

The Habits of Mind of Mathematical Thinkers - Math 290 (3 credits) – Winter 2022

Instructor: Dr. Brent Hancock

Email: brent.hancock@cwu.edu

Office Location: Samuelson 218B

Class times: MWF 10:00-10:50am in SAMU 149

Office hours: Mon Wed Fri 11:00-11:50am in SAMU 218B or by appointment

Required Materials:

- Required Text: None (assigned readings will be posted to Canvas)
- 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 might 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:

During most class periods, you will meet 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 (when applicable)
- 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.

***IMPORTANT:** A significant portion of the course grade (15%, see table on next page) will be assigned based on your contributions with respect to the above categories. Attending class every session AND actively participating in the above manners will be expected of all students.

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

If you will miss class during a problem 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. Note that these portfolio reflection assignments are very important for solidifying the habits of mind practiced in class, and therefore they comprise a large portion of the overall course grade (see table on next page) so they should be taken seriously and you should commit enough time each week to provide complete and thoughtful responses to each prompt.

COURSE GRADE CALCULATION

Weight	Assessment category (grading scale)
55%	Problem-Solving Working Group Assignments
30%	Habits of Mind (HoM) Portfolio Assignments
15%	Participation and Attendance

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%		

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.