

COURSE INFORMATION

Instructor: Dr. Peter Howard

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Course Time: 1:30 p.m. – 2:45 p.m.; Section 500 on Tuesdays, Section 501 on Thursdays

Course Location: BLOC 128

Online Office Hours: MW 1:30 p.m. – 2:45 p.m.

Course webpage: <http://www.math.tamu.edu/~phoward/M200.html>

COURSE CATALOG DESCRIPTION

Overview of different areas and topics of mathematics including logic, infinite sets, elements of topology, elements of history of mathematics; introduction to future courses in math degree plans and to some areas of research done by mathematics department faculty; topics may vary at the discretion of the instructor. Prerequisites: MATH and APMS majors; freshmen or sophomore classification; approval of instructor.

COURSE LEARNING OUTCOMES

Upon successful completion of this course, students will have developed a broad view of what the study and practice of mathematics is. This will include indications of the variety of mathematics that students will encounter in upper-division mathematics courses, as well as examples of mathematics used in industry. Specific skills learned will include linear regression; the basics of setting up a neural network model for machine learning; difference equations, especially as used in modeling epidemics; basic probability, with applications to game theory; facility with abstract concepts including the nature of the real numbers, set cardinality, algebraic groups, and topological spaces.

REQUIRED MATERIALS

No textbook is required for this course. Students will need technology appropriate for accessing the Texas A&M University Canvas system, and for scanning and submitting PDF files.

GRADING

HOMEWORK: Homework will be assigned each week on either Tuesday (Section 500) or Thursday (Section 501), due on the same day the next week. Homework will be assigned in Canvas and solutions should be submitted through Canvas in PDF format. Late homework will only be accepted in the event of a University excused absence.

ATTENDANCE AND PARTICIPATION: Class attendance and participation are absolutely crucial aspects of this course, and students should plan to attend each class meeting, either in person or through

Zoom. Class attendance will be evaluated as follows: Student who attend every class (aside from University excused absences) will receive 140 points; students will lose 10 points for each unapproved absence. Class participation will be evaluated as follows: 100 points: the student fully engages in class discussions, including asking questions that stimulate discussion and suggesting steps when the class is jointly working on a problem; 90 points: the student participates in class discussions and occasionally asks questions that stimulate discussion and/or suggests steps when the class is jointly working on a problem; 70 points: the student only participates in class discussions when directly called on by the instructor; 60 points: the student does not participate in class discussions, even when directly called on by the instructor; 0-59 points: the student is actively disruptive, interfering with class discussion.

GRADES: Homework assignments will count as 50% of the course grade, class attendance will count as 25% of the course grade, and class participation will count as 25% of the course grade. For final grades, standard grade ranges will be used: A: 89.5 – 100; B: 79.5 – 89.49; C: 69.5 – 79.49; D: 59.5 – 69.49; F: Below 59.5.

COURSE SCHEDULE

Week of Monday:	Material Covered
Jan. 18	Introduction to MATH 200 and the method of least squares regression
Jan. 25	Linear regression (Mon., Jan. 25 is last day for drop/add.)
Feb. 1	Nonlinear regression
Feb. 8	Machine learning with neural networks
Feb. 15	Difference equations and population dynamics
Feb. 22	Modeling epidemics and pandemics
Mar. 1	Some probability theory (No class Tues., Mar. 2; Texas Independence Day)
Mar. 8	Introduction to game theory
Mar. 15	Game theory: mixed strategies (Thurs., Mar. 18 is a redefined day; students attend their Friday classes.)
Mar. 22	Game theory: analyzing card games
Mar. 29	Analysis: the nature of the real numbers
Apr. 5	Analysis: sizes of infinity
Apr. 12	Algebra: origins & motivating examples (Thurs., Apr. 15 last day for Q-drop)
Apr. 19	Algebra: groups and symmetry
Apr. 26	Topology: origins and overview (Thurs., Apr. 29 is last day of class.)

UNIVERSITY POLICIES

COPYRIGHT: All printed handouts and web-materials are protected by US Copyright Laws. No multiple copies can be made without written permission by the instructor.

ATTENDANCE: The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to complete all assignments. Please refer to [Student Rule 7](#) in its entirety for information about excused absences, including definitions, and related documentation and timelines.

MAKEUP WORK: Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student's grade, for the reasons stated in Student Rule 7, or other reason deemed appropriate by the instructor. Please refer to [Student Rule 7](#) in its entirety for information about makeup work, including definitions, and related documentation and timelines. Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the timeframe for make-up work should be agreed upon by the student and instructor" ([Student Rule 7, Section 7.4.1](#)). "The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence" ([Student Rule 7, Section 7.4.2](#)). Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. (See [Student Rule 24](#).)

ACADEMIC INTEGRITY: Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to authenticate one's work, should the instructor request it, may be sufficient grounds to initiate an academic misconduct case ([Section 20.1.2.3, Student Rule 20](#)). You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at aggiehonor.tamu.edu.

"An Aggie does not lie, cheat or steal, or tolerate those who do."

AMERICANS WITH DISABILITIES ACT (ADA): Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact Disability Resources in the Student Services Building or at (979) 845-1637 or visit disability.tamu.edu. Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.

TITLE IX AND STATEMENT ON LIMITS TO CONFIDENTIALITY: Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit gender-based discrimination and sexual harassment, including sexual assault, sexual exploitation, domestic violence, dating violence, and stalking. With the exception of some medical and mental health providers, all university employees (including full and part-time faculty, staff, paid graduate assistants, student workers, etc.) are Mandatory Reporters and must report to the Title IX Office if the employee experiences, observes, or becomes aware of an incident that meets the following conditions (see [University Rule 08.01.01.M1](#)):

- The incident is reasonably believed to be discrimination or harassment.
- The incident is alleged to have been committed by or against a person who, at the time of the incident, was (1) a student enrolled at the University or (2) an employee of the University.

Mandatory Reporters must file a report regardless of how the information comes to their attention – including but not limited to face-to-face conversations, a written class assignment or paper, class discussion, email, text, or social media post. Although Mandatory Reporters must file a report, in most instances, a person who is subjected to the alleged conduct will be able to control how the report is handled, including whether or not to pursue a formal investigation. The University’s goal is to make sure you are aware of the range of options available to you and to ensure access to the resources you need. Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with [Counseling and Psychological Services \(CAPS\)](#). Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the University’s [Title IX webpage](#).

MENTAL HEALTH AND WELLNESS: Texas A&M University recognizes that mental health and wellness are critical factors that influence a student’s academic success and overall wellbeing. Students are encouraged to engage in healthy self-care by utilizing the resources and services available from Counseling & Psychological Services (CAPS). Students who need someone to talk to can call the TAMU Helpline (979-845-2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends. 24-hour emergency help is also available through the National Suicide Prevention Hotline (800-273-8255) or at suicidepreventionlifeline.org.

COVID-19 AMENDMENTS

CAMPUS SAFETY MEASURES: To promote public safety and protect students, faculty, and staff during the coronavirus pandemic, Texas A&M University has adopted policies and practices for the Spring 2021 academic term to limit virus transmission. Students must observe the following practices while participating in face-to-face courses and course-related activities (office hours, help sessions, transitioning to and between classes, study spaces, academic services, etc.):

- Self-monitoring—Students should follow CDC recommendations for self-monitoring. **Students who have a fever or exhibit symptoms of COVID-19 should participate in class remotely if that option is available, and should not participate in face-to-face instruction.**
- Face Coverings—[Face coverings](#) (cloth face covering, surgical mask, etc.) must be properly worn in all non-private spaces including classrooms, teaching laboratories, common spaces such as lobbies and hallways, public study spaces, libraries, academic resource and support offices, and outdoor spaces where 6 feet of physical distancing is difficult to reliably maintain. Description of face coverings and additional guidance are provided in the [Face Covering policy](#) and [Frequently Asked Questions \(FAQ\)](#) available on the [Provost website](#).
- Physical Distancing—Physical distancing must be maintained between students, instructors, and others in course and course-related activities.

- Classroom Ingress/Egress—Students must follow marked pathways for entering and exiting classrooms and other teaching spaces. Leave classrooms promptly after course activities have concluded. Do not congregate in hallways and maintain 6-foot physical distancing when waiting to enter classrooms and other instructional spaces.
- To attend a face-to-face class, students must properly wear an approved face covering. If a student refuses to wear a face covering, the instructor should ask the student to leave and join the class remotely. If the student does not leave the class, the faculty member should report that student to the [Student Conduct office](#) for sanctions. Additionally, the faculty member may choose to teach that day's class remotely for all students, or dismiss the class in the case of a traditional face to face lecture.

PERSONAL ILLNESS AND QUARANTINE: Students required to quarantine or self-isolate should still participate in courses and course-related activities remotely and **must not attend face-to-face course activities**. Students under quarantine or self-isolation are expected to participate in courses and complete graded work unless they have symptoms that are too severe to participate in course activities. Instructors teaching courses delivered only face-to-face should work closely with students who are in quarantine or self-isolation to ensure the student keeps up with the work. Students experiencing personal injury or illness that is too severe for the student to attend class qualify for an excused absence (see [Student Rule 7, Section 7.2.2](#)). To receive an excused absence, students must comply with the documentation and notification guidelines outlined in Student Rule 7.