Title of Course: MATH:1120 Logic of Arithmetic  
Course meeting time and place: 1:30pm-2:20pm MTuWTh 218 MLH  
Department of Mathematics: https://math.uiowa.edu

Course ICON site: To access the course site, log into Iowa Courses Online (ICON)  
https://icon.uiowa.edu/index.shtml using your Hawk ID and password.

Course Home  
The College of Liberal Arts and Sciences (CLAS) is the home of this course, and CLAS governs the add and drop deadlines, the “second-grade only” option (SGO), academic misconduct policies, and other undergraduate policies and procedures. Other UI colleges may have different policies.

Instructor: Joey Small (He/They)  
Office location: MLH B12  
Office Hours: Mondays 10:30am-11:20am and Wednesdays 3:00pm-3:50pm  
E-mail: jsmall3@uiowa.edu  
DEO: Weimin Han, weimin-han@uiowa.edu, MLH 14

Description of Course  
Starting with an overview of problem solving for mathematical problems, this course aims to equip students with the tools to effectively teach elementary-level mathematical concepts. Topics include sets, numeration systems, operations and ordering with integers, algorithms for mental math and estimation, operations in alternative bases, prime numbers, factors, operations with fractions and decimals, ratios, and percentages. We will end the course by discussing common extensions of these ideas such as rational/irrational numbers, algebra, relations, and functions.

The course was developed for elementary education majors who choose a specialization different from mathematics in mind, but it is not limited to those students. The course meets for two one-hour lectures and two one-hour discussion sections per week. Assignments will include ungraded in-class activities, and graded homeworks, quizzes, midterm exams and a final exam.

Learning Objectives  
As a course primarily aimed at elementary education majors, we will focus on strengthening students’ existing knowledge on the topics we cover as well as deepening their understanding to help them teach the topics to newcomers in the future. Collaborative work will be prioritized to ensure that students not only leave this class being able to solve problems themselves, but also being ready to teach their future students similar material.
Textbook/Materials

The required textbook for this course is:

- Mathematics for Elementary Teachers (10th Edition)
- ISBN: 9781118457443
- Author: Musser
- Publisher: John Wiley & Sons
- Copyright Year: 2014

Academic Honesty and Misconduct

All students in CLAS courses are expected to abide by the CLAS Code of Academic Honesty. Undergraduate academic misconduct must be reported by instructors to CLAS according to these procedures.

Beyond these general policies, the following policies apply to this class in particular:

- The use of any internet resources on homework assignments is allowed. However, if you choose to do this you must write a note on your solutions including all the online resources you used (for example, if you used a stack-exchange forum post to help with question 3 on a homework assignment, just write “used stack exchange to help with question 3” at the top). Your solutions must also be *your own* solutions; No credit will be given on assignments that include solutions directly copied from the internet.
- You are allowed to work with partners on homework assignments, but solutions between students should be unique enough that I shouldn’t be able to know who is working together just by reading them. If you’re looking at your partner’s solution as you write your own, it is no longer your solution.

Student Complaints

Students with a complaint about a grade or a related matter should first discuss the situation with the instructor, then with the Director or Chair of the school, department, or program offering the course.

Undergraduate students should contact CLAS Undergraduate Programs for support when the matter is not resolved at the previous level.

Drop Deadline for this Course

Last day for tuition & fee reduction without a W on your transcript: 01/30/2023
Last day to drop without collegiate approval: 04/17/2023

You may drop an individual course before the deadline; after this deadline you will need collegiate approval. You can look up the drop deadline for this course here. When you drop a course, a “W” will appear on your transcript. The mark of “W” is a neutral mark that does not affect your GPA. Directions for adding or dropping a course and other
registration changes can be found on the Registrar's website. Undergraduate students can find policies on dropping and withdrawing here.

Grading System

Final grades will be given according to a system like:

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<tr>
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<td>A-</td>
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These ranges might change, but only in the students' favor. I will do my best to keep everyone updated on how the curve is changing throughout the semester. Anyone can always ask me questions about grades, and grades will be regularly updated on ICON.

Course Grades

Final grades will be assessed based on your performance in the following activities:

Class Participation (10%): I expect all students to regularly show up to class, with a zoom component being offered (by request) when any student is not able to make it to class in person. Lateness will not be heavily considered for this grade unless it becomes a noticeable habit. What will be considered is students' involvement in discussion sections (usually on Tuesdays and Thursdays) which are primarily student-led. Please prioritize your mental energy on those days to make sure you’re able to contribute. All quizzes will have reflection sections on the previous week’s lectures/discussions and these reflections will be used to determine this part of your grade.

Quizzes (10%): To ensure that students are completing the course readings and understanding the material, weekly quizzes will be given on Thursdays. These quizzes will usually be concerned with the material covered in class during the previous week and the homework due on the day they’re given. Twelve quizzes will be given throughout the semester and the lowest two grades will be dropped, so there will be 10 total quizzes whose grades effect your final grade. Each included quiz will count for 1% of your grade. The end of each quiz will include a short reflection section where you should write a paragraph about the week leading up to the quiz’s meetings (Monday and Wednesday lectures and Tuesday discussion sections).

Homeworks (30%): Mathematics is best learned through doing, and homework assignments will be the primary vehicle through which that learning happens. Homeworks will usually be assigned on Thursday, with them being due the following Thursday in class. With very-few exceptions, all material needed to complete the homeworks will be covered in class by the Monday lecture of the week they’re due. There will be twelve homework assignments throughout the semester, with the lowest two being dropped, leaving 10 total graded homework assignments. Each included homework will count for 3% of your grade.
Exams (50%): Two closed-book midterm exams will be given throughout the semester, each worth 15% of your grade. These will not be culminative and will focus specifically on the material taught leading up to the exam. In the classes directly after these exams, you will be asked to write a reflection on what you struggled with or thoughts you had during the exam for possible extra credit. There will also be a culminative closed-book final exam worth 20% of your grade. This exam will focus on the material covered in the last two weeks of the course but will also include a few problems from earlier in the semester. A 3x5 (two-sided) index card of notes may be used for every exam.

Grade Summary:
Class Participation: 10%
Quizzes: 10%
Homeworks: 30%
Midterm Exam 1: 15%
Midterm Exam 2: 15%
Final Exam: 20%
Total: 100%

Date and Time of the Final Exam
The final examination date and time will be announced by the Registrar generally by the fifth week of classes and it will be announced on the course ICON site once it is known. Do not plan your end of the semester travel plans until the final exam schedule is made public. It is your responsibility to know the date, time, and place of the final exam. According to Registrar's final exam policy, students have a maximum of two weeks after the announced final exam schedule to request a change if an exam conflict exists or if a student has more than two exams in one day (see the policy here).

Calendar of Course Assignments and Exams
Most weeks will follow this pattern:
   Monday: Lecture
   Tuesday: In-Class Activities and general discussion
   Wednesday: Lecture
   Thursday: Quiz, HW collected and discussed, next week’s HW assigned

Any weeks that do not follow this pattern are below highlighted to draw your attention to how they will function differently (usually close to exams):

Week 1: Jan 16-20
   Monday: no class
   Tuesday: Intro PowerPoint, syllabus, and hand out survey
   Wednesday: Ch 1.1 Lecture (Polya’s steps and problem-solving strategies)
   Thursday: Ch 1.2 Lecture (More problem-solving strategies)
      - Survey Due
      - HW 1 Assigned
Week 2: Jan 23-27  
Monday: Ch 1.2 and Ch 2.1 Lecture (Combining strategies and introducing sets)  
Tuesday: Post-survey discussion and Task 1.2B  
Wednesday: Ch 2.1 Lecture (Sets, definitions, universes, etc.)  
Thursday: Quiz 1 (Ch 1.1, 1.2) and HW1 discussion  
  - HW1 Due  
  - HW2 Assigned

Week 3: Jan 30-Feb 3  
Monday: Ch 2.2 Lecture (Elements, ordering, numeration systems introduction)  
Tuesday: Tasks 2.1B, 2.1C, 2.2A  
Wednesday: Ch 2.3 Lecture (Hindu-Arabic system, pedagogical difficulties)  
Thursday: Quiz 2 (Ch 2.1) and HW2 discussion  
  - HW2 Due  
  - HW3 Assigned

Week 4: Feb 6-10  
Monday: Ch 3.1 Lecture (Adding and subtracting whole numbers)  
Tuesday: Alternative bases and Tasks 3.1A, 3.1C  
Wednesday: Ch 3.2 Lecture (Multiplication and division)  
Thursday: Quiz 3 (Ch 2.2, 2.3) and HW3 discussion  
  - HW3 Due  
  - HW4 Assigned

Week 5: Feb 13-17  
Monday: Finish Ch 3.2 and Ch 3.3 Lecture (Ordering and exponents)  
Tuesday: Go over Ex 3.5 and Tasks 3.2B, 3.3A, 3.3B  
Wednesday: Finish Ch 3.3 and start Ch 4.1 Lecture (Mental math)  
Thursday: Quiz 4 (Ch 3.1, 3.2) and HW4 discussion  
  - HW4 Due  
  - HW5 Assigned

Week 6: Feb 20-24  
Monday: Ch 4.1 and Ch 4.2 Lecture (Estimation and add/subtract algorithms)  
Tuesday: Tasks 4.1A, 4.1B  
Wednesday: Ch 4.2 and Ch 4.3 Lecture (Multiply/divide algorithms and bases)  
Thursday: Quiz 5 (Ch 3.3, 4.1) and HW5 discussion  
  - HW5 Due  
  - HW6 Assigned (due Monday of Week 8)

Week 7: Feb 27-Mar 3  
Monday: Catch up and review Lecture  
Tuesday: Tasks 4.2A, 4.3A  
Wednesday: Midterm Exam 1  
Thursday: Post-Exam 1 discussion and reflection  
  - HW7 Assigned (due Monday of Week 9 after break)
**Week 8: Mar 6-10**
Monday: Ch 5.1 Lecture (Primes, composite, and divisibility)
   - HW6 Due
Tuesday: Ch 5.2 Lecture (Factors and multiples)
Wednesday: Tasks 5.1B, 5.2B, 5.2C
Thursday: **Quiz 6 (Ch 4.2, 4.3)** and HW6 discussion

**SPRING BREAK**

**Week 9: Mar 20-24**
Monday: Ch 6.1 Lecture (Fractions)
   - HW7 Due
Tuesday: Tasks 6.1B, 6.1C
Wednesday: Ch 6.2 Lecture (Adding/subtracting fractions)
Thursday: **Quiz 7 (Ch 5.1, 5.2)** and HW7 discussion
   - HW8 Assigned

**Week 10: Mar 27-31**
Monday: Ch 6.3 Lecture (Multiplying/dividing fractions)
Tuesday: Tasks 6.2A, 6.3C
Wednesday: Ch 7.1 Lecture (Decimals)
Thursday: **Quiz 8 (Ch 6.1, 6.2)** and HW8 discussion
   - HW8 Due
   - HW9 Assigned

**Week 11: Apr 3-7**
Monday: Ch 7.2 Lecture (Operations with decimals)
Tuesday: Tasks 7.1B, 7.2A
Wednesday: Ch 7.3 Lecture (Ratios and proportion)
Thursday: **Quiz 9 (Ch 6.3, 7.1)** and HW9 discussion
   - HW9 Due
   - HW10 Assigned

**Week 12: Apr 10-14**
Monday: Ch 7.4 Lecture (Percents)
Tuesday: Tasks 7.3C, 7.4B
Wednesday: Ch 8.1 and 8.2 (Add/subtract for integers)
Thursday: **Quiz 10 (Ch 7.2, 7.3)** and HW10 discussion
   - HW10 Due
   - HW11 Assigned (due Monday of Week 14)
**Week 13: Apr 17-21**
Monday: Ch 8.2 finish and review Lecture (Multiply/divide for integers)
Tuesday: Tasks 8.1A, 8.2B
Wednesday: **Midterm Exam 1**
Thursday: Post-Exam 2 discussion and reflection

**Week 14: Apr 24-28**
Monday: Ch 9.1 Lecture (Rational numbers)
- **HW11 Due**
Tuesday: Ch 9.2 Lecture (Real numbers and algebra)
Wednesday: Ch 9.3 Lecture (Relations and functions)
Thursday: **Quiz 11 (Ch 7.2, 7.3)** and HW11 discussion
- **HW12 Assigned**

**Week 15: May 1-5**
Monday: Ch 9.3 and Ch 9.4 Lecture (Functions and graphs)
Tuesday: Tasks 9.1B, 9.2A(one), 9.3B
Wednesday: Catch up and review Lecture
Thursday: **Quiz 12 (Ch 9.1, 9.2)** and HW12 discussion
- **HW12 Due**

**Week 16: May 8-12**
Final Exam
Late Work/Exams
Midterm exam dates and times are known to you once you’ve received this syllabus. Thus, you should let me know ASAP if you foresee any scheduling conflicts (such as sports games, religious obligations, etc.). In the case of something unexpected (such as family emergency or illness), just let me know before the exam is given and we will figure out an alternative test time and place for you.

Quizzes are a bit more difficult to do late since they’ll likely be handed back soon after they’re given to ensure students are able to track their progress in the course. If you are unable to make a quiz let me know as soon as you become aware of the issue, although do keep in mind that the lowest two quiz grades will get dropped.

Homeworks may be accepted up to a week late for a 25% late penalty. Anything you’d like to hand in later than this requires permission from me if you’d like it to be graded.

Communication: UI Email
Students are responsible for all official correspondences sent to their UI email address (uiowa.edu) and must use this address for any communication with instructors or staff in the UI community.

Other Expectations of Student Performance
Any behavior that provides distractions for other students will not be tolerated. I will try to keep the class vibe loose and (hopefully even) fun, but that fun will stop the moment that it becomes an excuse for people to act inappropriately. It will be up to all of us to find the right balance between lightness and seriousness during class, and we will all give each other grace during that process.

Where to Get Help:
If you find yourself struggling and are not able to make my office hours or speak with me during discussion section time, I strongly recommend going to the MTL (Math Tutorial Lab) for assistance with concepts and assignments. It is located at MLH 125 and open MTuWTh 9:30am-4:30pm, 6:00pm-9:00pm and F 9:30am-3:30pm

University Policies
Accommodations for Students with Disabilities
Basic Needs and Support for Students
Classroom Expectations
Exam Make-up Owing to Absence
Free Speech and Expression
Mental Health
Military Service Obligations
Non-discrimination
Religious Holy Days
Sexual Harassment/Misconduct and Supportive Measures
Sharing of Class Recordings