Math 5470/6440 - Chaos Theory, Spring 2017

Lecturer: Alla Borisyuk
Office: LCB 303, Phone: (801) 585-1639
E-Mail: borisyuk at math.utah.edu
Office Hours: Tuesday 11-12 or by appointment


Course description: Chaos is everywhere around us from fluid flows, weather forecasting, stock prices and fractal images. The theory of nonlinear dynamical systems uses bifurcations, attractors and fractals to describe the chaotic behavior in the real world. The course gives an introduction to chaotic motions, strange attractors, fractal geometry: We shall generally follow Strogatz' text. We will emphasize applications taken from various subjects like mathematical biology, engineering, geometry and physics.

Class time: TTh 12:25-1:45 in LCB 225
Prerequisites: Math 2250 or Math 2270-2280 sequence
3 credit hours

Canvas: This is where I will post class announcements and grades. This is also where online version of the quizzes will be administered. Tests will usually be done in class.

Course type: In person. You are expected to attend the lectures. This class does not always follow a textbook. You will be expected to follow the material in lectures. If the lectures are occasionally moved online, they will be recorded and the recordings posted in Canvas.

Class Zoom link: is provided on CANVAS. Please do not distribute it or post it anywhere online.

Attendance, punctuality, and etiquette: Attendance is strongly encouraged. Please attend class on time, not to be disruptive.

Course Grade: 2 Midterms (20% each) + Quizzes (20%) + Final (40%)

Homeworks and quizzes: Homework will be assigned every lecture and posted on the class website. The homework itself will not be turned in! However, every Thursday, at the start of the class, there will be a quiz, featuring one or two of the homework problems. The quiz will be graded. Some of the quizzes might have an option of doing them in Canvas, so feel free to bring your computer.
I want to emphasize greatly that doing the homework in the timely fashion is the only way to keep up with the course, to identify where you may be having trouble, and where you need additional work. Math can only be learned through practice. Doing homework is your chance to learn! The quizzes will be easy if you really understand how to do the assigned problems, and impossible if you don't.

**Extra credit problems and 6440 students:** Some homework assignments will contain extra-credit problems (including exercises from additional sections of the book, computing exercises or open-ended questions). The extra credit problems can be turned in and will be graded. Students who successfully complete most of these will be permitted to do a project at the end of the class, instead of the comprehensive part of the final exam. **Students registered for 6440 are required to attempt extra credit problems** --- they will contribute to your homework score.

**Exams:** Exams will be closed book except that you will be allowed to bring a "cheat sheet," an 8.5" x 11" piece of paper with notes on both sides (the "cheat sheet" will not be allowed on quizzes). Your text, notes, homework papers, calculators, laptops, tablets, phones, text messaging devices, and other books will not be allowed.

**Midterms:** There will be two in-class one-hour midterm exams, tentatively, on Thursdays Feb. 23 and Mar. 30.

**Final Exam:** Wednesday, May 3, 2023, 10:30 am – 12:30 pm. Half of the final will be devoted to material covered after the second midterm exam. The other half will be comprehensive.

**With any questions, please, contact me in class, with a Canvas message or by email:** borisyuk@math.utah.edu

**Friendly advice:**

Ask questions!!! If lecture was unclear, homework confusing, homework grading strange, book mysterious or anything else --- ask! (office hours, after class, Canvas, email). Since ideas will build on each other throughout the semester, seek help as soon as possible.

Read your book! It has detailed explanations and more examples that can be covered in class. It is a good book --- use it wisely.

Do your exercises! This is really the only way to learn or to know what questions to ask. Make sure that you look over your homework when it is returned to you, and if you still do not know why an answer is wrong, ask about it.

I strongly encourage you to start the homework as early as possible, so that you can seek help as needed. Do feel free to ask questions after you attempted the problems yourself. I also strongly suggest that you complete the homework even if you are late in handing it in.
Further important information:

- It is the student's responsibility to regularly check their Umail or have it forwarded to an address they check regularly. The Umail is the only way for me to communicate privately with the student. There will be occasions during the semester that we may need to reach out to individual students (e.g. regarding a grade or assignment) and it is in their best interest to respond promptly.

- I would like to encourage the students to email me only if it is something personal that requires individual attention. For questions about logistics of the class, course material and assignments, and anything else the classmates may wonder about as well, please post a question on the Discussions Board in CANVAS. This way the information is shared quickly to the entire class, and everyone can benefit from seeing other classmates’ questions.

- Please stay updated by regularly checking: the announcements on Canvas, your Umail, the posts on the Discussions Board, and pay attention to the announcements given in class. Students are also strongly advised to set up notifications for canvas so they do not miss any important notifications.

- Respectful participation in all aspects of the course will make our time together productive and engaging. Zoom lectures, discussion threads, emails and canvas are all considered equivalent to classrooms and student behavior within those environments shall conform to the student code.

- **The Americans with Disabilities Act:** The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability & Access, 162 Olpin Union Building, 801-581-5020. CDA will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in alternative format with prior notification to the Center for Disability & Access.

- **Addressing Sexual Misconduct:** Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a Civil Rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran's status or genetic information. If you or someone you know has been harassed or assaulted on the basis of your sex, including sexual orientation or gender identity/expression, you are encouraged to report it to the University’s Title IX Coordinator; Director, Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or to the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to police, contact the Department of Public Safety, 801-585-2677(COPS).

- **Campus Safety:** The University of Utah values the safety of all campus community members. To report suspicious activity or to request a courtesy escort, call campus police at 801-585-COPS (801-585-2677). You will receive important emergency alerts and safety messages regarding
campus safety via text message. For more information regarding safety and to view available training resources, including helpful videos, visit safeu.utah.edu

- University Counseling Center: The University Counseling Center (UCC) provides developmental, preventive, and therapeutic services and programs that promote the intellectual, emotional, cultural, and social development of University of Utah students. They advocate a philosophy of acceptance, compassion, and support for those they serve, as well as for each other. They aspire to respect cultural, individual and role differences as they continually work toward creating a safe and affirming climate for individuals of all ages, cultures, ethnicities, genders, gender identities, languages, mental and physical abilities, national origins, races, religions, sexual orientations, sizes and socioeconomic statuses.

- Office of the Dean of Students: The Office of the Dean of Students is dedicated to being a resource to students through support, advocacy, involvement, and accountability. It serves as a support for students facing challenges to their success as students, and assists with the interpretation of University policy and regulations. Please consider reaching out to the Office of Dean of Students for any questions, issues and concerns. 200 South Central Campus Dr., Suite 270. Monday-Friday 8 am-5 pm.