
Special Topics in Advanced Math: *History of Mathematics*

Math 395 Fall 2023

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Fowler 310 TR 1:30pm - 2:55pm

<http://sites.oxy.edu/ron/math/395/23/>

INSTRUCTOR Ron Buckmire ~ Fowler 313 ~ x2536 ~ ron@oxy.edu

OFFICE HOURS My official office hours (which I have reserved for interacting with students) for Fall 2023 are **MTWRF 3-4pm**. I'll either be in my office or available via Zoom at <https://occidental.zoom.us/j/3232592536?pwd=ZmxkY01sRVNPTlY2a04rMzJHU1BXQT09> or 3232592536 code 235711

I am readily accessible by e-mail at ron@oxy.edu and by phone at **323-259-2536**. If you need to see me at a time not specified here, then contact me and make an appointment.

I strongly recommend that you come to office hours at least once in the semester. Although it is not mandatory, I do ask that you come and see me for a brief visit at some point early in the semester so that I can learn more about your background, interests and expectations for the semester.

TEXTBOOK(S) We will be using multiple sources of information during the class.

- **(REQUIRED)** *The History of Mathematics: A Source-Based Approach (Volume 1)*, by June Barrow-Green, Jeremy Gray, and Robin Wilson. MAA Press, 2019. ISBN 978-1-4704-4352-8.
- **(REQUIRED)** *The History of Mathematics: A Source-Based Approach (Volume 2)*, by June Barrow-Green, Jeremy Gray, and Robin Wilson. MAA Press, 2022. ISBN 978-1-4704-4382-5.
- **(SUPPLEMENTAL)** *A History of Mathematics*, 3rd edition by Carl B. Boyer and Uta C. Mertzbach. Wiley, 2011. ISBN-13 978-0470525487.
- **(SUPPLEMENTAL)** *A History of Mathematics, An Introduction*, Third Edition by Victor J. Katz Addison-Wesley, 2009. ISBN-13 978-0321387004.
- **(SUPPLEMENTAL)** *An Introduction to the History of Mathematics*, Sixth Edition by Howard Eves. Cengage, 1990. ISBN-13 978-0030295584.

OTHER SOURCES In addition to the textbooks above I would encourage students to have access to some of the following

- Mathematical Association of America's *Convergence* journal on the History of Mathematics
- Online version of Euclid's *Elements*
- Donald Allen's *History of Mathematics* online textbook
- David Pengelley's *Teaching with Original Historical Sources in Mathematics* website
- *History of Mathematics Archive* at University of St. Andrew's, Scotland

COURSE WEBSITE <http://sites.oxy.edu/ron/math/395/23/>

COURSE DESCRIPTION This seminar course is a survey of selected topics from the history of mathematics. Through exposure and access to primary historical sources and other materials, students will gain deeper insights into mathematical concepts they have seen before, be introduced to new mathematical ideas, and learn about the development and developers of mathematics in the past and present. The primary objective of the course is for students to synthesize various mathematical ideas from fundamental and advanced mathematics courses as a capstone experience for the major. Students will complete a project about an advanced mathematical topic with presentations in written and oral form at the end of the course. *This course satisfies the Core Program Requirement: Pre-1800 (CPPE). Prerequisite: Any 300-level Mathematics course (may be taken concurrently) or permission of instructor.*

COURSE OBJECTIVES This course is designed so that students will

- be exposed to the human side of mathematics and the people involved in the development of mathematical concepts.
- appreciate the significant contributions and connections mathematics and mathematicians have with our culture.
- receive an overview of a wide variety of mathematics topics, so students can see how various mathematics concepts and results are related to each other, and how and where important ideas come from.
- improve their written and oral communication skills in the context of mathematics.
- use primary sources to see the ways that various mathematical concepts were initially presented and contrast this with more modern approaches.
- learn about contributions of female and non-western mathematicians to the mathematics discipline.

STUDENT LEARNING OUTCOMES The official Departmental learning outcomes of this class are:

- Outcome 2.1: Students will complete an individual or group project related to the content of an upper division mathematics course, and present the results of the project through a paper, poster, or talk.
- Outcome 3.1: Students will write a clear and well-organized paper in the model of a scholarly paper in the field.
- Outcome 3.2: Students will give a clear and well-organized presentation on a mathematical topic.
- Outcome 5.1: Students are able to define and deploy important terms in multiple areas of advanced mathematics.
- Outcome 5.2: Students are able to provide examples that illustrate important concepts found in multiple areas of advanced mathematics.

COURSE POLICIES

HEALTH & WELL-BEING Your health and well-being, and that of our community, are essential. If you are feeling any symptoms of illness, please refrain from attending class until you receive a negative COVID test or it has been 10 days since your symptoms began. Please work with Emmons and the COVID Operations team to confirm when and how you can end your isolation. Similarly, if you have been identified as a close contact of someone who

has tested positive for COVID-19, please follow all applicable College policies, and wear a high-quality mask when around other individuals for 10 days. If you miss an assignment due to illness or other emergency, you will need to provide appropriate documentation (a note from Emmons or from the Dean of Students Office). If you should contract COVID or other illness that necessitates further accommodation, please let me know as soon as possible so that we can help meet your educational needs.

Your mental health and emotional well-being impacts learning and academic success. Symptoms like depression, anxiety, and trauma may cause loss of motivation, difficulty concentrating, and other issues that make learning difficult. Emmons Counseling staff are committed to supporting the mental health needs of our students. Emmons counseling services are available M-F from 9a-4p and include individual and group therapy, drop-in chats, case management, and referral consultations. Walk-ins are available M-F from 2-4p. All of these services are offered in person and via teletherapy. Students can also utilize the 24/7 confidential hotline at (323) 341-4141. To get connected to any of the free, confidential services at Emmons call (323) 259-2657.

ASSESSMENT AND GRADING In order to enhance equity and agency for students, a number of Oxy faculty (including myself) have begun implementing “alternative grading” policies. In this class this involves providing students with the expectations and specification for what the students need to do in order to receive a specific grade in the class. This “specifications grading” process or “grade contract” means that although you will receive individualized feedback on all assignments (typically *meets expectations* or \checkmark and *fails to meet expectations* or \times) your grade will not be computed as a percentage of the available points on individual assignments or in the course as a whole.

The idea behind this approach is to try to separate the grade in a course from the learning that occurs in the course. This does not mean that you will be doing less work or having your work assessed less often. It means that as the student, you have more control over what your final course grade is, because the terms are stated clearly in the grading contract (see below).

There are different kinds of assignments/activities in this class

- **Informal Homework Response** This is a homework solution which could have been done as a group and is submitted as a handwritten document.
- **Formal Homework Response** This is a homework solution which is written up using \LaTeX and/or is an individual response to a problem set or assignment.
- **Synchronous Class Meetings** These are the class meetings on Tuesdays from 1:30p.m. to 2:55p.m. where synchronous interaction between students and between students and the instructor occur.
- **Live Faculty-Student Interview** This is a short (5-10 minute) synchronous meeting with the student and instructor where the student provides a presentation of a solution to an assigned problem and/or concept in the class, and answers questions.
- **Course Project** This is the capstone event of the course, where students demonstrate their understanding of and provide historical context for an advanced mathematics concept (i.e. a topic which is or would be) included in a 300-level Mathematics course. The Course Project includes a 8-10 page paper and a 8-10 minute oral presentation.

GRADING CONTRACT This section defines the minimal requirements that need to be achieved in order to achieve the specified grade range.

This is a 300-level Mathematics class so the expectation is that all students will earn a C grade or higher.

To **earn a D**, a student must do all of the following:

- Submit at least six (6) Informal Homework Responses at the level of *meets expectations*
- Submit at least one (1) Formal Homework Response
- Miss no more than six (10) Synchronous class meetings
- Submit a paper OR give a talk as part of the Course Project
- Score Over 33% on the Short Exam

To **earn a C**, a student must do all of the following:

- Submit at least eight (8) Informal Homework Responses at the level of *meets expectations*
- Submit at least one (1) Formal Homework Responses at the level of *meets expectations*
- Miss no more than six (6) Synchronous class meetings
- Submit a paper OR give a talk as part of the Course Project; the submission must be at the level that *meets expectations*
- Score Over 50% on the Short Exam

To **earn a B**, a student must do all of the following:

- Submit at least ten (10) Informal Homework Responses at the level of *meets expectations*
- Submit at least two (2) Formal Homework Responses at the level of *meets expectations*
- Miss no more than four (4) Synchronous class meetings.
- Submit a paper AND give a talk as part of the Course Project; one of these must be at the level that *meets expectations*
- Score Over 66% on the Short Exam

To **earn an A**, a student must do all of the following:

- Submit at least twelve (12) Informal Homework Responses at the level of *meets expectations*
- Submit at least three (3) Formal Homework Responses at the level of *meets expectations*
- Miss no more than two (2) Synchronous class meetings.
- Submit a paper AND give a talk as part of the Course Project; both of these must be at the level that *meets expectations*
- Score Over 80% on the Short Exam

The grades A-, B+, and C+ will be determined at the discretion of the instructor based on

- level of engagement in the class
- token tally at the end of the semester
- how much minimum requirements are exceeded by

(Note: A+ is not an available grade at the College.)

The grades A-, B- and C- will be determined at the discretion of instructor based on partial fulfillment of the specification for a particular grade range.

A Live Faculty-Student Interview can be requested by the student to earn Extra Credit.

Academic Flexibility: Extra Credit Tokens

In order to provide students with academic flexibility to deal with unexpected situations that may negatively impact your ability to do your best work in the class, all students are provided with **three tokens** that they can use to alleviate situations, circumstances or problems that would otherwise negatively impact their performance. For example, one can use a token to re-submit an assignment that has been assessed as *fails to meet expectations* or to extend the deadline on an assignment, or to do a make-up assignment. Tokens are **not** “get out of jail free” cards; they can only be used if you have consulted with the instructor in advance and received permission to use the token in the requested way. You do not have to provide a reason for why you want to use the token. However, you cannot miss a deadline and then after the fact ask to use a token to submit the assignment late. Although each student begins with three tokens, there will be extra credit opportunities that will serve to earn you more tokens.

EXAMS There will be no final exam in this class. There will be a midterm exam (50 points) in the second half of the semester (probably Thursday November 16 or Tuesday November 21).

CLASSROOM EXPECTATIONS Here are some expectations I have for behavior in the classroom

Inclusiveness I strive to foster an inclusive classroom environment. Please be respectful of your peers and feel free to come to us with any concerns. We are allies. You should know that we are not confidential resources (those you will find here).

Class Updates Students will be expected to regularly access the course website and to frequently check Oxy email for course announcements.

Electronic Devices Technology in the classroom is great as a tool, not as a distraction. You may use any device of your choice, but don't let your computers, phones, etc. take you off-task – or distract your neighbors.

ATTENDANCE POLICY Attendance and participation in class are a significant component of the course grade since this is a small seminar class. We will be working together to analyze and understand the course material together. However, if there is a medical issue or family emergency please let me know; I do not want you coming to class if you are seriously ill, and I recognize that other life issues can sometimes arise unexpectedly. If you must miss class due to an official Oxy event, or due to reasons of faith or conscience, please let me know as early in the semester as possible. **Note: attendance is also addressed in the Grading Contract given above.**

RECORDING POLICY You may not record any course activities without our written consent. Do not share or post any course information except with written consent.

SYLLABUS CHANGES Any aspect of this syllabus is subject to change, at any time, although you will be notified of any changes in writing (probably by email).

OTHER NOTES Prof. Buckmire will be out of town Tuesday September 26.

COLLEGE POLICIES

Credit Hour Policy Math 395 is a 4-credit course. The expectation is that students will be devoting at least twelve(12) hours each week (including in-class time) on average working on this course.

Academic Calendar The 2023-2024 Academic Calendar includes information about important deadlines.

Discrimination, Harassment and Retaliation The College seeks to maintain an environment of mutual respect among all members of its community. All forms of harassment and discrimination on the basis of sex, gender identity and expression, pregnancy, religion, creed, color, race, national or ethnic origin, ancestry, sexual orientation, medical condition, physical or mental disability, age, marital status, veteran status, family care leave status, political affiliation or any other class protected by federal, state or local law destroy the foundation for such respect and are violations of this policy.

<https://www.oxy.edu/student-handbook/general-college-policies/discrimination-harassment-and-retaliation>

Statement Of The Shared Academic Integrity Commitment Academic Integrity is a shared community value. It is built around trust and respect between members of the Occidental Community, and embodies a commitment to honesty and integrity in every aspect of ones academic life. All members of the Occidental community are committed to uphold the highest degree of academic integrity. Unless stipulated otherwise, the academic work done for all assignments is expected to be the students own, and students give proper credit to the ideas and work of others.

Signing the Academic Integrity Commitment at matriculation and at the beginning of every semester represents a students affirmation to uphold the shared values of honesty and integrity. When signing the Integrity Commitment associated with work in a course, students are affirming that they have not cheated, plagiarized, fabricated, or falsified information; nor assisted others in these actions. Here is a link to the Student Handbook (which includes the framing of the commitment, definitions of Academic Ethics, and Process for alleged violations of the commitment): <https://www.oxy.edu/student-handbook/occidentals-shared-academic-integrity-commitment>

Diversity, Equity, and Inclusivity Occidental College seeks to provide an inclusive and non-discriminatory environment by making it possible for students to use a lived first name and pronouns on college records when a legal name is not required. More information can be found here: <https://www.oxy.edu/student-handbook/general-college-policies/lived-name-pronoun-policy>. Students are encouraged to use Zoom to display their lived name and pronouns. These can be set at <https://occidental.zoom.us/profile>.

You may also consider connecting with the Intercultural Community Center (ICC) which seeks to uplift and support the experiences of students who identify as BIPOC, LGBTQIA+,

low income or first generation college students. The ICC also aims to reduce institutional barriers for minoritized groups through intersectional programming, identity-specific services and structural resources. To learn more, contact icc@oxy.edu

Accommodations for Reasons of Faith and Conscience Consistent with Occidental Colleges commitment to creating an academic community that is respectful of and welcoming to persons of differing backgrounds, we believe that students should be excused from class for reasons of faith and conscience without academic consequence. While it is not feasible to schedule coursework around all days of conviction for a class as a whole, faculty will honor requests from individual students to reschedule coursework, to be absent from classes that conflict with the identified days. Information about this process is available on the ORSL website: <https://www.oxy.edu/office-religious-spiritual-life>

Special Accommodations/Learning Differences All academic and housing accommodation requests are managed by Disability Services & Student Support (DSSS). It is a students responsibility to contact DSSS if they need accommodations or additional support. Any student who has, or thinks they may have, a physical, learning, or psychological disability may contact Disability Services at accessibility@oxy.edu to learn about available services and support. More information is available at <http://www.oxy.edu/disability-services>.

Academic Ethics Students are expected to comply with the Student Handbook, in particular the section on Academic Ethics. Whenever outside sources are used, they must be properly credited. <https://www.oxy.edu/student-handbook/academic-ethics/academic-ethics>.

Civil Rights & Title IX In the event that you write or speak about having experienced discrimination or harassment on the basis of a protected characteristic or sexual misconduct (including sexual assault, dating/domestic violence, stalking, sexual exploitation or any other form of sexual and/or gender-based harassment), as a designated Responsible Employee, I must inform the Civil Rights & Title IX Office. They will contact you to let you know about resources and support services at Oxy, as well as reporting options both on and off-campus. You have no obligation to respond to the Civil Rights & Title IX Office or to meet with them to discuss support services and reporting options.

If you do not want the Title IX Office notified, instead of disclosing this information to your instructor, you can speak confidentially with the following people on campus:

Oxy's Survivor Advocate, Project SAFE (survivoradvocate@oxy.edu)

Emmons Counseling (For appointments, call: 323-259-2657)

Rev. Dr. Susan Young, Office of Religious and Spiritual Life (young@oxy.edu)

Oxy 24/7 Confidential Hotline (323-341-4141)

The Colleges civil rights policies, along with additional resources, can be found at: <https://www.oxy.edu/civil-rights-title-ix>. If you would like to contact the Civil Rights & Title IX Office directly, you may email Civil Rights & Title IX Coordinator Alexandra Fulcher at afulcher@oxy.edu or call 323-259-1338 .

Student Academic Support Resources The college has many types of resources to help students succeed.

Academic Coaching If you'd like to take advantage of the College's Academic Coaching resource, which offers one-on-one sessions focused on supporting your time management skills, online learning strategies, and other study skills, you may schedule an academic coaching meeting by sending an email to academiccoaching@oxy.edu. Share what you'd like to work on, and an academic coach will schedule an appointment with you within a few days.

Finding Research Help The librarians and disciplinary specialists in the library can help you find sources, use library resources, and refine your research focus. Book a one-on-one research appointment with a specialist at libcal.oxy.edu Remote Learning Peer Tech Support: The Critical Making Studio is shifting gears to offer peer to peer support and training for students as you adapt to new learning technologies. This group of students can provide asynchronous training materials or meet with you virtually to help troubleshoot. Note: if your tech is broken, missing, or just not working, start with the helpdesk@oxy.edu for the fastest support response.

Writing Assistance The Writing Center offers opportunities to work on all forms of writing for any class or other writing tasks such as personal statements, senior comprehensives, etc. They offer peer-to-peer consultations with knowledgeable Writing Advisers and sessions with Faculty Writing Specialists. For Fall 2020, all of their appointments will be remote: either synchronous virtual meetings or asynchronous writing feedback. See the Writing Center website for more information about fall hours and how students can sign up for appointments. We will update our information again for spring 2021. Please contact the Writing Programs-Center Director, Julie Prebel (jprebel@oxy.edu; x1307) for more information on how the Center can work with you