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MATH 20 Probability

Summer 2024

- **Prerequisite:** MATH 8 (Calculus of Functions in One and Several Variables)
- **Textbook:** Introduction to Probability by Grinstead and Snell 2006
- **Class Time:** Tuesdays and Thursdays, 10:10am-12:00pm
- **Class Location:** Kemeny Hall 108
- **Tentative Calendar:** Please check this Google Spreadsheet after each lecture for updates.
- **Office Hours:** Xhours (Fridays, 3:30pm-4:20pm) and Tuesdays, 9:00am-10:00am. They will be held in my office unless you request Zoom. Please note that the Xhour on Friday, July 12, 2024 will be used for lecture.

Course Description:

This course covers an undergraduate-level introduction to probability, which includes combinatorics (permutations and combinations), conditional probability, important probability distributions, moments (expected value and variance), sum of random variables, Law of Large Numbers, and Central Limit Theorem.

Grading:

Quizzes	100 points (20 points each)
Midterm	100 points
Final Exam	100 points
Project	100 points
Total	400 points

Assessment Description:

- **Suggested Practice Problems:** Suggested practice problems for each lecture will be posted on the course calendar/Google Spreadsheet; they will not be collected. In addition to understanding concepts, you are expected to master these suggested problems. No solutions will be provided, but I would be happy to answer any questions you have on them in class or during office hours.
- **Quizzes and Exams:** Quizzes and exams will be in person and closed-book, and will be based heavily on the suggested practice problems. The dates and topics of the exams and quizzes are indicated on the course calendar. If you cannot be present during any of the designated exam/quiz times, you must email me **before** the exam/quiz is given with **documented proof**. Make-up exams/quizzes will be given at my discretion.

- **Project:** The project is a 3-page report (including references) on the following question:

  How random is ChatGPT?

  Your report must include the following parts:

  (P1) A literature review on the mathematics underlying ChatGPT.

  (P2) Your mathematical definition of "random" using the concept(s) you learn from this class.

  (P3) Your mathematical quantification/experimental design to analyze "how random" ChatGPT is using the concept(s) you learn from this class. Please make your quantification as mathematically precise as possible and clarify which version(s) of ChatGPT you are analyzing.

  (P4) Your conclusions and future work. By "future work", I mean: what would you like to do next based on the results from your analysis.

  (P5) References.

Email Policy:

I will only respond to emails from your "dartmouth.edu" address. In the subject line of your email, please include "MATH 20 Summer 2024."

Attendance:

Should you miss a lecture for any reason, you are responsible for all missed coursework.

Academic Integrity:

Academic integrity is expected at all times. The minimum penalty for cheating, plagiarism, etc. is a grade of zero on the assignment.

Considerations:

If you have a religious observance that conflicts with your participation in the course, please let your instructor know as soon as possible but no later than the end of the second week of the term to discuss appropriate accommodations.

Students requiring disability-related academic adjustments and services must consult the Student Accessibility Services office (Carson Suite 125, 646-9900, Student.Accessibility.Services@Dartmouth.edu). Once SAS has authorized services, students must show the originally signed SAS Services and Consent Form and/or a letter on SAS letterhead to their professor. As a first step, if students have questions about whether they qualify to receive academic adjustments and services, they should contact the SAS office. All inquiries and discussions will remain confidential.