

# Course Syllabus



## Masters of Education Specialization **STEM LEADERSHIP** CENTRAL WASHINGTON UNIVERSITY

### MATH 512 | 3 Credits

### Functions and Modeling for Teachers

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## Course Overview

Educators will explore fundamental properties of functions from a mathematical modeling perspective. Teachers will investigate function concepts by authentically engaging with the full modeling cycle to model real-world scenarios.

### Required Materials

- Canvas account with enrollment in MATH 512
- References utilized in this course are *recommended* for your personal teaching library, but are *not required*. All assignment materials will be provided by the instructor.
  - Cooney, T., Beckmann, S., & Lloyd, G. (2010). *Developing Essential Understanding of Functions for Teaching Mathematics in Grades 9-12*. National Council of Teachers of Mathematics. Reston, VA.
  - Ronau, R.N., Meyer, D., & Crites, T. (2014). *Putting Essential Understanding of Functions into Practice Grades 9-12*. National Council of Teachers of Mathematics. Reston, VA.
  - Lloyd, G., Eisenmann, H.B., & Star, J. (2011). *Developing Essential Understanding of Expressions, Equations, and Functions for Teaching Mathematics in Grades 6-8*. National Council of Teachers of Mathematics. Reston, VA.
  - Araujo, Z., Dougherty, B., & Zenigami, F. (2018). *Putting Essential Understanding of Expressions and Equations into Practice Grades 6-8*. National Council of Teachers of Mathematics. Reston, VA.
  - Lee, J. & Galindo, E. (Eds.) (2018). *Rigor, Relevance, & Relationships: Making Mathematics Come Alive with Project-Based Learning*. National Council of Teachers of Mathematics. Reston, VA.

### Learning with Canvas

Additional course resources including in-class session materials and assignments are available 24 hours a day, 7 days a week through the Canvas Learning System. This term we will use Canvas, which offers improved ease of use and access to learning materials. All course announcements, assignments, rubrics, etc. will be available so there should be no confusion on what is expected or how your performance will be evaluated. Check the Canvas site *often* so that you are aware of any course changes.

## Student Learning Outcomes and Assessment

Learner Outcome	Assessment
LO1: Compose models to solving problems using all phases of the modeling cycle.	Modeling project portfolio assessed with a rubric, Culminating public-facing product (e.g., proposal, debate, website, video, etc.)
LO2: Hypothesize and compose key structural attributes of various classes of functions to model different phenomena of interest.	Modeling project portfolio assessed with a rubric
LO3: Appraise affordances and constraints of various types of functions when	Modeling project portfolio assessed with a rubric

modeling phenomena.	
LO4: Analyze functions using graphical, verbal, tabular, and symbolic representations.	Modeling project portfolio assessed with a rubric
LO5: Plan inquiry utilizing appropriate technology.	Modeling project portfolio assessed with a rubric
LO6: Propose data-driven decisions with respect to function models.	Culminating, public-facing product (e.g., proposal, debate, website, video, etc.)
LO7: Examine common student conceptions and misconceptions related to functions and covariational reasoning.	In-class assignments, activity/task mapping

### Learning Performance Evaluation

A mixed approach will be used in this course to provide each student with opportunities for growth. Each assignment is described in detail in Canvas. Your performance will be determined using a point grading system:

Assignment Group/Intended Outcome	Grade Weight (%)
Attendance and Professional Participation: In-Person Launch	10
Modeling Project Portfolio Culminating, Public-facing Product	40
Essential Understandings Module Assignments Examine common student conceptions and misconceptions related to functions and covariational reasoning Activity/Task Mapping	50
<b>Total</b>	<b>100</b>

### Grading Scale and Performance Characteristics

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	D-	F
Percent	93-100	90-92	87-89	83-86	80-82	77-79	73-76	70-72	67-69	63-66	60-62	0-59

Please see the Central Washington University Catalog for the eligibility requirements for an incomplete (I).

## 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.

### Professional Participation

**Think critically.** People that analyze, infer, evaluate, and make reasoned judgments perform better, make better daily decisions, and have greater professional success. Ask questions to support your critical thinking process.

**Apply yourself.** Success in this course will require considerable time and energy. If you have high learning expectations, that is what you will achieve. Expect to invest significant effort. Budget the time and energy needed to accommodate the workload.

**Be present.** Focus on learning by being an active participant. Show enthusiasm and bring a positive, energetic attitude.

**Act professionally.** Arrive to class on time and stay for the entire class. Respect everyone, treat each other with dignity, and encourage all to participate.

**Communicate clearly.** Effective written and oral communication is an important component of teaching. Clarity, proper format, spelling, and grammar are expected of every student.

**Use common sense.** Don't cheat on assignments, and don't plagiarize others' work – either will result in a zero and the possibility of disciplinary action by the university. If you have a problem that prohibits you from turning something in on time, let me know ahead of time. In all instances, good communication with me will prevent the vast majority of problems.

### Attendance Policy

**Participation in the in-person launch is required.** University Policy, [CWUP 5-90-040\(38\)](http://www.cwu.edu/resources-reports/cwup-5-90-040-38) (<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.

### Academic Honesty and Student Conduct

Consult university policies [CWUP 5-90-040\(25\)](http://www.cwu.edu/resources-reports/cwup-5-90-040-25) (<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-2-90-040-24) (<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-2-35-050) (<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.

### Disability Support Services

Central Washington University is committed to creating a learning environment that meets the needs of its diverse student body. If you anticipate or experience any obstacles to learning, contact Disability Services to discuss a range of available options to removing barriers, including accommodations. Student Disability Services is located in Hogue 126. Call (509) 963-2214 or email [ds@cwu.edu](mailto:ds@cwu.edu) (<mailto:ds@cwu.edu>) for more information.

## Schedule of Course Topics

Week	Essential Understandings Modules			PBL Modeling Project		
	Module Topic	Course Objectives Addressed	Assessments	Project Activities	Course Objectives Addressed	Assessments
1 (January 15 - 23)	Big Idea 0: The Mathematical Modeling Cycle Big Idea 1: The Function Concept	LO7	Module Activities; Task Analysis of Student Work	Project Launch:  Entry/Anchoring Event & Driving Question  Identify Need-to-Knows	LO1, LO5, LO6	Modeling Portfolio Entry
2 (January 24 - 30)	Big Idea 2: Covariation and Rate of Change	LO7	Module Activities; Task Analysis of Student Work	Car Buying Workshop	LO1, LO5, LO6	Modeling Portfolio Entry
3 (January 31 - February 6)	Big Idea 3: Families of Functions	LO2, LO3, LO7	Module Activities; Task Analysis of Student Work	Affordability Workshop	LO1, LO5, LO6	Modeling Portfolio Entry
4 (February 7 - 13)	Big Idea 3: Families of Functions	LO2, LO3, LO7	Module Activities; Task Analysis of Student Work	Depreciation Workshop	LO1, LO5, LO6	Modeling Portfolio Entry
5 (February 14 - 20)	Big Idea 4: Multiple Representations of Functions	LO4, LO7	Module Activities; Task Analysis of Student Work	Public Product Development	LO1, LO5, LO6	Modeling Portfolio Entry
6 (February 21 - 27)	Big Idea 4: Multiple Representations of Functions	LO4, LO7	Module Activities; Task Analysis	Public Product Development	LO1, LO5, LO6	Modeling Portfolio Entry

			of Student Work		
7 (February 28 - March 6)				Peer Review	LO5
8 (March 7 - 13)				Public Product Revisions	LO5 Culminating, public-facing product
9 (Finals Week) (March 14 - 18)				Project Reflection	LO5 Modeling Portfolio Entry

**Changes**

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

