Professor

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Office Hours: posted on course webpage

Please stop by my office when you have questions! In person is the best way to contact me. Email is the next best way. If you need to make an appointment to see me, please send me an email suggesting several times that will work for you.

Webpage

https://facultysites.houghton.edu/rebekahyates/STEM140Spring2025.html

Location/Time

Mondays, Wednesdays, and Fridays 10–11:05 am in Library 140

Text

Mathematics for Human Flourishing, by Francis Su with reflections by Christopher Jackson, published by Yale University Press

Description

Catalog Description: "Explores topics in mathematics, computing or data science with a focus on historical context and/or applications to other disciplines and to real-world problems. Students develop effective mathematical/computational thinking and communication skills through open-ended inquiry and explore how these skills can inform and enrich a Christian life. Cultivates an appreciation for the ways in which reasoning and abstraction contribute to problem solving and emphasizes conceptual understanding rather than computational proficiency. Fulfills General Education Mathematics requirement. Liberal Arts." **Note: since this is a two-credit half-semester course, you should expect to spend *at least eight hours per week outside of class* studying and doing homework for this course.**

Course Goals

In this course, students will

- develop effective mathematical thinking and communication skills.
- experience open-ended inquiry individually and collaboratively in mathematics.
- explore ways in which mathematical thinking inform and enrich a Christian life.
- grow in their appreciation for the beauty of mathematics.
- broaden their understanding of what mathematics is and gain insight into how mathematicians approach problems.

Essential Learning Outcomes

This course fulfills the General Education Mathematics core course requirement and contributes to students' progress on the following Essential Learning Outcomes at Houghton: 1: Christian Faith, 4: Critical Thinking, and 6: Logical & Quantitative Reasoning.

In-Class Participation

Class periods will require your active involvement, both with the professor and with your fellow students. Come prepared to be engaged in your learning by listening, asking and answering questions, staying on task during group activities, and presenting ideas and solutions to the whole class. Choosing not to actively participate will adversely affect your understanding of the material, which will consequently adversely affect your grade. At the end of the course, you will write a self-evaluation and include what grade you think you have earned for your in-class participation. I will review these grades, and in most cases, you will receive the participation grade you submit, though I reserve the right to adjust it either up or down if I disagree with your self-assessment.

Technology in the Classroom

Other than using visualization tools as instructed, we will be practicing an electronic-device-free classroom in order to engage deeply with the material and each other. Please turn off your computers, cell phones, and smart watches and stow them in your bag upon entering the classroom and leave them there for the duration of the class unless instructed to use a device for visualization.

Celebrations of Learning

There will be a short celebration of learning (quiz) every Friday. Topics for each celebration will be posted on the course webpage. Each problem will be marked as E (excellent/exceeds expectations), M (meets expectations), R (revise), or N (not assessable). Problems on which you earn an R can be revised on separate paper and resubmitted with the original attached within two class periods of receiving the graded celebration. You are welcome (encouraged!) to consult with me about a revision, but you may not use any other resources beyond your own notes and work unless you first obtain permission. To improve your mark, your revision must also include a short statement about what you did not get correct the first time and what you learned by revising that issue.

Reading Responses

Before the celebration on Fridays, you will turn in your answers to the assigned questions (posted on the course website) from the chapters we discussed that day, annotated with any added thoughts inspired by our class discussion in a different color. Your answers should be complete and incorporate your personal experiences and thoughts. They must be your own college-level writing following appropriate grammar and punctuation guidelines; you may not use AI to write your reading responses. These responses will be graded as E (excellent), M (meets expectations), or N (does not meet expectations).

Problem Sets

You will have a weekly problem assignment to complete and turn in. These assignments and their due dates will be posted on the course webpage. While you are welcome to discuss the problems with your classmates and you are **strongly encouraged** to seek help from me, after discussing the problems with others, you must write your own solutions. On work you turn in, you should acknowledge your collaborators by including their names with any problems. Problems must be turned in as a hard copy at the beginning of class on the posted due date. Work must be neat; problems that are unreadable will receive an N (not assessable).

Note: while you are welcome to use textbooks as resources (but not to copy solutions from them), looking at solutions on the internet or using AI to complete a problem is not an acceptable resource to use when completing a homework problem. Each problem will be marked as E (excellent/exceeds expectations), M (meets expectations), R (revise), or N (not assessable). Problems on which you earn an R can be revised on separate paper and resubmitted (and you are encouraged to consult with me on your revision) at any time during the course for an opportunity to improve your mark. Important limitation: you may resubmit a maximum of 3 problems per week.
Late work: Assignments that are not submitted on time will earn an N and cannot be revised without using a token.

Tokens

You will begin the semester with two tokens that you can use to buy a 24-hour extension on a problem set or celebration of learning revision. You can earn extra tokens by taking advantage of opportunities announced in class throughout the course.

Final Project

Each student will work in a group of 2 or 3 students to create a poster about a math puzzle, game, or some other topic. You will sign up online for the topic that you have chosen (with no repeats permitted); signups will open in the second week of class. On the last day of class, all posters will be assessed by peers and the instructor during a poster session. More details (and a link to the sign up sheet) will be posted on the course webpage.

Time Commitment

In accordance with the guidelines of 2–3 hours of work for each credit hour for a course, the well-prepared student should spend approximately 8–12 hours of work per week beyond the time spent in class. If you find that you are spending significantly more time than this, please let me know so that I can help you be more efficient or adjust the workload. If you are spending less time than this, you may not be investing enough time to learn well.

Attendance

If you are unable to come to class, please let me know as soon as possible. Since class time involves your active participation, missing class without a valid excuse will adversely affect your grade.

Grading

Your grade will be based on problem sets (PS), in-class work/participation, celebrations of learning, reading responses, and the final project. Your final course grade will be assigned based on this chart and the guidelines below it:

Base Grade	PS		In-Class/	Celebrations		Reading Responses		Project
	% E's	% E's/M's	Participation grade	% E's	% E's/M's	# E's	# E's/M's	grade
A	20	90	A	30	90	4	6	A
B	10	80	B	10	80	2	5	B
C	0	70	C	0	70	0	4	C
D	0	60	D	0	60	0	3	D

- To earn a particular base grade, you must meet the minimum requirements in the table above in every category in the corresponding base grade row. Exceeding requirements (e.g., earning an E on 100% of your celebration of learning problems) also meets the requirements for that base grade. Note: I reserve the right to change the minimums, but I will never increase them; i.e., any change I make will only maintain or benefit the grade this chart and the notes below would assign.
- If you do not meet **all** the requirements for a D, you will earn an F for the course.
- **Plus/minus grades**: If you meet all the minimum requirements in a row for a particular base grade *and* two of the non-participation categories meet the minimum requirements for the next higher grade *and* your in-class participation has been consistently positive, you will earn a plus on your grade (unless you already have an A as Houghton does not give A+'s).

  If you meet all the minimum requirements for a base grade (e.g., B) except one, and that one is in the next lower category, you will earn a minus on your grade (e.g., B-).

  If you meet all the minimum requirements for a base grade *and* your in-class participation has been inconsistent or has negatively impacted the class environment on more than one occasion, your final grade will be one letter grade lower than your base grade.
- For example, suppose a student earns an E on 15% of the problem set problems, an M on another 70% of the problem set problems, an A for in-class participation, an E on 35% of the celebration problems, an M on another 60% of the celebration problems, an E on 4 of the reading responses, an M on another 2 of the reading responses, and a B on the project. The student is in the A row for participation, celebration of learning problems, and reading responses and in the B row for problem sets and the project, so the student's base grade is B. Since the student's grade is in the A row for two categories other than participation, the student's final course grade will be a B+.

Academic Integrity

Honesty is the foundation on which all intellectual endeavors rest. To use the ideas of others without acknowledging the authors of those ideas belies the nature and purpose of academic life. At Houghton, where we strive to live out Christian calling and commitment, personal integrity, including academic honesty, should be the hallmark of all our work and relationships. Houghton's full Academic Integrity Policy, including procedures for addressing violations, can be found in the Academic Catalog: https://www.houghton.edu/undergraduate/majors/academics/catalog/
Any work or writing you turn in should be your own, and you are responsible for ensuring that you do not copy anyone else's work or writing (this includes not copying things from the internet or using generative AI).

Accommodations

If you have an academic or physical disability that requires accommodations please contact the Academic Support and Accessibility Services in the Center for Student Success located on the first floor of the Chamberlain Center (585–567–9622). With appropriate documentation, you will be afforded the necessary accommodations. For more information about Academic Support and Accessibility Services go to https://www.houghton.edu/undergraduate/student-life/student-success/.

Tentative Schedule

On Mondays and Wednesdays, we will explore problems, puzzles, and games together in class. On Fridays (except for the last week of class, when we will do project presentations instead), we will discuss the assigned readings and questions from *Mathematics for Human Flourishing*, do further exploration and discussion of the problems from earlier in the week as needed, and finish with a short celebration of learning. The schedule below shows due dates for assignments; more details for each assignment will be posted on the course webpage.

Monday	Wednesday	Friday
Jan 13 **1** Introduction	15 **2** Logic Puzzles	17 **3** Flourishing and Exploration Discussion **Celebration of Learning 1** **Reading Response 1 due**
20 MLK Day (no class; alternative programming)	22 **4** Tic-Tac-Toe **Problem Sets 0 and 1 due**	24 **5** Meaning and Play Discussion **Celebration of Learning 2** **Reading Response 2 due**
27 **6** Tic-Tac-Toe	29 **7** Tic-Tac-Toe Variations **Problem Set 2 due**	31 **8** Beauty and Permanence Discussion **Celebration of Learning 3** **Reading Response 3 due** sign up for project topic
Feb 3 **9** Tic-Tac-Toe Variations	5 **10** Tic-Tac-Toe Variations **Problem Set 3 due**	7 **11** Truth and Struggle Discussion **Celebration of Learning 4** **Reading Response 4 due**
10 **12** Countdown	12 **13** Countdown **Problem Set 4 due**	14 **14** Power and Justice Discussion **Celebration of Learning 5** **Reading Response 5 due**
17 **15** Chomp	19 **16** Chomp **Problem Set 5 due**	21 **17** Freedom, Community, and Love Discussion **Celebration of Learning 6** **Reading Response 6 due**
24 **18** Prime Cubes	26 **19** Prime Cubes	28 **20** **Project Poster Session** **Problem Set 6 due** **self-assessment due**