



MATH 290 | The Habits of Mind of Mathematical Thinkers

General Information

Class Time: W, 3pm -- 4⁴⁰pm

Modality: Hybrid (2 credits in person, 1 credit asynchronous online)

In-Person Location: Discovery 301

Instructor: Dr. Emilie Hancock (Please refer to me as Emilie or Dr. Hancock)

Office: Samuelson 218C | **Email:** emilie.hancock@cwu.edu | **Phone:** 509.963.2402

Office Hours: M 1-3pm in **DISCOVERY 301** (no appointment necessary). If needed, you can also [schedule an individual appointment](#) [\(https://outlook.office365.com/owa/calendar/DrHancock@cwuwildcat.onmicrosoft.com/bookings/\)](https://outlook.office365.com/owa/calendar/DrHancock@cwuwildcat.onmicrosoft.com/bookings/) outside of office hours.

Required Materials

- **Canvas Access**
- **Textbook:** None

Disability Support Services

Central Washington University is committed to creating a learning environment that meets the needs of its diverse student body. [Disability Services \(https://www.cwu.edu/disability-services/\)](https://www.cwu.edu/disability-services/) serves students with permanent and temporary disabilities attending Central on the Ellensburg campus, online or at any of our eight University Centers. Their mission is to make university life accessible to students with disabilities. They work individually with students identifying barriers, and providing accommodations to ensure equal access. Students with disabilities should contact Disability Services to discuss a range of options to removing barriers, including accommodations: Hogue Hall 126, 509.963.2214, [DS@cwu.edu \(mailto:DS@cwu.edu\)](mailto:DS@cwu.edu).

Course Overview and Outcomes

Reflecting [Washington State \(Common Core\) mathematics K-12 learning standards \(https://www.k12.wa.us/student-success/resources-subject-area/mathematics/mathematics-k%E2%80%9312-learning-standards/\)](https://www.k12.wa.us/student-success/resources-subject-area/mathematics/mathematics-k%E2%80%9312-learning-standards/), the [National Council of Teachers of Mathematics \(NCTM\) Process Standards \(https://www.nctm.org/Standards-and-Positions/Principles-and-Standards/\)](https://www.nctm.org/Standards-and-Positions/Principles-and-Standards/), and the State of Washington Professional Educator Standards Board (PESB) [Endorsement Competencies for Mathematical Practice \(https://www.pesb.wa.gov/preparation-programs/standards/endorsement-competencies/mathematics/\)](https://www.pesb.wa.gov/preparation-programs/standards/endorsement-competencies/mathematics/), this course emphasizes the development of mathematical habits of mind. Students will engage in mathematical [processes \(https://www.nctm.org/Standards-and-Positions/Principles-and-Standards/Process/\)](https://www.nctm.org/Standards-and-Positions/Principles-and-Standards/Process/) and [practices \(http://www.corestandards.org/Math/Practice/\)](http://www.corestandards.org/Math/Practice/) that highlight ways of thinking like mathematicians, transitioning from using mathematics as a tool to being empowered by mathematics as a way of thinking. Major topics include problem solving, reasoning and proof, communication, connections, representations, and the Common Core Standards of Mathematical Practice. Upon successful completion of this [course \(http://catalog.acalog.cwu.edu/\)](http://catalog.acalog.cwu.edu/), you will be able to:

- Use and adapt a variety of appropriate strategies to solve problems that arise in mathematics
- 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.

Grading Scale and Method of Evaluation

Final letter grades will be determined based on your weighted percent grade, rounded to the nearest whole percent.

Letter Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	F
Percent	93-100	90-92	87-89	83-86	80-82	77-79	73-76	70-72	67-69	60-66	0-59

Overall grades will be determined as a weighted average:

40% Problem-Solving Working Groups

40% Habits of Mind (HoM) Reflection Portfolio

20% Attendance and Professional Participation

Problem-Solving Working Groups

You and a team of students will work together on mathematical problems where you may not know how to solve the problem immediately; that's what makes it a *problem*. Integrating content and problem solving² will help you (1) deepen your mathematical content knowledge, (2) develop your problem-solving skills, and (3) increase your awareness of your problem-solving process and the habits of mind you employ. All of these skills are necessary if you will be teaching mathematical problem solving in the future.

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. You can help your group work effectively by:

- Arriving to meetings on time and staying for the entire session.
- Coming to sessions prepared by completing any pre-session assignments (when applicable)
- Bringing a positive and energetic attitude.
- Focusing on learning by being an active participant:
 - Ask questions, communicate your understanding to your group mates, and complete the assigned tasks.
 - Respect everyone, treat each other with dignity, and encourage all to participate.
 - Limit side activities and put away cell phones.

Habits of Mind Reflection Portfolio

You will be asked to reflect on your problem-solving process to identify habits of mind and productive ways of thinking mathematically. In these reflections you may be asked to make connections to essential mathematical concepts and/or mathematics education literature.

Attendance and Professional Participation

Attend every class and complete pre-class assignments.

Attendance is required for all class meetings and is included as part of your course grade.

University Policy [CWUP 5-90-040\(38\)](http://www.cwu.edu/resources-reports/cwup-5-90-040-academic-and-general-regulations#Class%20Attendance%20and%20Participation) (<http://www.cwu.edu/resources-reports/cwup-5-90-040-academic-and-general-regulations#Class%20Attendance%20and%20Participation>) provides for reasonable accommodation of student absences for religious holidays in accordance with [RCW 28B.137.010](https://apps.leg.wa.gov/rcw/default.aspx?cite=28B.137.010) (<https://apps.leg.wa.gov/rcw/default.aspx?cite=28B.137.010>). Students seeking reasonable accommodations under this policy must provide written notice to their instructors within the first two weeks of class specifying the dates for which religious accommodations are requested. Contact the Dean of Student Success at (509) 963-1515 for further information.

What if I have to Miss Class?

- Communicate with me as soon as possible. If you are not in communication with me, I will immediately reach out to the [Office of the Dean of Student Success \(https://www.cwu.edu/student-success/\)](https://www.cwu.edu/student-success/).
- Communicate with your group as soon as possible. Find out what you missed and determine how you will catch up.

Course Expectations

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 culture for all in its classrooms, work environments, and at campus events.

Intended Norms for Professional Participation⁴

Move Up/Move Back. Share air time equitably. Know yourself, balance your listening and talking.

Use Evidence to Support your Claims. Back what you have to say with data, readings, etc.

Speak Honestly. All perspectives are valued, and all perspectives are partial.

Value Differences. Remember that your perspective is not the only one.

Discomfort is OK. Identify your learning edge and push it. Take risks, make mistakes.

Make sure everyone feels safe. Safe is not the same as comfortable.

Own your impact. Your intentions may not be the same as your impact.

Anonymity. What's said (and by who) stays, what's learned can leave.

We're all in this together.

Academic Honesty and Student Conduct

Consult university policies [CWUP 5-90-040\(25\)](http://www.cwu.edu/resources-reports/cwup-5-90-040-academic-and-general-regulations#Class%20Attendance%20and%20Participation) (<http://www.cwu.edu/resources-reports/cwup-5-90-040-academic-and-general-regulations#Class%20Attendance%20and%20Participation>), [CWUR 2-90-040\(24\)](http://www.cwu.edu/resources-reports/cwur-2-90-040-academic-and-general-regulations#Academic%20Dishonesty) (<http://www.cwu.edu/resources-reports/cwur-2-90-040-academic-and-general-regulations#Academic%20Dishonesty>), and [WAC 106-125-020](https://apps.leg.wa.gov/WAC/default.aspx?cite=106-125-020) (<https://apps.leg.wa.gov/WAC/default.aspx?cite=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.

Central Washington University is committed to providing all community members with a learning and work environment that is free from sexual harassment and assault. Students have options for getting help if they have experienced sexual assault, relationship violence, and sexual harassment, or stalking. Information can be found at <http://www.cwu.edu/wecare> (<http://www.cwu.edu/wecare>) and in [CWUP 2-35-050](http://www.cwu.edu/resources-reports/cwup-2-35-equal-opportunity-policies-and-programs#Harassment) (<http://www.cwu.edu/resources-reports/cwup-2-35-equal-opportunity-policies-and-programs#Harassment>): Sexual Harassment. Faculty are required to report information regarding sexual misconduct or related crimes. Students may speak to someone confidentially by contacting the CWU Wellness Center, 509-963-3213, or the CWU Student Counseling Clinic, 509-963-1391.

A Positive Note

Remember that I want you to be successful. That is, I want you to develop a deep, personal understanding of the material we study so that you become a better student of mathematics who can go on to do well in all of your future endeavors. Every part of this course structure is intended to help you with this. You will often struggle, and that's intentional – struggle (and eventual success!) is essential to learning. You are always welcome to discuss your questions or concerns with me at any time. The [Office of the Dean of Student Success](https://www.cwu.edu/student-success/) (<https://www.cwu.edu/student-success/>) also provides resources and services to help you be successful. Commonly used services include:

- FREE [in-person counseling](https://www.cwu.edu/medical-counseling/counseling-clinic) (<https://www.cwu.edu/medical-counseling/counseling-clinic>) and 24/7 [virtual counseling](https://timely.md/schools/index.html?school=wildcatcare365&=#) (<https://timely.md/schools/index.html?school=wildcatcare365&=#>)
- [On-campus health services](https://www.cwu.edu/health-services/welcome-student-health-services-shs) (<https://www.cwu.edu/health-services/welcome-student-health-services-shs>) (most services are free) and FREE 24/7 [tele-health services](https://timely.md/schools/index.html?school=wildcatcare365&=#) (<https://timely.md/schools/index.html?school=wildcatcare365&=#>).
- (<https://www.cwu.edu/disability-services/>) A [wellness center](https://www.cwu.edu/wellness/welcome) (<https://www.cwu.edu/wellness/welcome>) providing support and education for life outside the classroom so you can maximize your time at CWU and build skills for the future (e.g., coaching related to stress/time management, alcohol and drugs, supporting others experiencing mental health challenges, violence prevention and response, sexual health and healthy relationships).
- See the [Student Success website](https://www.cwu.edu/student-success/) (<https://www.cwu.edu/student-success/>) for even more services, and [here is a list of o](https://www.cwu.edu/student-success/where-go) (<https://www.cwu.edu/student-success/where-go>) [ther services around campus](https://www.cwu.edu/student-success/where-go) (<https://www.cwu.edu/student-success/where-go>) you may need.

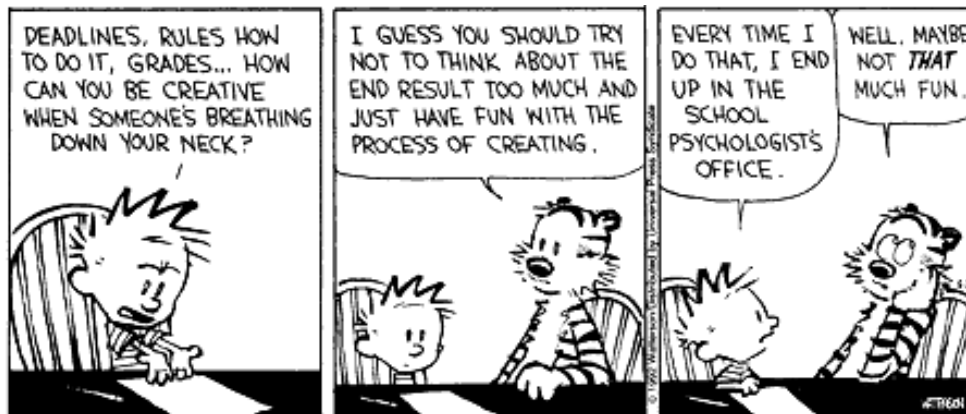
Schedule of Course Topics

Week	Essential Questions for The Secondary Math Major	Focus NCTM Process Standard	Focus Common Core Standard of Mathematical Practice
1 (Jan 4)	What are Mathematical Habits of Mind?	Problem Solving	SMP 1: Make Sense of Problems and Persevere in Solving Them
2 (Jan 11)	What is Mathematics?		
3 (Jan 18)	What are the Major Content Areas and Essential Concepts for K-16 Mathematics?	Connections	SMP 7: Look for and Make Use of Structure
4 (Jan 25)			SMP 8: Look for and Express Regularity in Repeated Reasoning
5 (Feb 1)	What is Pure Mathematics and Why is it Relevant?	C O M M U N I C A T I O N	SMP 3: Construct Viable Arguments and Critique the Reasoning of Others
6 (Feb 8)			SMP 6: Attend to Precision
7 (Feb 15)	What is Applied Mathematics and Why is it Relevant?	R e a s o n i n g a n d P r o o f	SMP 2: Reason abstractly and Quantitatively
8 (Feb 22)			R e p r e s e n t a t i o n s
9 (Mar 1)	Closing the Loop: What is Mathematics? What are Mathematical Habits of Mind?		SMP 5: Use Appropriate Tools Strategically
10 (Mar 8)	How Should we Teach Mathematics to Foster Mathematical Habits of Mind?		
Finals Week	Final Presentations (Working Groups)		

Assignment deadlines available in Canvas.

Changes

I reserve the right to amend, adjust, or otherwise modify the syllabus at any time during the course.



References

1. Adapted from [Rifkin \(2020\)](https://www.nsta.org/science-teacher/science-teacher-julyaugust-2020/who-does-science). <https://www.nsta.org/science-teacher/science-teacher-julyaugust-2020/who-does-science>
2. Cai, J., & Lester, F. (2010). Why is teaching with problem solving important to student learning. National council of teachers of mathematics, 13(12), 1-6.