MAT 305: Basic Concepts of Mathematics I

Fall 2026

Instructor:	Jared McBride	**Time:**	MWF 8:00–8:50am
Email:	jared.mcbride@svu.edu	**Place:**	Magnolia Hall 109
Phone:	(480) 695-5627	**Office:**	Magnolia Hall 111

"Character is the aim of true education; and science, history, and literature are but means used to accomplish the desired end. Character is not the result of chance work but of continuous right thinking and right acting. . . . True education seeks, then to make men and women not only good mathematicians, proficient linguists, profound scientists, or brilliant literary lights, but also honest men, combined with virtue, temperance, and brotherly love — men and women who prize truth, justice, wisdom, benevolence, and self-control as the choicest acquisitions of a successful life. . . . It is regrettable, not to say deplorable, that modern education so little emphasizes these fundamental elements of true character. The principal aim of many of our schools and colleges seems to be to give the students purely intellectual attainments and to give but passing regard to the nobler and more necessary development along moral lines."

—David O. McKay
(*Gospel Ideals*, p. 440)

Information for all my students

Student Hours: Student hours are like office hours but they are not in my office. They are held, instead, right next door in the Magnolia Hall conference room (Magnolia Hall 109). They are at these times:

Tuesday and Thursday from 12:00 PM to 4:00 PM.

or by appointment. If you can't make student hours physically but can drop in on Zoom, please let me know before hand. The Zoom link will be https://zoom.us/my/drmcbsvu. Please, feel free to drop in with your questions. No appointment is necessary.

If you have a private matter to discuss, please make an appointment to see me. If it is quick (these things usually are) feel free to come to student hours and we can step into my office.

My tentative weekly schedule is as follows:

Time	Monday	Tuesday	Wednesday	Thursday	Friday
8:00 AM	MAT 305		MAT305		MAT305
9:00 AM	MAT 100	MAT221	MAT100	MAT221	MAT100
10:00 AM	MAT 343	MAT221	MAT343	MAT221	MAT343
11:00 AM	MAT 221		MAT221		Forum
12:00 PM	MAT 221	Student Hours	MAT221	Student Hours	
1:00 PM		Student Hours		Student Hours	
2:00 PM		Student Hours		Student Hours	
3:00 PM		Student Hours	Faculty Meeting	Student Hours	
4:00 PM			Faculty Meeting		

AI Use Policy: The purpose of this course is to help you develop both skills and deep understanding, especially of mathematical concepts. Homework and assignments are designed to give you the practice you need to build those skills.

Some students may be tempted to use AI tools to complete their work instead of working through problems themselves. This is like signing up for a weight training class but using a machine to do the lifting for you; you wouldn't build the strength you need. The same is true here: if AI does the work, you miss the chance to develop the understanding and skills necessary for success in this course and in future courses.

That said, AI can be a helpful learning aid when used appropriately. Think of it like using a box to assist with pull-ups: you can use the box to help you get above the bar, then slowly lower yourself to build strength. After a while, you'll be able to do pull-ups without the box. Similarly, you can use AI to help you get "unstuck" on a problem—by asking for hints, clarifications, or explanations of a concept, rather than simply asking for the full answer. This is using AI to facilitate your learning rather than rob you of the chance to learn. This is what I referr to as using AI wisely.

Illustrative examples:

- **Wise use:** You are working on the homework and there is a question that you have already worked on but you keep getting it wrong, even after going to your notes and checking your method. You ask ChatGPT the question and observe what it did differently, you try it again and get it right with that modification. You make a note of that in your notes so you get it right next time. Or you make a note to ask about it in class.
- **Unwise use:** You have not yet attempted a certain homwork question but becaue you are low on time you copy the question and ask ChatGPT. Only some of the explanation makes sence or seems familiar to you, but you submit it anyway. This is dishonest and not acceptable.

In this course, the policy for AI use is to use it wisely, which often means not using it at all. The unwise use of AI is prohibited and results in a loss of points and in some cases may be reported to the Provost office as a breach of academic integrity. Also, the use of AI on any quiz or test of any kind is prohibited, and if discovered will result in a zero on that quiz or test. If you are unsure about whether your use of AI is wise or unwise, please ask me before you submit your work.

If you rely on AI to do the work for you, you may finish assignments faster, but it is unlikely that you will develop the skills you need to succeed.

One more thing, the wise use of AI is likely to be extremely important in your career. Start now learning how to get the full benefit of AI usage without compromising your own DEVELOPMENT.

Policies Specific to MAT 305: Basic Concepts of Mathematics I

Here is the class in a nutshell. This course is about mathematics for future elementary teachers — not just doing math, but understanding it deeply enough to explain it to a child. We cover Chapters 1–6 of the textbook, one section at a time. Each section spans two class meetings. On **Demo Day** we explore the mathematical idea together through a task or structured investigation — come ready to think, not having pre-read. On **Deeper Day** you will have read the section, filled out a Lesson Guide, and submitted a Lesson Quiz to Canvas before class begins; in class we unpack examples, connect back to the Demo Day task, and link the mathematics to elementary teaching. After each chapter there is a **Celebration of Knowledge** (chapter test) and a take-home Practice Test to prepare for it. The course concludes not with a final exam but with a **Final Lesson Plan**: you will design, write, and present a mathematics lesson to your classmates during the last two class meetings and finals week.

Textbook: We will use *Mathematics for Elementary Teachers: A Conceptual Approach*, 10th Edition, by Bennett, Burton, Nelson & Ediger (McGraw-Hill, 2016). This course covers Chapters 1–6; MAT 306 covers Chapters 7–12, so you will use the same book for both semesters. You are required to purchase or rent a copy through the SVU Online Bookstore (print or digital).

Required Materials:

- The textbook (see above). The online version is accessed through MHTML files provided in Canvas; a physical copy is also acceptable.
- A **Manipulative Kit** (ISBN: 9781259293474), loaned to you by the instructor at the start of the semester. You will need it for several class activities and your Final Lesson Plan. Return it at the end of the semester in good condition. If you prefer to own a copy, used versions are available online.
- A **Student Solutions Manual** (digital copy provided in Canvas) — out of print, but useful for checking odd-numbered homework problems.

Course Description: Provides a broad background of number systems and operations for prospective elementary school teachers. Includes development and applications of set theory; number systems, their structure, basic operations and properties; number theory; ratio, proportion, and percent. Students also develop the pedagogical knowledge needed to teach these topics to K–6 learners.

Prerequisites: MAT 115: College Algebra.

Course Expectations:

- Regular attendance is essential. Both class meetings for each section matter: Demo Day cannot be made up through notes alone, and Deeper Day cannot be productive without the pre-reading.
- Expect to spend at least **2 hours** outside of class for every hour in class — roughly 6 hours per week beyond our meeting time.
- Bring your textbook (or access to the MHTML files) and your Manipulative Kit on days when they are listed in the Course Schedule.
- Keep phones on silent and put them away. Class time is active work time.

Grading Scheme:

Task Reflections	10%
Lesson Guides	10%
Lesson Quizzes	5%
Homework	15%
Celebrations of Knowledge (6)	48%
Final Lesson Plan	12%
Total	100%

(The percentages guarantee at least the following letter grades.)

A	93%	C+	77%
A-	90%	C	73%
B+	87%	C-	70%
B	83%	D+	67%
B-	80%	D	63%

A grade of C− (70%) or better is required to advance to MAT 306. A grade between 60% and 69% is passing but indicates insufficient preparation for MAT 306; per SVU policy, you will be required to repeat MAT 305.

Grading Rubric (applied to Homework, and Celebrations of Knowledge):

100%	Complete and accurate
80%	Minor errors
60%	Major errors
40%	Incomplete attempt
20%	Substantially incomplete
0%	Not submitted

Task Reflections (10%): After each Demo Day class meeting you will submit a brief written reflection (handwritten scan or typed, via Canvas) answering exactly two questions:

1. **What did you learn?** Describe the core mathematical idea in your own words — not what we did, but what you now understand that you did not understand before class.
2. **How did the task do?** Evaluate the task as a future teacher: Was it effective at building understanding? Who engaged, and who struggled? What would you keep or change if you used it in your own classroom?

Due by midnight on Demo Day. May be submitted up to two weeks late for partial credit.

Lesson Guides (10%): Before each Deeper Day class meeting you will read the assigned section of the textbook and fill out the Lesson Guide *as you read* — not after. The guide contains key-term blanks, big-picture conceptual questions, worked examples without solutions (you attempt them), and classroom-connection items that link the mathematics to elementary teaching. Submit the completed guide to Canvas before class begins on Deeper Day.

The ideal time to do this reading is in the gap between Demo Day and Deeper Day. Demo Day will have introduced the mathematical idea experientially, which tends to make the formal treatment in the textbook easier to follow — the vocabulary and structure feel less abstract when you have already wrestled with the idea yourself. That said, if your schedule requires it, completing the reading before Demo Day is perfectly fine; what matters most is that you come to Deeper Day having read carefully and filled out the guide.

Deeper Day class is structured around your pre-reading. If you arrive without having done the reading, class will be significantly less useful to you.

None of these will be dropped — every section's pre-reading matters. May be submitted late (within two weeks) for partial credit.

Lesson Quizzes (5%): For each Deeper Day class meeting there is a 10-question Canvas quiz due *before class begins*:

- **Questions 1–5 (Mathematics):** Content understanding, procedures, and reasoning from the section. Levels range from recall to analysis.
- **Questions 6–10 (Pedagogy):** Teaching knowledge — CCSS connections, common student misconceptions, manipulative selection, and teaching moves. Question 6 always connects to the Demo Day task.

Quizzes are submitted to Canvas and must be completed before Deeper Day class begins. Late quizzes are not accepted. At least two quiz grades will be dropped at the end of the semester.

Homework (15%): After each Deeper Day class meeting, complete the textbook exercises listed in your Lesson Guide. Show full reasoning for every problem — a final answer without supporting work earns no credit. Each section's homework is due by midnight on the *next* section's Demo Day. The exception is the last section of each chapter: that homework is due before the chapter's Celebration of Knowledge, so it still serves as test preparation. Exact dates are listed in the Course Schedule and on Canvas.

Homework is calibrated to prepare you for the Celebrations of Knowledge. Work each problem independently; collaboration is encouraged for understanding, but every student must submit their own work and reasoning. One or two of the lowest homework scores will be dropped at semester's end.

Celebrations of Knowledge (48%): Six chapter assessments, one per chapter, each worth approximately 8% of your final grade.

Celebration	Sections Covered
Chapter 1	1.1, 1.2
Chapter 2	2.1, 2.2
Chapter 3	3.1, 3.2, 3.3, 3.4
Chapter 4	4.1, 4.2
Chapter 5	5.1, 5.2, 5.3
Chapter 6	6.1, 6.2, 6.3, 6.4

Before each Celebration of Knowledge a **Practice Test** is distributed at the end of class. Complete it independently in one sitting and submit it to Canvas; a solution key is provided after submission. Chapters 1, 3, 5, and 6 also receive a **Test Prep** class session that discusses the most difficult practice problems.

Exact testing windows are listed in the Course Schedule. You may retake a Celebration of Knowledge once, within two weeks of your original attempt; the higher score is recorded. If you must miss the window entirely, contact me in advance.

Final Lesson Plan (12%): In place of a final exam you will design, write, and present an elementary mathematics lesson plan.

- **Topic:** Any K–6 mathematics topic of your choice.
- **Format:** Purple-book style — a task or structured exploration for elementary students, with Launch, Explore, and Discuss & Summarize phases.
- **Duration:** A 20-minute lesson with a student-based activity using manipulatives.
- **Presentation:** Live presentation to the class during the last two class meetings and/or the finals-week session. Peers provide written feedback.
- **Submission:** Lesson plan document submitted to Canvas by the finals-week deadline.

You have one attempt. There are no make-ups or retakes during finals week.

Schedule: A day-by-day schedule — activities, homework, Practice Test and Celebration of Knowledge windows — is provided in the separate *Course Schedule* handout and posted on Canvas. It is subject to change; changes will be announced in class and on Canvas.

Course Goals: After completing this course you should be able to:

1. Apply Polya's four-step problem-solving process and a variety of strategies to non-routine problems.
2. Explain *why* standard elementary algorithms for whole-number, integer, and fraction arithmetic work — not just how to execute them.
3. Use physical and visual models (number lines, area models, manipulatives) to represent mathematical operations and concepts.
4. Apply number theory concepts (divisibility, primes, GCF, LCM) in arithmetic contexts.
5. Connect ratio, proportion, and percent to multiplicative reasoning.
6. Identify the cognitive demand level of a mathematical task and select tasks appropriate for elementary learners.
7. Match mathematical concepts to the relevant CCSS content standards and grade levels.
8. Recognize common student misconceptions and describe how to address them with models or questioning.
9. Design a student-centered elementary mathematics lesson using the task-launch-explore structure.

Since this is a major course, I feel it is important to give students ample opportunities and resources to develop their skills as independent learners. In my experience, one characteristic that sets math majors apart from other students is their ability to assimilate complex procedures and concepts in a short period of time. For better or worse, this ability is universally expected of math majors in both industry and academia. This is often referred to as a soft skill in graduate school, or as part of what is called the "hidden curriculum." My hope is that all of my students are well practiced in this skill by the time they graduate—so that they are not only capable of learning something on their own, but can do so effectively.

The way I attempt to foster this skill is by asking students to read the textbook before class. We then work through the section together during class time. Throughout this process, you will have ample opportunity to ask questions and—most importantly, in my opinion—to **discuss**, in your own words, what is happening. In doing so, we leverage the significant benefit of having a very small class size while we still have it. Each of you will have the opportunity to test and develop your understanding of the material through discussion with your peers and with me.

Core Learning Goals (CLG): Here is a reminder of the goals SVU has for each graduate. Students completing Southern Virginia's core curriculum are expected to attain the following college-level competencies:

- *Careful Writing:* Students will be able to present arguments in clear written English with proper spelling, grammar, vocabulary, and transitions.
- *Critical Thinking:* Students will be able to separate a conclusion from its premises and evaluate how well the premises support the conclusion.
- *Analytic Reasoning:* Students will be able to evaluate a body of evidence and draw appropriate conclusions.

Core Values: Lastly, Here is a reminder of the values SVU endeavors to foster in each student. Students demonstrate:

- *Scholarship* by coming prepared to class, focusing on activities in class, and meticulously completing homework assignments.
- *Discipleship* by being respectful of others and showing courtesy and concern for others and the learning environment.
- *Accountability* by faithfully attending class and coming on time, coming prepared, being aware of assignments given and completing them on time.
- *Enthusiasm* by participating in class discussions and completing in-class activities, showing interest in cultural material and discussions about mathematics in general.
- *Refinement* by going above and beyond in living the dress and grooming standards, their manner of speech and actions, cleaning up the classroom and following proper classroom etiquette. This includes not using cell phones (texting, etc.) or other electronic devices that may disrupt learning in the class.

Title IX

Southern Virginia University is committed to providing an environment that promotes personal integrity, civility, and mutual respect and is free of all forms of sex discrimination and gender-based violence, including sexual assault, sexual harassment, gender-based harassment, domestic violence, dating violence, and stalking.

Southern Virginia University, in compliance with Title IX, supports the academic success of pregnant students and students with pregnancy-related conditions (pregnancy, childbirth, termination of pregnancy, lactation, and all related medical conditions or recovery). Students may request reasonable, related modifications from the University by contacting the Title IX Coordinator at titleix@svu.edu.

Title IX of the Education Amendments of 1972 states that "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or

activity receiving Federal financial assistance." Title IX applies to all employees and students and covers discrimination in programs, admissions, and activities.

You can report any concerns to the Title IX Coordinator, Nathan Friesema (titleix@svu.edu), your professor, the Wellness Center, or any university administrator. Please be aware that all instructors are mandated reporters, so by law, we must disclose details relayed to us about any possible Title IX infraction to the University's Title IX coordinator.

Accommodations: Southern Virginia University is committed to providing a learning environment that accommodates and supports students with disabilities through accommodations. The Office of Accessibility Services oversees Academic Accommodations. Students with any type of physical, medical, psychological, or emotional disability may be eligible - through the Americans with Disabilities Act (ADA) - to receive accommodations to provide equal access to the academic settings. Any student seeking accommodations should contact the Office of Accessibility Services by emailing accessibility@svu.edu. Students are advised to take care of the necessary documentation and paperwork early in the semester. Accommodations are not made until the student follows the procedures outlined on the website, (https://catalog.svu.edu/policies/accessibility-and-accommodations) receives an official accommodation letter AND discusses it with their professors.

Academic Honesty: Following the code of conduct, (https://svu.edu/about/faith/code-of-conduct/), students are expected to "be honest in all things, obey the law and follow university policies, and not cheat, steal, or plagiarize." The objective of every faculty member is to empower students by providing opportunities for learning in the best environment possible. If there are questions about what is honest or dishonest behavior, please speak to your professor. Violations of academic honesty are reported to the Office of the Provost and appeals are handled through the student grievance process.

Wellness: We are located on the second floor of Main Hall, Room 234. We are open from 8am to 5pm Monday to Friday. To schedule an appointment with a therapist please Call or Text 540-261-8474, email counseling@svu.edu, or stop by in-person. We strive to accommodate same-day appointments for urgent needs whenever possible.

For Mental Health Emergencies After Hours:

Please use any of the following options:

- **Call or text 988** — Suicide and Crisis Lifeline
- **1-855-222-2046** — Rockbridge Area Community Services Behavioral Health Hotline
- **540-261-4911** — SVU Campus Security
- **Visit the ER** — Carilion Rockbridge Community Hospital
  1 Health Circle, Lexington, VA 24450
- **Call 911**

AI was used in the development and editing of this document.