

Senior Seminar (MA-180) Westmont College

Spring 2026

Time	MWF, 12:45-1:50pm
Location	Winter Hall 311 Professor Kyle Hansen, Ph.D.
Email	kylhansen@westmont.edu Office Winter Hall 303
Student Hours	M:2–3pm, W:2–4pm, Th:9–11am

Course Description & Resources

Student Growth Outcomes

Rather than first asking “What will I learn by taking this class?” we start by asking “Who might I become by taking this class?”¹ By taking this class you will be given opportunities to grow in wisdom, virtue, and godliness.² You will, in particular, be offered opportunities to grow as an adopted child of God who makes **expedient decisions** informed by **temperance** and **hope**.

Wisdom: Expedient Decision-Making Briefly, “wisdom” may be viewed as expedient decision-making in humble response to truth, beauty, and goodness, often gained through diverse experiences; the beginning of wisdom is the fear of the Lord. In this class, you will have opportunities to develop the practical wisdom of expedient decision-making, which may be concretely thought of as the act of making and acting on decisions towards a desired end goal. As a result, expedient decision-making is the development of your creative agency and power as one created in God’s image.

You will be challenged to see old things in a new light, to ask questions, and create answers both as a community **and** independent of others, as you synthesize and harmonize your diversity of educational experiences thus far. In particular, rather than seeing the “problems” that you encounter in this class as “problems”, we will frame our work as “opportunities for creative exploration”.³ As Augustus De Morgan has said, “The moving power of invention is not reason, but imagination”. This class will give you the chance to fully engage in this moving power in an exciting, creative, and wonderful way which demonstrates the freedoms you have developed as a student of mathematics at Westmont.

Virtue: Temperance Of the three classical “cardinal virtues” (courage, temperance, and justice) this class will emphasize the development of temperance, by which I mean an active patience towards what truly good, real, and beautiful in appropriate proportion to what it merits by nature of its design.

You will sit with uncertainty for long periods of time, as you struggle to solve problems which you have never seen before, and which have no immediate context for their solutions. This will require temperance, and the practice of temperance itself will build this virtue.

Godliness: Hope Of the three classical “theological virtues” (faith, hope, and charity (or “love”)) this class will challenge you to grow in hope. That is, you will have opportunity to practice holding firmly to the expectation of God’s promised future realities in spite of present circumstances. This will be especially relevant as you near the end of the term.

You will be challenged to discuss how mathematics can be used as a tool in God’s Kingdom. What will be the role of mathematics in a restored creation? What are the ways in which mathematics can be used now in a fallen world to promote shalom? How does mathematics give a language for understanding and living in the promises God has made?

¹ The definitions throughout this section are incomplete, and partially due to various sources, many of which I have forgotten, and I apologize for not properly citing them.

² This framework is thanks to Veritas Classical Christian School in Newberg, OR. ³ I am stealing this phrase from Dr. Howell.

What are the limitations of mathematics for fulfilling these promises itself? Engaging with these questions will develop an understanding of the necessity of hope, from a Christian perspective, in the person and promises of Jesus the Redeemer.

Course Description

Catalog Description

(Four credit hours) **Prerequisite(s)**: Senior standing or instructor consent

At its heart, mathematics is problem solving. In most undergraduate courses, the problems assigned are intimately connected with the current topic of discussion in the class and in the text. This practice gives an unrealistic picture of the way the mathematics generally works. In most non-classroom situations, problems and questions are unstructured and come without external clues as to what approach will be useful or how difficult the problem is likely to be. In this capstone course, you will be introduced to “context free” problems from sources such as *The American Mathematical Monthly*, *Mathematics Magazine*, and *Math Horizons*, and you will learn how to devise your own approach to finding a solution. You will have the opportunity to submit your solutions to the mathematics journals in which the problems appeared, and present these solutions to an invited audience of faculty and peers. Through readings, reflections, and in-class discussions, students will also explore the role of mathematics within its historical, philosophical, and societal context. As a culmination of this exploration, students will produce an essay reflecting on the discipline of mathematics, and how pursuing mathematics fits within a Christian calling and vocation.

Put another way... In this course, you will choose problems to solve, and solve them. You will think critically about what mathematics *is*, and what it means to be a Christian mathematician. That is, this course is about putting together everything that you’ve been learning throughout your undergraduate career.

Textbooks

- Howell, Russell, and Bradley, James. *Mathematics Through the Eyes of Faith*. Harper Collins, 2011.
- Su, Francis. *Mathematics for human flourishing*. Yale University Press, 2020.
- Stewart, Ian. *Visions of Infinity: The Great Mathematical Problems*. Basic Books, 2013.

Learning Outcomes

Institutional Learning Outcomes (ILO’s)

The faculty of Westmont College have established common learning outcomes for all courses at the institution.

These outcomes are summarized as follows: 1. Christian Understanding, Practices, and Affections, 2. Global Awareness, 3. Diversity, 4. Critical Thinking, 5. Quantitative Literacy, 6. Competence in Written Communication, 7. Competence in Oral Communication, and 8. Information Literacy.

Program Learning Outcomes (PLO’s)

Additionally, the mathematics department at Westmont College has formulated the following learning outcomes for all of its classes.

1. **Core Knowledge:** Students will demonstrate knowledge of the main concepts, skills, and facts of the discipline of mathematics.
2. **Communication:** Students will be able to communicate mathematical ideas following the standard conventions of writing or speaking in the discipline.
3. **Creativity:** Students will demonstrate the ability to formulate and make progress toward solving non-routine problems.

4. **Christian Connection:** Students will incorporate their mathematical skills and knowledge into their thinking about their vocations as followers of Christ.

Course Learning Outcomes (CLOs)

The above outcomes are reflected in the particular learning outcomes for this course. After taking this course, you should be able to

1. Demonstrate proficiency in approaching context-free mathematical problems as a mathematical explorer. (PLO 1, ILOs 4,5)
2. Create, communicate, and evaluate mathematical arguments according to the standards of the discipline. Students will effectively communicate orally as informed by rhetorical situation, audience, genre, and purpose. (PLO 2, ILOs 4,6)
3. Construct solutions to novel problems, demonstrating perseverance in the face of open-ended or partially-defined contexts. (PLO 3, ILO 4)
4. Articulate the theological implications of a Christian vocation in mathematics. (PLO 4, ILO 1)

These outcomes will be assessed by daily discussion and written reflections, as well as weekly written and verbal reports, which will culminate in final essays, reports, and presentations.

Grades

Grades in the class will be distributed according to the following table; to receive the grade for a given column, you will need to meet, at minimum, all of the deliverables in that column. This is subject to reasonable change, and any such changes will be communicated in advance by the professor.

Letter Grade	A	B	C	F
Daily Discussions (40 Max)	37	35	33	< 33
Weekly Reflections (14 Max)	13	12	11	< 11
Internal Integration (14 Max)	6	5	4	< 4
External Integration (14 Max)	6	5	4	< 4
Weekly Presentations (14 Max)	13	12	11	< 11
Weekly Reports (14 Max)	13	12	11	< 11
Friday Explorations (2 Max)	2	1	1	< 1
Final Essay (score out of 4)	3.5	3	2.5	< 2.5
Final Report (score out of 4)	3.5	3	2.5	< 2.5
Final Presentation (score out of 4)	3.5	3	2.5	< 2.5

For example, even if every other item is completed to perfection, a score of a "1.78" on the final presentation will produce a "C" grade. Because these final projects will be developed throughout the semester, you should have plenty of time to prepare, edit, and practice these to attain the grade you want to earn.

Reading and Discussion

Daily Discussion Each class day, we will spend about 20–30 minutes discussing the assigned reading for this day. You are expected to contribute to this discussion each day in a meaningful way, and may earn up to one "Daily Discussion" point

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each day. Your participation will be assessed on your ability to construct messages with insightful ideas, contextual appropriateness (sensitivity to the audience and occasion), and audience, as well as on attentiveness (good listening, receptivity to feedback, ability to understand and respond appropriately, etc.) to your peers.

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Weekly Reflections On Monday of each week, you will turn in ≤ 200 word reflection on the previous week's readings, to be turned in on Canvas.

Internal Integration In addition to the required readings, there will be a collection of short readings and/or podcasts posted on Canvas for you to explore throughout the semester. You are expected to engage with a few of these readings and incorporate a citation **both during discussion and in the written weekly reflection** which demonstrates you have engaged with this source in a meaningful way. Citations which are only incorporated into weekly reflections will not be credited. You may receive at most one "Internal Integration" point each week, and at most one point will be awarded for each source, per person.

External Integration Similarly, at most once per week you may receive an "External Integration" point, where you integrate your educational experience from a class from outside of the discipline of mathematics, together with clear and accurate citations. As before this should be **both in your discussion and your written reflection**.

Presentations and Reports

Weekly Reports Each week you should come to class with a written report (typeset) detailing the progress you have made on your problem over the previous week. This is due on **Monday** each week as a **printed report**.

Weekly Presentations This report should clearly distinguish between collaborative work and your own work. In class, once per week, you will present your progress and questions to the class. In addition, you will carefully listen to the presentations of your classmates and offer suggestions and criticisms. Your presentation will be assessed on your ability to construct messages with insightful ideas, contextual appropriateness (sensitivity to the audience and occasion), and audience, as well as on attentiveness (good listening, receptivity to feedback, ability to understand and respond appropriately, etc.) to your peers.

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Friday Explorations Each week on Friday (where we don't have a break earlier in the week) one person from the class will lead everyone in a ~30 minute exploratory activity of their choice. This activity should clearly incorporate some kind of mathematical exploration in a philosophical, physical, or playful way (or all three). There are 11 eligible weeks, and I (Dr. Hansen) will fill up any weeks which are not signed up for by the Wednesday of that week.

Final Assessments

Final Essay The ability to articulate the interplay between Christian faith and academic learning is an essential component of a Christian liberal arts education. By the end of the semester, you should compose an integrative essay where you explore these topics for yourself, combining the knowledge and insights gained over your entire experience at Westmont as well as this course. Your essay will be completed in several stages, including a proposal, draft, and final draft; each stage must be approved before work on the next stage may begin. Feedback on each stage will be given within two weeks of its submission.

Final Report By the end of the semester, you are expected to solve (or at least make significant progress toward solving) one problem from an appropriate source (The College Mathematics Journal, Mathematics Magazine and The American Mathematical Monthly) and produce a write-up suitable for publication. At the time of your Integrative Presentation (see below), you will also submit your solution to the appropriate journal (most deadlines are at the end of April or beginning of May). Your final report will be evaluated for both style and substance.

Integrative Presentation At the end of the semester, each member of the class will make a 15–20 minute oral presentation of the work done and the results obtained over the course of the semester. This is a formal presentation to other members

of the department (including faculty) and should use appropriate presentation materials. The presentation will be evaluated for both content and quality of presentation. Presentations are tentatively scheduled for May 1, 3:30pm (Study Day). Presentations will be evaluated for clarity and style in a specific oral communication context informed by purpose, audience, and genre in addition to content, and will be graded on skills such as quality of voice (tone, pitch, rate) as well as physical presence (eye contact, gestures, posture, appropriate appearance, and energy).

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Late/Missing Work Policy: Grace Days

By their very nature, the following items will not be accepted late:

- Daily Discussions
- Daily Reports
- Final Reports
- Final Essays
- Final Presentations

Throughout the semester, you may have 4 "grace" days for turning in the following items late with no penalty:

- Weekly Reflections
- Weekly Reports
- Weekly Presentations

Any written work (reflections/reports) turned in after the beginning of the class period but before the end of the day will count as 1 day late. In this case, each additional business day uses 1 grace day. You may use 1 grace day to delay a presentation by one class period (up until Friday of that week) without penalty. You may allocate your grace days however you wish (e.g. four occasions of one day late, one occasion of four days late, etc.). After all of the grace days have been used, work missed without a valid excuse will receive a zero.

Community and Inclusion

Diversity Matters

Westmont's Diversity Matters document outlines how we live out the expectations of the Community Life Statement as we strive to love one another as Christ has first loved us, especially as relates to active inclusion and life in community with people who are different from ourselves. In particular, our daily interactions will seek to affirm others as persons created in God's image as we:

- engage in discussion openly, demonstrating humility toward our own perspectives, and respectfully examining views that are unfamiliar;
- affirm every person as created in God's image and reject stereotypical notions that demean, mock, or oversimplify;
- honor what is distinct in each other's experience as well as what we share in common;
- make choices that convey respect for our neighbors' experiences; and
- acknowledge the significance of context and its influence on our words and actions.

Accommodations and Accessibility

Westmont is committed to ensuring equal access to academic courses and college programs. In keeping with this commitment under the Americans with Disabilities Act (ADA) of 1990, Section 504 of the Rehabilitation Act of 1973, and the Americans with Disabilities Amendments Act (ADAAA) of 2008, individuals with diagnoses that impact major life activities are protected from discrimination and are entitled to reasonable accommodations. Students who choose to disclose a disability are encouraged to contact the Accessibility Resource Office (ARO) as early as possible in the semester to discuss potential accommodations for this course. Accommodations are designed to ensure equal access to programs for all students who have a disability that impacts their participation in college activities. Email aro@westmont.edu or see <https://www.westmont.edu/accessibility-resources> for more information.

Policies

Media & Technology

Technology which presents knowledge and understanding as if it were cheap, immediate, and easy to gain will almost certainly deceive you into thinking that you can obtain deep truth easily, cheaply, and immediately.³ On the contrary, your holistic education (and mathematics in particular) is a serious, challenging, and rewarding endeavor. Except in prearranged circumstances,⁴ I do not permit information or entertainment technology in the classroom during class time, nor in the 5 minutes surrounding class. By “information technology” I mean those tools which present truth as if it were simply obtained. For a class that runs from 11:00—12:00, for example, such technology may not be used in the classroom between 10:55—12:05. Such technology includes (but is not limited to) smart phones, tablets, or laptops. This policy applies to myself as well as to students and visitors.

A.I.: Academic Integrity & Artificial Intelligence

Institutional Policy Westmont’s academic integrity policy prohibits us from “present[ing] another’s work as our own.” Generative AI tools such as ChatGPT attempt to do the work of writing, making, and other creative activities for their users. Therefore, students should **not** substitute AI-generated content or ideas for original academic work. Westmont faculty members design courses and assignments for students’ incremental and active learning through methods such as reading, summarizing, discussion, and an authentic generative process in which a student does the work of critical thinking, making meaning, and constructing messages and other creative works. I reserve the right to prohibit or limit AI use in particular assignments or for an entire course.

“How did you do your work?” Students are advised to document their process of completing each assignment: e.g., their brainstorming, conversations, research queries, reading notes, writing or other creative expression, and the particular resources and tools used to achieve this work. Since software capabilities and AI integrations are rapidly changing, using even such tools as Grammarly without an instructor’s permission puts a student’s academic integrity at risk. When this use has been permitted, the content generated or modified by AI must be properly attributed (e.g., sharing the AI Archives link to that chat). Upon instructor request, a student should be able to narrate the process of assignment completion from start to finish, which shows how a student is learning within and across assignments.

Your weekly reports will serve as your documentation for your problem-solving endeavor. Failure to keep these logs will be tantamount to admitting that generative AI was used in place of a creative process.

Character Development through Mathematics The temptation to use generative AI will be greater than ever in this course. You will be faced with problems that do not have a clear path forward. You will be faced with the challenge of clearly communicating your work to anonymous readers. You will be faced with ambiguity and uncertainty at every turn. Generative AI will only shortcut the opportunities to grow from these challenges, and you will rob yourself of your education if you use generative AI at any point in this course.

In this course therefore, any use of generative AI is **strictly forbidden**. **This includes the use of generative AI to explain unfamiliar terms**, because there is no way to credit the original source of this information, and it is possible that generative AI gives you more information than you ask for. Instead, you are to find and use **citable sources** when learning new information. **This also includes the use of generative AI to format your work**, because it is possible that along the way, generative AI **changes** your work and words. This may be evident if the presentation of your weekly work does not reflect your weekly written report. In many ways, no one cares if you get the answer “right”; we certainly care if **you** can communicate **your** work and ideas, both verbally and in writing. In short: **this policy extends to any and all use of generative AI.**

Representation to the Mathematical Community You are preparing to represent yourself and Westmont college to the broader mathematical community; as such, this policy is in place not only as a measure to develop your character and promote your education, but also as a matter of institutional integrity. Your work in this class is a reflection of your own

³ There is, moreover, a large overlap between such technology and those whose primary metaphor for the world is one of amusement and entertainment, which I call “entertainment technology”. I highly recommend making time to (re)read Neil Postman’s book *Amusing Ourselves to Death* for more on this idea.

⁴ If you plan to use a tablet for note-taking, for example, let’s have a conversation about what that will look like!

work and Westmont's mission to the broader mathematical community; failure to faithfully represent yourself or Westmont's mission will not be accepted. As such, any suspected use of generative AI will be immediately reported to the Provost's office, and a breach of this policy will immediately serve as grounds for termination from the course with a failing grade.

Exceptions The only exception to the above policies will be if a breach of academic integrity is self-reported before a final public presentation of one's work (ie before any of the final deliverables are turned in). Self-reported use of generative AI will constitute a conversation with Dr. Hansen where we will collaboratively decide on an expedient future path for growth. For example, if generative AI was used to discover a potential solution to a math magazine problem, we may decide that this problem will no longer be accepted as a problem on which the student may submit a final report.

Tentative Schedule

Typical Weekly Schedule

Day	Mondays	Wednesdays	Fridays
Due	Weekly reflections/reports		
Discussion Presentation	Howell and Bradley Problem solving (2–3 students)	Stewart Problem solving (2–3 students)	Su Friday Exploration

Tentative Due Dates

Problems and due dates will be officially managed through the course Canvas page.

Week	Date	Day	Reading	Other
1	2026-01-12	M	Syllabus	
	2026-01-14	W	Stewart 1	Problem Selection Due
	2026-01-16	F	Su 1	Friday Exploration
2	2026-01-20	T	Howell 1	
	2026-01-21	W	Stewart 2	
	2026-01-23	F	Su 2	Friday Exploration
3	2026-01-26	M	Howell 2	
	2026-01-28	W	Stewart 3	
	2026-01-30	F	Su 3	Friday Exploration
4	2026-02-02	M	Howell 3	
	2026-02-04	W	Stewart 4	
	2026-02-06	F	Su 4	Friday Exploration
5	2026-02-09	M	Howell 7	

	2026-02-11	W	Stewart 5	
	2026-02-13	F	Su 5	Friday Exploration
6	2026-02-16	M		BREAK
	2026-02-18	W	Stewart 6	
	2026-02-20	F	Su 6	Recommended: Essay proposal due
7	2026-02-23	M	Howell 6	
	2026-02-25	W	Stewart 7	
	2026-02-27	F	Su 7	Friday Exploration
8	2026-03-02	M	Howell 5	
	2026-03-04	W	Stewart 8	
	2026-03-06	F	Su 8	Friday Exploration
9	2026-03-09	M	Howell 9	
	2026-03-11	W	Stewart 9	Recommended: Essay first draft due
	2026-03-13	F	Su 9	Friday Exploration
N/A	2026-03-16	M		BREAK
	2026-03-18	W		BREAK
	2026-03-20	F		BREAK
10	2026-03-23	M	Howell 4	
	2026-03-25	W	Stewart 10	
	2026-03-27	F	Su 10	Friday Exploration
11	2026-03-30	M	Su 11	
	2026-04-01	W	Stewart 11	
	2026-04-03	F		BREAK
12	2026-04-06	M		BREAK
	2026-04-08	W	Howell 8	Recommended: Essay second draft due
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Week	Date	Day	Reading	Other

	2026-04-10	F	Stewart 12 + 13	Drop deadline
13	2026-04-13	M	Su 12	
	2026-04-15	W	Stewart 14	
	2026-04-17	F	Su 13	Friday Exploration
14	2026-04-20	M	Howell 10	
	2026-04-22	W	Stewart 15	
	2026-04-24	F	Su 14	Friday Exploration
15	2026-04-27	M	Stewart 16 + 17	
	2026-04-29	W	Howell 11	
	2026-05-01	F		BREAK
16				
