
Senior Colloquium: *Applied Mathematics*

Math 400 Fall 2020

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<http://zoom.us/j/3232592536> T 10:15am - 11:40am

<http://sites.oxy.edu/ron/math/400/f20/>

INSTRUCTOR Ron Buckmire ~ he/him/his ~ x2536 ~ ron@oxy.edu

OFFICE HOURS My official office hours for Fall 2020 are **T 4–5pm, W 12–1pm, R 10–11am**. However, because I am an Associate Dean it is possible there may not always be open slots during these times. In that case, I **strongly** encourage you to make an individual 1-on-1 appointment to see me. These meetings occur on Zoom, at <http://occidental.zoom.us/j/3232592536> with code 235711 (i.e. the first five prime numbers!)

I am also readily accessible by e-mail at ron@oxy.edu

I strongly recommend that you take advantage of attending a small liberal arts college in a remote setting to interact with your professors one-to-one. 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 material from multiple texts during this course.

- **(RECOMMENDED)** *Applied Mathematics*, Fourth edition by J. David Logan. Wiley-Interscience, 2013. ISBN-13 978-1-118-47580-5.
- **(SUPPLEMENTAL)** *Introduction to the Foundations of Applied Mathematics*, Second Edition by Mark H. Holmes, Springer, 2019. ISBN-13 ISBN 978-3-030-24261-9.
- **(SUPPLEMENTAL)** *Methods of Mathematical Modelling: Continuous Systems and Differential Equations*, First Edition by Thomas Witelski and Mark Bowen. Springer, 2020. ISBN-13 978-3319230412.

COURSE WEBSITE <http://sites.oxy.edu/ron/math/400/f20/>

COURSE MOODLE <https://moodle.oxy.edu/course/view.php?id=31165>

COURSE DESCRIPTION This weekly seminar course is an introduction to some of the classic techniques of applied mathematics. Topics will include scaling, dimensional analysis, regular and singular perturbations, and asymptotic matching. The goals of the course are to expose students to important techniques widely used in applied mathematics; to present a different mode of classroom instruction and student involvement where students see themselves as equal participants in the learning process; to provide students with opportunities to practice and hone oral presentation skills; and to become more familiar with using modern computational tools to solve mathematical problems.

COURSE FORMAT All instruction will occur remotely via web conference. Class worksheets will be available on Moodle (and my own class website). Live (synchronous) class will be conducted via Zoom and will involve significant amounts of group work using worksheets and shared screens. A recording of the Zoom session will be posted to Moodle after class.

(Students will need to provide consent to be recorded in order to participate in the live portion of the class.) Students will be expected to work together in small groups to produce homework solutions and will need to present these solutions to the rest of the class. (Its possible this component may be done asynchronously). Documents can be emailed to me as pdf attachments or uploaded in our Math 400 Google Drive.

COURSE OBJECTIVES This course is designed so that it will

- expose students to important techniques widely used in applied mathematics;
- present students with a different mode of classroom instruction and student involvement where students see themselves as equal participants in the education process;
- provide students with opportunities to practice and hone oral presentation skills; and
- supply students with the experience of using modern computational tools to solve mathematical problems;

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

- 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.

ASSESSMENT AND GRADING In order to enhance equity for students, a number of Oxy faculty (including myself) are implementing “specification grading” or “contract grading” this semester. This process involves providing students with the expectations for what the students need to do in order to receive a specific grade in the class. This means that although you will receive individualized feedback on all assignments (typically *meets expectations* or ✓ and *fails to meet expectations* or ×) 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 a response to an individualized problem or assignment.

- **Small-Group Interaction Documentation a.k.a. Tutorial Attendance** This is a synchronous activity in which a small group of students (usually no more than 3 or 4) interact with the instructor to discuss course material and/or present a Homework Response in verbal form.
- **Synchronous Class Meetings** These are the class meetings on Tuesdays from 10:15am to 11:40am 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.

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

To **receive credit for the class/earn a C**, a student must do all of the following:

- Submit at least five (5) Informal Homework Responses at the level of *meets expectations*
- Submit at least one (1) Formal Homework Responses at the level of *meets expectations*
- Be an *engaged participant* in at least two (2) Tutorials or four (4) Synchronous class meetings.

To **earn a B**, 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 two (2) Formal Homework Responses at the level of *meets expectations*
- Be an *engaged participant* in at least three (3) Tutorials or six (6) Synchronous class meetings.

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

- Submit at least seven (7) Informal Homework Responses at the level of *meets expectations*
- Submit at least three (3) Formal Homework Responses at the level of *meets expectations*
- Be an *engaged participant* in at least four (4) Tutorials or eight (8) Synchronous class meetings.
- Participate in at least one (1) Live Faculty-Student Interview

The grades 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.

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 tokens.

FINAL EXAM There will be no final exam in this class.

ONLINE LEARNING ENVIRONMENT As you know, all instruction in Fall 2020 will be remote and this section discusses the online learning environment.

Acceptable Behavior As a student participating in an online learning environment, you must abide by all College rules and regulations including, but not limited to, rules in the course syllabus, the Student Code of Conduct Policy, the Policy on Sexual Harassment and Discrimination, as well as any applicable laws. Any violation of these rules may lead to disciplinary action, up to and including expulsion from the College, and/or legal action.

Recording Classes (Portions of) Online class sessions will often be recorded. This means that the audio-visual and chat portions of each class may be recorded and then stored on the Colleges servers. These recordings will be made available through Moodle, but only for the express and sole use of those registered in the course. This is done to assist students in time zones far from California’s to have equitable access to the course content in an asynchronous fashion. The recorded material will be removed at the end of the semester. No other recording of classroom instruction is permitted. Students are required to provide consent to the recording or to contact the professor to come to an accommodation if they do not consent to their audio, video or chat being recorded. The sharing, altering, or distorting of any audio-visual capture of a class session is not permitted. All content contained in the records shall be subject to the Colleges Policy on Intellectual Property.

Zoom Etiquette Each class has the ability to determine the etiquette expected of participants in Zoom. I would like the class to collaboratively determine our Zoom etiquette for Math 400, which include the following: Should students be expected to have their video cameras on all the time? Should students be expected to be muted when not speaking to prevent extraneous noise? If students do not share video, should they add a meaningful picture to their Zoom profile?

SYLLABUS CHANGES Any aspect of this syllabus is subject to change, at any time, although you will be notified of any changes in writing (via email and also via announcement in Moodle).

OTHER NOTES We will not have class on Election Day, Tuesday November 3rd. I encourage all students to vote!

COLLEGE POLICIES

Credit Hour Policy Math 400 is a 2-credit course. The expectation is that students will be devoting at least six(6) hours each week (including in-class time) on average working on this course.

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>

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>

Language on Special Accommodations/Learning Differences No matter the mode of course instruction, approved academic accommodations remain in effect. Students with documented disabilities and learning differences who are registered with Disability Services are required to present their accommodation letter to the instructor at the beginning of each semester, or as soon as possible thereafter. 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>.

Academic Integrity I expect the highest level of academic honesty from my students. Students are responsible for knowing the Academic Misconduct policies found here: <https://www.oxy.edu/student-handbook/academic-ethics/academic-misconduct> I would like to alert students to the official Principle of Honor found in the Student Handbook: **“No student shall take unfair advantage of another student or member of the Occidental Community” - ASOC Constitution, Article VI, Section 1B.** I trust that you will follow this principle and act with integrity and respect for others.

Title IX In the event that you choose to write or speak about having experienced sexual or interpersonal violence, including sexual assault, dating violence, domestic violence, stalking, sexual exploitation or any other form of sexual harassment, federal and state education laws require that, as your instructor and a designated Responsible Employee, I notify the Title IX office. They will contact you to let you know about accommodations and support services at Oxy and reporting options both on and off-campus.

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:

Marianne Frapwell, 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)

The sexual misconduct policy, along with additional resources, can be found at: <http://www.oxy.edu/sexual-respect-title-ix/policies-procedures>. If you would like to contact the Title IX Office directly, you can email Title IX Coordinator Alexandra Fulcher at afulcher@oxy.edu or call 323-259-1338.

COLLEGE RESOURCES

Student Academic Support Resources The College has numerous resources to support and promote student success. These can be accessed at <https://www.oxy.edu/academics/student-success>

Writing Assistance The Writing Center (WC) can help you with papers for this class (and any other class), at any stage in your writing process, from generating ideas to revision. The WC provides two types of support: appointments with peer Writing Advisers and with Faculty Specialists. You can find more information about the Writing Center, including how to sign up for an appointment (synchronously through Zoom or to receive asynchronous feedback), on the WC website: <https://www.oxy.edu/writing-center>.

Intercultural Community Center The ICC 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, or reach out directly to Chris Arguedas, at carguedas@oxy.edu.

Lived Name Policy 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. Students are encouraged to use Zoom to display their lived name and pronouns. These can be set at <https://occidental.zoom.us/profile>. I encourage all students to include their lived names and pronouns after consulting this policy: <https://www.oxy.edu/student-handbook/general-college-policies/lived-name-pronoun-policy>

Student Health/Emmons Your health and well-being has always impacted learning and academic success, and this reality is only heightened as we learn and live through a global pandemic. Symptoms such as anxiety, depression, loss of motivation, difficulty concentrating, and strained relationships can occur. Emmons Counseling staff are committed to supporting the mental health needs of all of our students, regardless of where you're located. Emmons

provides virtual walk-ins, crisis support, and consultation to all students, and ongoing individual telecounseling to students residing in California. All students residing outside of California will have access to ongoing telecounseling through a national telecounseling service. Emmons also assists students with finding local therapy referrals. All students continue to have access to 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 or schedule an appointment online at <https://myhealth.oxy.edu> using your Oxy login credentials.