

The Habits of Mind of Mathematical Thinkers - Math 290 (3 credits) – Winter 2021

Instructor: Dr. Brent Hancock

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Class times: N/A (online and asynchronous)

Office hours: Tues & Thurs from 10:30am-11:20am via Canvas (on Blackboard Ultra), or by appointment

Required Materials:

- Required Text: None (assigned readings will be posted to Canvas)
- A **computer** (or iPad/tablet) with a **webcam** for small-group problem-solving sessions
- A **method to convert images to PDF**. If you write anything by hand and need to submit to Canvas, you may not have access to a scanner and need to take photos of your work. There are phone apps such as CamScanner that will convert photos to PDF. You can also send photos from a phone to your computer and use your computer to convert to PDF.
- Access to Canvas online at <http://canvas.cwu.edu> – this is where I will post everything for the course: course handouts, grades, policies, announcements etc. so it is important that you log on often.

Email Correspondence: I will respond to student communications during business hours (M-F, 8am-5pm). You can typically expect a reply within approximately 24 hours, not including weekends. If you email me with questions about specific homework problems, I can be most helpful if you send pictures of what you've tried so far or provide a brief explanation of what you've tried so far. Please note that some assignments will be due on Sunday evenings so make sure you leave time during the week to ask questions before the weekend.

Course Description and Learning Objectives: This course is designed for students who plan to teach mathematics at the secondary grades level. Students will engage in practices that highlight ways of thinking like mathematicians. In this course students will learn how to transition from using mathematics as a tool to being empowered by mathematics as a way of thinking.

According to the NCTM *Principles and Standards for School Mathematics* (2000), there are five essential strands of K-12 mathematical content: Number & Operations, Algebra, Geometry, Measurement, and Data Analysis & Probability. The activities and assessments in this course are implemented to align with the various grades 9-12 content standards set forth by the NCTM while nurturing mathematical habits of mind. Hence there will be five core units in which students will practice and reflect on productive ways of reasoning mathematically in a problem-solving context tied to each content strand. Moreover, collaborative problem solving will highlight the following eight standards for mathematical practice advocated for by the Common Core:

- ✓ (MP1) Make sense of problems and persevere in solving them.
- ✓ (MP2) Reason abstractly and quantitatively.
- ✓ (MP3) Construct viable arguments and critique the reasoning of others.
- ✓ (MP4) Model with mathematics.
- ✓ (MP5) Use appropriate tools strategically.
- ✓ (MP6) Attend to precision.
- ✓ (MP7) Look for and make use of structure.
- ✓ (MP8) Look for and express regularity in repeated reasoning.

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

- recognize reasoning and proof as fundamental aspects of mathematics.
- coherently and precisely communicate mathematical thinking and ideas both orally and in writing.
- recognize and use connections among different areas of mathematics.
- use and connect multiple representations to understand and communicate mathematical concepts and procedures.
- use and adapt a variety of appropriate strategies to solve problems that arise in mathematics

Course Modules on Canvas: The course will be divided into “modules” and organized this way on Canvas. All course handouts, assignments, etc. will be posted in their corresponding module as the course progresses.

Important policies:

- No late work is accepted without *prior arrangements* made with me due to extenuating circumstances.
- Consult university policies ([CWUP 5-90-040\(22\)](#), [CWUR 2-90-040\(22\)](#), and [WAC 106-125-020](#)) for student conduct, cheating, plagiarism, and other academic expectations. CWU's policies and recommendations for academic misconduct will be followed, leading to disciplinary action up to and including failing the course.

COURSE ASSESSMENT DETAILS

Problem-Solving Working Group:

You will meet weekly (in a virtual format) with a team of 3-4 students to work on a mathematical problem where you may not know how to solve the problem immediately (that's what makes it a *problem* as opposed to an *exercise*), though the key mathematical ideas are still directly related to course content. Integrating content and problem solving will help you (1) deepen your mathematical content knowledge of the current unit, (2) develop your problem-solving skills, and (3) nurture supportive mathematical habits of mind during the problem-

solving process. All of these skills are necessary if you will be teaching mathematical problem solving in the future. See Canvas for working group assignments and deadlines.

As a member of a peer learning community, a high degree of professionalism is necessary. **CWU expects every member of the university community to contribute to an inclusive and respectful classroom culture for all in its classrooms, work environments, and at campus events.** Here are some ways you can contribute:

- Arrive to meetings with your working group on time and stay for the entire session.
- Be present. Focus on learning by being an active participant. Limit side activities and put away cell phones.
- Come to working group sessions prepared by completing any pre-session assignments.
- Bring a positive and energetic attitude.
- Respect everyone, treat each other with dignity, and encourage all to participate.
- Participate in group work by asking questions, communicating your understanding to your group mates, and completing the problems.
- Share your ideas with your group and ask questions when other students share their ideas.

Severe or repeated lapses in professional judgment that negatively impact your working group's ability to function successfully may result in disciplinary action up to and including failing the course.

What if I can't make a working-group session?

First, attempt to reschedule the session for *later in the same week*. You do not need to contact me if your group can handle the rescheduling internally.

If you will miss your group's weekly session, (1) communicate with me and your group as soon as possible, and (2) get information from your team about what will happen/happened in the session and how you will get caught back up.

Habits of Mind (HoM) Portfolio:

After you work on each problem set, I will have you individually reflect on your group's problem-solving process so that you can ascertain which ways of thinking were most productive in which contexts, and why. Additionally, you will periodically reflect on which content standards and standards for mathematical practice aligned with the problem sets in each unit. Occasionally, I will assign additional readings that are pertinent to the current unit and ask you to reflect on how the reading(s) tie into the ways of reasoning you employed during your problem-solving sessions.

COURSE GRADE CALCULATION

Weight	Assessment category (grading scale)
70%	Problem-Solving Working Group Assignments
30%	Habits of Mind (HoM) Portfolio Assignments

Letter grades will be assigned as follows:

A- 90.0 - 92.9%	A 93.0 - 100%	
B- 80.0 - 82.9%	B 83.0 - 86.9%	B+ 87.0-89.9 %
C- 70.0 - 72.9%	C 73.0 – 76.9%	C+ 77.0 - 79.9%
D 60.0 - 69.9%		
F 0 - 59.9%		

Emergency Pass/Fail (EP/EF) Grades Option

To help you do your best work in this time of unusual stress and change, we are providing a temporary grading option called Emergency Pass/Fail. Emergency Pass/Fail (EP/EF) Grades. Students may elect EP/EF conversions on a course-by-course basis. Upon such election, letter grades of C- or higher shall be converted to a passing grade of EP; grades of D+ or lower shall be converted to EF. Students will have 3 days after the date on which final grades are due to choose to retain the assigned letter grade or to choose an EP/EF grade. This choice will be available on a course-by-course basis.

Credits earned with a grade of EP/EF are not included in the computation of grade point averages. Credits earned with a grade of EP shall count toward program-specific passing requirements and general education requirements. Moreover, a grade of EP shall satisfy the prerequisites of subsequent courses.

Transcripts that show a grade of EP/EF shall include a statement indicating that a state of campus emergency existed during the quarter in which the grade was posted. Credentialing for some programs/scholarships may require students to select the graded option. Students should consult with their major advisor before choosing the EP/EF grade.

Disability Support Services:

Central Washington University is committed to creating a learning environment that meets the needs of its diverse student body. Students with disabilities should contact Disability Services to discuss a range of options to removing barriers, including accommodations. Disability Support Services in Hogue 126. They may also be reached via email at (DS@cwu.edu).

Respect, inclusivity, and diversity:

In my classroom, diversity and individual differences are respected, appreciated, and recognized as a source of strength. Students in this class are encouraged and expected to speak up and participate during class meetings, **and** to carefully and respectfully listen to each other. So that everyone feels comfortable participating, every member of this class **must** show respect for every other member of this class. Be good to each other.

Changes to the syllabus: I reserve the right to make modifications to this syllabus at any time. In the event of such changes, I will notify the class and upload a revised syllabus on Canvas.