporate real-world contexts from a variety of cultures and everyday experiences, allowing students to connect mathematical concepts to their own lives. Assignments also offer choices in format (written explanations, visual representations, or oral presentations) to ensure all students can demonstrate understanding in ways that align with their strengths. Scaffolding is provided through guided examples, prompts, and differentiated support, ensuring equitable access to complex problems.

Instruction: Instruction integrates multiple strategies to address diverse learning needs. Visual aids, manipulatives, and interactive technology support conceptual understanding for students who benefit from concrete representations of abstract ideas. Teachers use culturally responsive examples and analogies to make concepts relatable across different communities. Collaborative learning is encouraged, pairing students with diverse perspectives to enrich problem-solving discussions, build reasoning skills, and foster mutual respect. Instruction also emphasizes growth mindset principles, encouraging students to value effort and reasoning over speed or correctness alone.

Evaluation: Evaluation practices are designed to fairly assess students' understanding of quantitative reasoning, rather than just procedural fluency. Multiple forms of assessment—such as project-based tasks, performance tasks, written explanations, and traditional quizzes—allow students to demonstrate mastery in ways that reflect their strengths. Rubrics highlight reasoning, application, and clarity of communication. Teachers provide timely, constructive feedback to support continuous improvement, and accommodations are made for learners with specific needs, ensuring assessments are equitable and accessible.

Interactions

Explain how the course will incorporate student-to-student interaction.

Students will regularly work in pairs or small groups to solve mathematical problems. Group activities might include analyzing word problems, exploring number patterns, or applying operations to real-world scenarios.

Assignments such as written explanations of problem solutions or mini-projects will include opportunities for peer feedback. Students can evaluate each other's methods, provide constructive comments, and suggest alternative approaches.

In both in-person and distance learning settings, students can engage in structured online discussion boards. Prompts may involve comparing approaches to a problem, sharing real-world applications of mathematical concepts, or debating multiple solution strategies.

Students may take turns teaching a concept or solution method to classmates in small groups. Teaching peers reinforces the student-teacher's understanding while supporting classmates' learning.

Explain how the course will incorporate instructor-to-student interaction.

The instructor provides clear explanations of mathematical concepts, step-by-step demonstrations, and modeling of problem-solving strategies. Guided practice allows the instructor to observe student thinking, provide immediate feedback, and clarify misunderstandings.

Homework, quizzes, and projects receive timely, individualized feedback. The instructor highlights correct reasoning, points out misconceptions, and suggests strategies for improvement.

The instructor offers office hours to provide personalized guidance tailored to students' learning needs and pace. The instructor communicates via discussion boards, email, or video conferencing. Timely responses to questions and explanations ensure ongoing support and maintain engagement.

Explain how the course will incorporate student-to-content interaction.

Students interact directly with sets, number systems, arithmetic operations, basic number theory, ratios, proportions, and percentages through structured exercises, guided examples, and problem sets. Activities require students to analyze, manipulate, and apply mathematical concepts rather than simply memorize formulas.

Students work with manipulatives, visual models, or digital tools to explore patterns, relationships, and real-world applications of mathematical ideas. For example, using tables, graphs, or area models to understand operations and proportions encourages active exploration.

The course uses real-life scenarios and word problems that require students to apply concepts to meaningful contexts. This interaction deepens comprehension and highlights the relevance of mathematics beyond the classroom.

Students engage with videos, readings, interactive simulations, and practice modules to reinforce learning. Immediate feedback from digital tools allows students to test understanding, correct mistakes, and progress at their own pace.

Assignments and exercises often include reflective prompts, asking students to explain reasoning, compare methods, or generalize patterns. These activities require students to actively construct knowledge rather than passively receive information.

Students encounter content through numbers, symbols, diagrams, tables, and verbal explanations, fostering flexible thinking. They are encouraged to translate between representations, deepening conceptual understanding.

Explain how the course will incorporate student-to-self interaction (metacognitive).

Students regularly reflect on their understanding of concepts, problem-solving strategies, and errors.
Reflection prompts may include questions like: "What strategy worked best for this problem?" or "Where did I struggle and why?"

Students assess their own progress through quizzes, practice exercises, or checklists aligned with learning objectives. Self-assessment encourages awareness of strengths, weaknesses, and areas needing additional practice.

Students are prompted to choose strategies intentionally, predict outcomes, and evaluate the effectiveness of their approaches. This metacognitive process helps students identify patterns in their thinking and adapt strategies for better results.

When students make mistakes, they are guided to analyze the error, understand why it occurred, and adjust their approach. This promotes a growth mindset and develops resilience in learning mathematics.

Key: 2103