Differential Equations: Dynamics and Change MAT351-1

Spring 2022

Instructor:	James Waterman	**Time:**	TuTh 1:15pm – 2:35pm
Email:	james.waterman@stonybrook.edu	**Place:**	Earth & Space 079
Office:	Math Tower 3-118		
Grader:	Pranav Upadrashta		

Please read the entire syllabus carefully before continuing in this course. In particular, be sure that you are available for the final exam.

Course Description: This course is an introduction to dynamical systems, including the study of the long-term behavior of solutions to ordinary differential equations or of iterated mappings, emphasizing the distinction between stability on the one hand and sensitive dependence and chaotic behavior on the other. The course describes examples of chaotic behavior and of fractal attractors, and develops some mathematical tools for understanding them.

Office Hours: TuTh 10:30am–11:30am, or by appointment

Exam Dates:

- Midterm: To be announced in class and on the course website at least one week in advance.
- Final Exam: Monday, May 16, 11:15am-1:45pm

Course Resources:

- **Course Website:** https://sites.google.com/view/jwaterman/teaching
- **Course Textbooks:** We will make use of the following two recommended (but not required) texts: *Chaos: An Introduction to Dynamical Systems*, by Alligood, Sauer, and Yorke. Springer-Verlag, 1997. *An Introduction to Chaotic Dynamical Systems*, by Robert Devaney, Addison Wesley. There is a new third edition which covers a little more complex dynamics, but the second is probably cheaper and easier to get.

Prerequisites: C or higher in the following: MAT 203 or 205 or 307 or AMS 261; MAT 303 or 305 or 308 or AMS 361; MAT 200 or permission of instructor

Grading Policy:

- **Homework** – 40% of total grade
  There will be a homework assignment due in class biweekly, usually every other Thursday. Some questions may require some thought. I would strongly recommend against starting the homework the day before it is due. Homework assignments will be posted on the course webpage and blackboard. No late homework will be accepted. Any homework turned in after class will be considered late and will not be graded. You may work with other students on the homework, but you must write it yourself in your own words. Homework should be neatly written or typed, except where specified. Homework may be submitted via email in exceptional circumstances. This should only be done occasionally, when it is not possible to attend class.
- **Midterm** – 30% of total grade
  There will be one closed book exam in class which will be scheduled during the course. The exam date will be posted at least one week in advance on the course website and blackboard.

- **Final** – 30% of total grade
  There will be one closed book final exam scheduled by the university: Monday, May 16, 11:15am-1:45pm.

Make-up policy: Make-up exams are given only for work missed due to unforeseen circumstances beyond the student's control.

Masks: Everyone participating in this class must wear a mask or face covering at all times or have the appropriate documentation for medical exemption. Please contact Student Accessibility Support Center (SASC) at sasc@stonybrook.edu if you need special accommodations. Any student not in compliance with this policy will be asked to leave the class.

Student Accessibility Support Center Statement: If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact the Student Accessibility Support Center, Stony Brook Union Suite 107, (631) 632-6748, or at sasc@stonybrook.edu. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and the Student Accessibility Support Center. For procedures and information go to the following website: https://ehs.stonybrook.edu//programs/fire-safety/emergency-evacuation/evacuation-guide-disabilities and search Fire Safety and Evacuation and Disabilities.

Academic Integrity Statement: Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at http://www.stonybrook.edu/commcms/academic_integrity/index.html

Critical Incident Management: Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Student Conduct and Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.

Syllabus Revision: The standards and requirements in this syllabus may be modified at any time by the course instructor. Notice of such changes will be announced in class and changes to this syllabus will be posted on the course website.