IDS 2935: Mathematics and the Humanities Fall 24
Quest 1: The Examined Life

I. General Information

Class Meetings

- MWF3 (9:35am-10:25am) in MAEB 0229

Instructors

- Konstantina Christodoulopoulou
- Office: Little Hall 365
- Office Hours: M6 (12:50pm-1:40pm), W7 (1:55pm-2:45pm), F4 (10:40am-11:30am), or by appointment.
- Contact: kchristod@ufl.edu

- Chrysostomos Kostopoulos
- Office: Turlington 2326B
- Office Hours: MWF4 (10:40am-11:30am), TR3 (9:35am-11:30am), or by appointment.
- Contact: ckostopo@ufl.edu

Course Description

For more than 3000 years, mathematics has been part of the human quest for knowledge and has helped us to understand the world that surrounds us. From ancient civilizations to our modern societies, mathematical discoveries and applications have constantly shaped the way we comprehend our environment and have given us the methodologies for analyzing and explaining our world. Through the centuries, the reach of mathematics has been extended beyond the physical sciences to practically every area of human endeavor, from industry to philosophy, and from art to politics.

This multidisciplinary course explores the humanistic side of mathematics and invites students to explore and discover the creative elements that are inherent in it. By examining selections from Plato, Aristotle, Euclid, Descartes, Kant, et al., and mathematical elements in art, music, and architecture from classical Greece to modern times, we will evaluate the role of mathematics in philosophy, aesthetics, music, and art, and we will address the following two essential questions:

a. How various mathematical ideas and concepts have shaped our views about reality, our existence, and knowledge?

b. How has mathematics fostered human flourishing by encouraging us to find truth, beauty, creativity, and imagination in a variety of human endeavors?

Although we will follow a historical approach in our lectures, this course is not a history of mathematics. Instead, it examines how certain mathematical ideas arose and how they influenced certain human activities, such as philosophy, writing, and art. We will begin our lectures with a discussion of the origins of rational inquiry in classical Greece and we will examine the role of mathematics in the passage from superstition to reason. Then we will examine the impact of mathematics on art from ancient times to modern times. We will then discuss the influence of mathematics in the most revolutionary intellectual movement in Europe, the movement of the Enlightenment and we will conclude our journey with an overview of the relationship between humanities and mathematics in the 21st century. All topics will be covered objectively without endorsements of viewpoints and will be observed from multiple perspectives.

Instruction will follow a Team-Teaching Model. Both instructors will be present and participate in each lecture co-operatively depending on the subject matter.

Quest and General Education Credit

- Quest 1
- Humanities
- Writing Requirement (WR) 2000 words

This course accomplishes the Quest and General Education objectives of the subject areas listed above. A minimum grade of C is required for Quest and General Education credit. Courses intended to satisfy Quest and General Education requirements cannot be taken S-U.

Required Readings and Works

All other readings and works are available in Canvas.

Recommended writing manual: Strunk, W. (1999). The Elements of Style.

Materials and Supplies Fees: n/a

II. Graded Work

Description of Graded Work

Assignment	Assignment Description	General Education SLOs Met	Quest 1 Humanities SLO Met	% of Grade

Discussions (due in Canvas Discussions)	There will be regular discussion assignments on Canvas where the students will be asked to discuss topics related to the weekly lectures and readings. Specifically, the discussion assignments will require the following: a. Answer the question(s) posted in the weekly discussions. (10 points) b. Respond to at least two of your fellow students' original posts. (5 points)	*Communication, Content, Critical Thinking (Analyze and Connect)*	Identify, explain, and describe theories and methodologies	**10%**
Quizzes	There will be regular quizzes during the semester based on course readings. The format will be a combination of short answer, multiple-choice, and fill in the blank questions. These will not be difficult but will test whether you have done the readings and are prepared for class.	*Communication, Content, Critical Thinking (Analyze and Connect)*	Identify, explain, and describe theories and methodologies	**10%**

Adobe Express Story (due 11/22)	The students will visit the Harn Museum on the UF Campus or take a virtual museum tour (links will be provided). After their visit, they will create a story in Adobe Express where through images and written narrative they will describe and analyze an artwork. The students should focus on the connection, or the lack thereof, between the artwork and certain mathematical concepts that we discussed in class, such as patterns, symmetry, perspective, etc. Examples of sample Adobe Express Stories will be provided ahead of time to guide the students.	*Communication, Critical Thinking (Analyze and Connect)*	Connect course content to own lives	20%

Analytical Essay Draft (due 11/13)	Students will submit a draft of their analytical essay. The essay prompt will ask you to either examine a question or theme of the class readings or a class topic. The draft should include a bibliography of at least two sources. The instructors will provide feedback on the essay draft on content, punctuation, spelling, syntax, and diction.	*Communication and Critical Thinking*	Analyze and evaluate essential questions	**5%**
Analytical Essay (due 12/4)	A 2,000 words thesis-driven essay on the already provided essay prompt. The essay will be graded and marked for content, organization and coherence, argument and support, punctuation, spelling, syntax, and diction. The essay counts towards the WR 2000 words requirement.	*Communication, Content, Critical Thinking (Analyze and Connect)*	Analyze and evaluate essential questions	**25%**
Midterm Exam (in class, 10/11)	A fifty-minute Midterm Exam in lecture. The exam will be based on the course material (lectures and readings) and will consist of a	*Content (Analyze and Connect), Communication*	Identify, explain, and describe theories and methodologies	**20%**

	combination of multiple-choice and free-response questions.			
Attendance and Class Participation	In addition to roll call attendance in lectures, there will be numerous opportunities to participate through various in-class activities, such as think-pair-share, debate, peer-review, etc.	*Content (Analyze and Connect), Communication*	Identify, explain, and describe theories and methodologies	**10%**

Grading Scale

For information on how UF assigns grade points, visit: https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/

A	≥94%		C	≥74%
A-	≥90%		C-	≥70%
B+	≥87%		D+	≥67%
B	≥84%		D	≥64%
B-	≥80%		D-	≥60%
C+	≥77%		E	<60%

Grading Rubrics

Writing Assessment Rubric and Statements

	SATISFACTORY (Y)	UNSATISFACTORY (N)
CONTENT	Papers exhibit at least some evidence of ideas that respond to the topic with complexity, critically evaluating and synthesizing sources, and provide at least an adequate discussion with basic understanding of sources.	Papers either include a central idea(s) that is unclear or off-topic or provide only minimal or inadequate discussion of ideas. Papers may also lack sufficient or appropriate sources.

ORGANIZATION AND COHERENCE	Documents and paragraphs exhibit at least some identifiable structure for topics, including a clear thesis statement but may require readers to work to follow progression of ideas.	Documents and paragraphs lack clearly identifiable organization, may lack any coherent sense of logic in associating and organizing ideas, and may also lack transitions and coherence to guide the reader.
ARGUMENT AND SUPPORT	Documents use persuasive and confident presentation of ideas, strongly supported with evidence. At the weak end of the Satisfactory range, documents may provide only generalized discussion of ideas or may provide adequate discussion but rely on weak support for arguments.	Documents make only weak generalizations, providing little or no support, as in summaries or narratives that fail to provide critical analysis.
STYLE	Documents use a writing style with word choice appropriate to the context, genre, and discipline. Sentences should display complexity and logical sentence structure. At a minimum, documents will display a less precise use of vocabulary and an uneven use of sentence structure or a writing style that occasionally veers away from word choice or tone appropriate to the context, genre, and discipline.	Documents rely on word usage that is inappropriate for the context, genre, or discipline. Sentences may be overly long or short with awkward construction. Documents may also use words incorrectly.
MECHANICS	Papers will feature correct or error-free presentation of ideas. At the weak end of the Satisfactory range, papers may contain some spelling, punctuation, or grammatical errors that remain unobtrusive so they do not muddy the paper's argument or points.	Papers contain so many mechanical or grammatical errors that they impede the reader's understanding or severely undermine the writer's credibility.

- The Writing Requirement (WR) ensures students both maintain their fluency in writing and use writing as a tool to facilitate learning.
- The instructor will evaluate and provide feedback before the end of the course on all of the student's written assignments with respect to grammar, punctuation, clarity, coherence, and organization.
- WR course grades have two components. To receive writing requirement credit, a student must receive a grade of C or higher and a satisfactory completion of the writing component of the course.

Attendance and Participation

Attendance: You are expected to participate in class discussions. Therefore, it is essential that you attend class. Excused absences are consistent with university policies in the undergraduate catalog and require appropriate documentation.

https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Participation: We believe that participation during class is crucial, and it constitutes an important avenue for learning. We encourage you to be active in every class session. Class Participation in each in-class activity will be evaluated using the rubric below. This Participation Grading Rubric covers expectations for individual contributions in all class discussions and smaller group discussions (think-pair-share, etc.).

Note: We understand that we all have different levels of comfort regarding speaking in class. If you have any issues that prohibit you from participating in class, we encourage you to contact us so we can find ways to make participation work for you in this class.

Participation Rubric

	Excellent (≥90%)	Good (≥80%)	Average (≥70%)	Insufficient (≥60%)	Unsatisfactory (<60%)
Informed: Shows evidence of having done the assigned work. (40 % of points)					
Thoughtful: Shows evidence of having understood and considered topics and ideas discussed. (30% of points)					
Considerate: Takes the perspective of others into account. (30% of points)					

III. Annotated Weekly Schedule

Week	Topic	Summary	Required Readings/Works	Assigned Work Due

Week	Topic	Description	Readings	
Week 1 (8/23)	Course Introduction: What is Mathematics, part I.	After looking briefly at the history of mathematics from its ancient origins to today we will discuss what mathematics is.	Herodotus, *Histories*, ii. 109. Aristotle, *Metaphysics*, A. 981^b 13-25. Morrow, G., 1970, *Proclus: A Commentary on the First Book of Euclid's Elements*, 52-70.	
Week 2 (8/26-8/30)	What is Mathematics, part II. How does Mathematics relate to the Humanities?	We will provide an overview of the humanities, and we will examine the way humanities relates to mathematics.	Burrow-Green J., Gray J., and Wilson, R., The History of Mathematics: A Source Based Approach, vol. 1, pp. 5-33.	Discussion
Week 3 (9/4-9/6) Labor Day (No Class): 9/2	Pythagoras, Philosophy, Music and Mathematics, Part I.	We will begin our discussion of the mathematical and philosophical ideas of Pythagoras and his followers and examine their influence on Greek philosophy, especially on Plato.	Bertrand Russell, *A History of Western Philosophy,* pp. 29-35 Diogenes Laertius, *Lives of the Eminent Philosophers*, Book VII, Chapter 1, Pythagoras.	Discussion

Week 4 (9/9-9/13)	Pythagoras, Philosophy, Music and Mathematics, Part II	We will continue our discussion on Pythagoras with an examination of the relationship between mathematics and music. We will focus on the Pythagorean tuning, musical and mathematical intervals, and the notion of irrational numbers.	Kline, M. 1964, *Mathematics in Western Culture*, pp.24-39 Fauvel, J., Flood, R., and Wilson, R., Editors, *Music and Mathematics*, pp. 1-27.	Discussion
Week 5 (9/16-9/20)	Plato's Meno, the Philosopher and the Slave.	We will examine the influence of geometry in Platonic philosophy, and we will see how mathematics has provided the basis of Plato's theory of knowledge.	Plato, *Meno*	Quiz
Week 6 (9/23-9/27)	Plato's Allegory of the Cave in the Republic. Can Mathematics Describe Reality?	We will discuss the most famous of the Platonic dialogues, the Republic, focusing on the central allegory of the cave and we will examine the question of whether mathematics can describe reality, a question that has occupied the minds of Plato as well as many modern thinkers.	Plato, *Republic* 514a–531d Plato, *Laws*, 746d-747d Plato, *Timaeus,* 32-33, 53-56. Wigner, E., *The unreasonable effectiveness of mathematics in the natural sciences,* Communications on Pure and Applied Mathematics 1 (1960), no. 1, 1–14.	Discussion
Week 7 (9/30-10/4)	Reductio ad Absurdum. Logic, Logical Fallacies, and Mathematics in Greek Philosophy.	We will discuss the impact of mathematics on the origins of logical principles in ancient Greek philosophy, particularly Zeno, Aristotle, and Euclid.	Euclid, *Elements*, Book I, Definitions, Postulates, Common Notions, Proposition 1-5.	Discussion

		We will also discuss how Zeno's paradoxes provided some of the first examples of a method of proof called "reductio ad absurdum", also known as proof by contradiction.	Aristotle, *Physics* VI:9, 239b5-240 a18.	
Week 8 (10/7-10/11)	Symmetry, Mathematics, and Art Part I	We will examine the relationship between mathematics and art focusing on the concept of symmetry.	Euclid, Elements, Book X, Definition 1 Aristotle, *Metaphysics*, 1078a36 Vitruvius, *On Architecture, 26-27.*	Mid-Term Exam (10/11, in class)
Week 9 (10/14-10/16) Homecoming (No Class): 10/18	Symmetry, Mathematics, and Art Part II	We will continue our discussion on the impact of mathematical symmetry on art from classical Greek architecture to the paintings of Leonardo Da Vinci and the graphical designs of M.C. Escher.	Pomeroy, S. et al., *A Brief History of Ancient Greece*, 2004, pp. 150-157. Conway, John Horton, et al. The Symmetries of Things. 2008, pp. 7-13.	Discussion
Week 10 (10/21-10/25)	The Establishment of Perspective in Art. Part I	We will discuss the human perception of space and how this perception was shaped by mathematics.	Kline, M. 1964, *Mathematics in Western Culture* pp. 126-143	Visit the Museum and work on the Adobe Express Story
Week 11 (10/28-11/1)	The Establishment of	We will continue our examination of perspective by	Field, J. V. 1997, *The Invention of Infinity:*	Visit the Museum and work on the

	Perspective in Art Part II	examining the way projective geometry was influenced and used by painters and architects, including Leonardo da Vinci, Rafael, Michelangelo, and Durer.	*Mathematics and Art in the Renaissance*, pp. 4-42 Kline, M. 1964, *Mathematics in Western Culture* pp. 144-158	Adobe Express Story
Week 12 (11/4-11/8)	The Influence of Mathematics on the European Enlightenment Part I	We will begin our discussion on the influence of mathematics on the European Enlightenment by providing an overview of the movement of the Enlightenment, a significant intellectual and philosophical movement that dominated Europe in the 17th and 18th centuries.	Kant, I. 1784, *What is Enlightenment*. Kline, M. 1964, *Mathematics in Western Culture* pp. 159-165, 234-256	Quiz
Week 13 (11/13-11/15) Holiday (No Class): 11/11	The influence of mathematics on the European Enlightenment Part II	We will continue our examination of mathematics and the Enlightenment by examining the impact of mathematics in the philosophical writings and ideas of Descartes, Spinoza, and Kant.	Descartes, R., *Meditations*, I-III Spinoza: Ethics (1677) I (Def. 1–Prop. 17) Kant, I., *Critique of Pure Reason*, B1-B	Essay Draft Due 11/13
Week 14 (11/18-11/22)	Non-Euclidean Geometry and its Impact on Art, Architecture, and Modern Philosophy.	We will discuss non-Euclidean geometry and its impact on the views of the Enlightenment, art, and architecture.	Kline, M. 1964, *Mathematics in Western Culture* pp. 410-431 Einstein, A.: Geometry and Experience https://mathshistory.st-andrews.ac.uk/Extr	Quiz Adobe Express Story due on 11/22

			as/Einstein_geometry/	
Week 15 (11/25-11/29) Thanksgiving Break (No Classes)				
Week 16 (12/2-12/4)	Conclusion. Humanistic Mathematics in the 21st Century.	We will conclude our course with an overview of what we have examined during the semester and some thoughts on the role and interaction of mathematics with the humanities in the 21st c		Analytical Essay due on 12/4

IV. Student Learning Outcomes (SLOs)

Humanities courses must afford students the ability to think critically through the mastering of subjects concerned with human culture, especially literature, history, art, music, and philosophy, and must include selections from the Western canon.

Humanities courses provide instruction in the history, key themes, principles, terminology, and theory or methodologies used within a humanities discipline or the humanities in general. Students will learn to identify and to analyze the key elements, biases and influences that shape thought. These courses emphasize clear and effective analysis and approach issues and problems from multiple perspectives.

At the end of this course, students will be expected to have achieved the Quest and General Education learning outcomes as follows:

- Students will be able to identify the key theories, methodologies, and personalities in the history of mathematics and their impact on various aspects of human culture and civilization, such as philosophy, literature, music, and art. (Content SLOs for Gen Ed Hum, and Q1)
- Students will be able to discuss, analyze, and evaluate key elements and figures, biases, and influences in the humanities, and point out their relationship with certain mathematical ideas and methods. (Content and Critical Thinking SLOs for Gen Ed Hum, and Q1)
- Students will be able to discuss, analyze and evaluate the role and impact of mathematics on art and provide specific examples of art works that demonstrate the impact of mathematics. (Content and Critical Thinking SLOs for Gen Ed Hum, and Q1, Connection SLOs for Q1)
- Students will be able to approach the development of mathematics within and across various civilizations and cultures from multiple perspectives, recognize how mathematics and culture are often interconnected, and enhance their ability to interpret and evaluate sources. (Critical Thinking SLOs for Gen Ed Hum, and Q1, Connection SLOs for Q1)
- Students will be able to communicate their knowledge, thoughts, and reasoning clearly and effectively in written and oral form through class assignments, such as in-class and online

discussions and self-reflections, the analytical essay, etc. (Communication SLOs for Gen Ed Hum, and Q1)

V. Quest Learning Experiences

1. Details of Experiential Learning Component

This class includes an experiential learning component in which students will actively engage with a UF resource. As such, the class requirements include a visit to the Harn Museum on the UF Campus. After their visit to the Museum, the students will create a story in Adobe Express where through images and written narrative they describe and analyze an art works. The students should focus on the connection, or the lack thereof, between the artwork and certain mathematical concepts that we discussed in class, such as patterns, symmetry, perspective, etc. Examples of similar Adobe Express Stories will be provided ahead of time to guide the students.

2. Details of Self-Reflection Component

Students will reflect on the reading material provided each week and share their thoughts both through in-class participation as well as by discussion posts on Canvas. These activities will be due weekly.

VI. Required Policies

Attendance Policy
Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Students Requiring Accommodation

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting https://disability.ufl.edu/students/get-started/. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

UF Evaluations Process

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

University Honesty Policy

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructors in this class.

Counseling and Wellness Center

Contact information for the Counseling and Wellness Center: http://www.counseling.ufl.edu/ , 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

The Writing Studio

The writing studio is committed to helping University of Florida students meet their academic and professional goals by becoming better writers. Visit the writing studio online at http://writing.ufl.edu/writing-studio/ or in 2215 Turlington Hall for one-on-one consultations and workshops.

In-Class Recordings

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.
A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.
Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third-party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.