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**Office:** Math Tower 4-114

**Office Hours:** JA: Tuesday/Thursday 1:00-2:00pm, TD: Monday/Wednesday 1:00-2:00pm.

If you cannot make these times, email or talk to us and we will arrange a time that works for all.

**Course Webpage:** <https://www.math.stonybrook.edu/~tdrivas/MAT401.html>

**Course Description.** Long have humans been enamored by the “unreasonable” effectiveness of Mathematics for describing the Natural world. This course aims, through a series of vignettes, to give some examples of this effectiveness for a set of basic yet surprising phenomena. Topics may include a priori deductions on the shape of the earth, why a rainbow appears as it does, how to bottle sunshine, how to stabilize an inverted pendulum, and so on.

**Textbook:** There is no required text, however parts of the course will parallel discussion in:

- Arnold, V. I. (2014). Mathematical understanding of nature: essays on amazing physical phenomena and their understanding by mathematicians. American Mathematical Soc.

**Prerequisites:** Multivariable calculus (MAT 203/307), and some knowledge of differential equations is highly recommended, at least at the level of MAT127, MAT132, or AMS161. **Important Note:** If you have not master the concept from those courses, you should should visit either of us and we can provide additional resources that can help you learn and review the concepts.

**Homework.** Problems will be posted on the course website. They are for fun and not be collected or graded.

**Exams.** There will be no exams in the class.

**Presentations.** Towards the end of the course, we will assign material for the students to read and to present in class. A short (approximately 5 pg) writeup will also be required. Students will work in pairs for this assignment

**Grading.** The grades will be based on the class presentations and write ups.

**Student Absences Statement.** Students are expected to attend every class, report for examinations and submit major graded coursework as scheduled. If a student is unable to report for any exams or complete major graded coursework as scheduled due to extenuating circumstances, the student must contact the instructor as soon as possible. Students may be requested to provide documentation to support their absence and/or may be referred to the Student Support Team for assistance. Students will be provided reasonable accommodations for missed exams, assignments or projects due to significant illness, tragedy or other personal emergencies. In the instance of missed lectures, the student is responsible for the material covered. Please note, all students must follow Stony Brook, local, state and Centers for Disease Control and Prevention (CDC) guidelines to reduce the risk of transmission of COVID. For questions or more information, visit <https://www.stonybrook.edu/commcms/comingback/students.php>.

**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](mailto:sasc@stonybrook.edu). They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

**Academic Integrity.** 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.

**Caregiver responsibilities policy** Some of you may be balancing schoolwork with the responsibilities of caring for family members. If you run into challenges that require you to miss a class, please contact either of the instructors. There are ways we can support your learning.

**School-life conflict** If you are facing obstacles to your education as a result of work, family obligations, or unforeseen personal difficulties, please reach out to either of the instructors as soon as possible so that we can work together to form a plan for your academic success.