Data Science of Randomness

CIS 4930/CIS 5930
Department of Computer Science, Florida State University

Class Time and Location

Lecture

Monday through Friday: 8:00 AM – 9:15 AM DSL
Lectures will meet in person at the specified time and location. The class is in person only and will not be offered in Flex mode. The lectures will NOT be simulcast over Zoom or recorded for future viewing.

Office Hours

The instructor will hold office hours on demand.

- Students may request one-on-one sessions by prior appointment. The request should be made through email at least 24 hours in advance. The appointments are subject to the availability of the instructional staff.
- Some of the appointments may be virtual through Zoom. In this case, the student will be provided with a Zoom link.
- Students may also request assistance through FSU email.

Instructor Information

- Instructor: Dr. Michael Mascagni
- Email:mascagni@fsu.edu
- Office: 498 DSL

Teaching Assistants

- TBA

Email Policy

Email is the best way to contact the instructors outside of class or office hours. Emails will usually receive a response within the NEXT BUSINESS DAY. In times of heavy load, like during the due dates for assignments, this might take up to 2 business days.

Please contact us directly by email, instead of Canvas messages. Most of us receive Canvas messages as a digest once a week, so your Canvas message most likely will not reach us in time. If you have a question about grading, please send an email or ask us in person. Comments on grading feedback will not be read, as we have no way of knowing if and when you post comments on grading feedback.

Course Materials

The lectures in class will be given by the instructor using detailed LaTeX/Beamer slides. The PDFs of these slides, and the PDF of this document can be found in `https://www.cs.fsu.edu/~mascagni/DSoR/Slides`

Prerequisites

This course is being taught at a level suitable for upper level undergraduates and graduate students. There are no formal prerequisites, and this is taken into account in the way the students are evaluated. However, the students may need to refresh their knowledge of probability and statistics, discrete mathematics and linear algebra to understand some of the important concepts discussed in the course.

Course Rationale

Data science is a rapidly growing field that underpins decision-making across industries. Random data of of great interest to the course instructor, and so this course combines both into a course that introduces essential concepts and hands-on skills needed to navigate the data lifecycle from acquisition and cleaning to modeling and visualization. This course serves as a gateway for students aspiring to careers in analytics, AI, and computational research, especially in random number generation.

Course Description

Randomness is an important idea that in its computational form plays a major role in games of chance, numerical simulation, Monte Carlo computations, among many others. This course will introduce mathematical and statistical randomness in terms of:

- Random numbers generated by computation and their mathematical abstractions.
- Random or stochastic processes defined mathematically by concepts from probability and statistics.

The course will then introduce various techniques of data analysis of large data sets from both the fields of data science and artificial intelligence.

These techniques will then be used to analyze random data sets created above to assess their purported randomness. This will create the basis for extending the computational and analytic tools to the study and measurement of randomness.

Lecture Policy

The course is face-to-face. Students are required to be in the classroom at the specified times. The lectures will not be recorded. Students are expected to take notes on the material for future reference. Students will complete in-class exercises for credit, both individually and in groups.

Attendance and Class Participation

Attendance and participation are expected and REQUIRED to do well in the course. Attendance translates to staying current with the course. Attendance and class participation, measured through the in-class Top Hat exercises, will count towards 10% of the course grade. We follow FSU's attendance policy. If a student needs to miss class for whatever reason, they should contact the instructor.

Attendance and Class Participation would be measured through in-class activities. Each lecture would include a few questions. Student responses would be collected through Top Hat. The responses to these questions will be

used to determine the student's class participation grade. The activities are location-locked. Students need to be in the classroom to answer the questions. They will be available for review later.

Assignments, Quizzes, and Tests

Homework Assignments

Assignments will be given periodically throughout the semester. They will be posted on the course website. Students will have a week to 10 days to complete these assignments.

- Assignments are NOT OPTIONAL. Students need to turn in all the homework assignments to make an attempt at getting full credit for the homework/assignment component of the grade.
- Students are expected to turn in all assignments ON TIME!
- Students are not permitted to "re-do" assignments after the deadline.
- Assignment deadlines are STRICTLY enforced.
- STUDENTS are responsible for ensuring that their program file was submitted correctly. This means making sure their file was submitted without error, ON TIME, and also submitting the correct .py or .tar file.
- STUDENTS are responsible for ensuring they do not accidentally delete or overwrite their files.
- Interpretation Errors
  - Programs that do not run are very tedious to grade, and they show a lack of testing, which is a large part of programming. There will be an automatic 5 point penalty for each interpretation error in a student's code that has to be fixed in the grading process. (This means that program submissions with interpretation errors will likely earn very little, if any, credit).
  - If there are more than 10 interpretation errors the program receives an automatic zero. Students are responsible for making sure the code RUNS before they submit it.

Homework assignments are handed out once a module/learning objective is completely covered in class. Students then have a week to 10 days to complete the assignment. Hand-grading the assignments takes another couple of weeks. Therefore, students should not wait for the quantitative feedback (a grade for the assignment) to make adjustments/seek help. Additionally, students know if the program produces the expected output before they turn in the assignment for grading. Unlike most other disciplines, students have a reasonable estimate of their expected grade on an assignment when they submit it. So it is recommended that students seek timely qualitative feedback on the assignment by going to office hours to identify issues with the course material and assignments before any deficiencies affect subsequent topics.

Grading Policy

The final course grade will be computed as follows:

Class Participation and Attendance	10%
Written Project Presentation	45%
Written Project Presentation	45%

Final Letter Grade

If a student has passed the milestone average requirement, then their final grade will be calculated according to a numerical average as shown in the table below. **THE CLASS WILL NOT BE GRADED ON A CURVE.**

THE GRADES WILL NOT BE ROUNDED TO THE NEXT WHOLE NUMBER.

		A	>93	A-	92.99 - 90
B+	89.99 - 87	B	86.99 - 83	B-	82.99 -80
C+	79.99 - 77	C	76.99 - 73	C-	72.99 -70
D+	69.99 - 67	D	66.99 - 63	D-	62.99 -60
F	<60				

The passing grade for undergraduate credit (IDC 4140) is a C- or higher in the course. The passing grade for graduate credit (CAP 5768) is a B- or higher in the course. Canvas only takes the graded assignments into account while calculating your letter grade. Ungraded assignments are accounted as 100%, instead of 0. So, Canvas might show an expected letter grade of A- one day and C- the next. Students are requested to calculate their grade according to the grade distribution, with a 0 for all the grades that haven't yet been posted. If a student needs an Excel formula for their grade, they can email the instructor/ TA's for one.

Incomplete Grade Policy

The grade of 'I' (Incomplete) will be assigned only under the following exceptional conditions (in keeping with FSU's policy on Incompletes): Please note that "Incomplete" is not a "get-out-of-bad-grade-and-retake-the-course" card. University policy on Incompletes will be strictly followed.

University Attendance Policy

Excused absences include documented illness, deaths in the family, and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid written excuse. Consideration will also be given to students whose dependent children experience serious illness.

Academic Honor Policy

The Florida State University Academic Honor Policy outlines the University's expectations for the integrity of student's academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to "... be honest and truthful and ... [to] strive for personal and institutional integrity at Florida State University." (Florida State University Academic Honor Policy, found at **http://fda.fsu.edu/academic-resources/academic-integrity-and-grievances/academic-honor-policy**)

Additional Notes on the Academic Honor Policy

In addition to the University's Academic Honor Policy, students are expected to be aware of the following:

- Students are expected to do their own work on any classwork or test submitted for a grade. There are no group assignments in this course.
- It is NOT appropriate to work on assignments with other students or to give or receive solutions to or from anyone before an assignment is due and handed in (by all parties).
- It is NOT appropriate to share any amount of assignment/quiz/exam solutions with your classmates.
- Using or submitting existing scripts or solutions from the internet is a violation of the Academic Honor Policy.

- Submitting programs/reports/assignments done, wholly or in part, by a third party, including hired and contracted, is a violation of the Academic Honor Policy.
- DO NOT POST YOUR SOLUTIONS ONLINE (online compilers, text sites, blogs, help sites, etc...). No matter what the intent was in posting your solutions, this is automatically in violation of the Academic Honor Policy, and the appropriate actions will be taken.
- **DO NOT UPLOAD COURSE MATERIALS (INCLUDING HOMEWORK QUESTIONS/ PROBLEM STATEMENTS) TO PAY-FOR SOLUTION WEBSITES LIKE CHEGG OR QUID-PRO-QUO WEBSITES LIKE COURSE HERO**. This is a violation of the Honor Policy. These materials are the intellectual property of the instructor, and this also violates general Copyright rules.
- Discussing solutions and techniques on assignments with other students after the assignment has been graded and handed back is okay, and encouraged.
- Students are expected to turn in their work with their name on it, and they are representing that work as their own. If a student's submission matches that of another student, it is considered a violation of the Academic Honor Code.
- If a student has previously taken the course, they are NOT permitted to submit their old work for any assignment in the current semester. They must do their work from scratch. This is included in the FSU honor policy. See the link above.
- If it is found that a student has violated the academic honor policy the student is not permitted to drop or withdraw from the course, and must complete the course with the sanctions accessed via the policy. This is a UNIVERSITY policy.
- **A first violation of the honor code will result, at minimum (but not limited to), a penalty of a 0 grade on the assignment or test involved, along with a reduced letter grade in the course.** This will be done by filing the Student-Instructor Resolution of the FSU Honor Policy.
- **Any second violation of the honor code will result in an automatic F in the course, and possible proceedings before the Honor Court.** This will be done with a Step-2 Hearing.

Additional Notes on AI Tools and the Academic Honor Policy

Artificial Intelligence (AI) tools can be valuable resources for learning and productivity when used responsibly. In this course, students are encouraged to engage deeply with the material and demonstrate mastery of core concepts and skills. AI should serve as a supporting tool, not a substitute for your own thinking and problem-solving.

Permitted Uses of AI

Students may use AI tools for:

- Clarification and Explanation: Understanding concepts, algorithms, or syntax.
- Practice and Exploration: Generating sample questions or examples for self-study.
- Data Generation: Creating synthetic or random datasets for exercises.
- Environment Setup: Assisting with installation, configuration, and troubleshooting.
- Minor Support Tasks: Formatting code, debugging small errors, or automating repetitive steps.

Prohibited Uses of AI

Students may not:

- Submit AI-generated solutions as their own work.
- Use AI to complete significant portions of assignments, projects, or assessments.
- Rely on AI in ways that bypass learning objectives or undermine academic integrity.

Citation Requirement

Whenever AI tools are used in any capacity for an assignment or project, students must:

- Disclose the tool used (e.g., ChatGPT, Copilot).
- Describe how it was used (e.g., "Used AI to generate a sample dataset of 100 rows").

This ensures transparency and accountability.

Rationale

The goal of this policy is to help students leverage AI as a learning aid while preserving the integrity of the educational process. Responsible use of AI can enhance understanding, but true competence comes from applying your own knowledge and reasoning.

Americans With Disabilities Act

Florida State University (FSU) values diversity and inclusion; we are committed to a climate of mutual respect and full participation. Our goal is to create learning environments that are usable, equitable, inclusive, and welcoming. FSU is committed to providing reasonable accommodation for all persons with disabilities in a manner that is consistent with the academic standards of the course while empowering the student to meet the integral requirements of the course. Students with disabilities needing academic accommodation should: (1) register with and provide documentation to the Office of Accessibility Services; and (2) request a letter from the Office of Accessibility Services to be sent to the instructor indicating the need for accommodation and what type; and (3) meet (in person, via phone, email, skype, zoom, etc. . .) with each instructor to whom a letter of accommodation was sent to review approved accommodations. Please note that instructors are not allowed to provide classroom accommodations to a student until appropriate verification from the Office of Accessibility Services has been provided. This syllabus and other class materials are available in an alternative format upon request. For the latest version of this statement and more information about services available to FSU students with disabilities, contact the: Office of Accessibility Services
874 Traditions Way
108 Student Services Building
Florida State University
Tallahassee, FL 32306-4167
(850) 644-9566 (voice)
(850) 644-8504 (TDD)
oas@fsu.edu
https://dsst.fsu.edu/oas

Academic Success

Your academic success is a top priority for Florida State University. University resources to help you succeed include tutoring centers, computer labs, counseling and health services, and services for designated groups, such as veterans and students with disabilities. The following information is not exhaustive, so please check with your advisor or the Department of Student Support and Transitions to learn more.

Confidential Campus Resources

Various centers and programs are available to assist students with navigating stressors that might impact academic success. These include the following:

Victim Advocate Program

University Center A,
Room 4100, (850) 644-7161, Available 24/7/365,
Office Hours: M-F 8-5
`https://dsst.fsu.edu/vap`

Counseling and Psychological Services (CAPS)

Florida State University's Counseling and Psychological Services (CAPS) primary mission is to address psychological needs and personal concerns, which may interfere with students' academic progress, social development, and emotional well-being. The following in-person and virtual (tele-mental health) services are available to all enrolled students residing in the state of Florida:

1. Individual therapy
2. Group therapy
3. Crisis Intervention
4. Psychoeducational and outreach programming
5. After hours crisis-hotline
6. Access to community providers for specialized treatment

Call 850-644-TALK (8255) for more information on how to initiate services.
Counseling & Psychological Services
250 Askew Student Life Building
942 Learning Way
Tallahassee, Florida 32306
Phone: 850-644-TALK (8255)
Walk-in and Appointment Hours:
M-F 8 am – 4 pm

Services at UHS are available to all enrolled students residing in Florida:

The mission of University Health Services (UHS) is to promote and improve the overall health and well-being of FSU students. UHS provides a coordinated continuum of care through prevention, intervention, and treatment. Services include general medical care, priority care, gynecological services, physicals, allergy injection clinic, immunizations, diagnostic imaging, physical therapy, and a medical response unit. The Center for Health Advocacy and Wellness (CHAW) assists students in their academic success through individual, group, and population-based health and wellness initiatives. Topics include wellness, alcohol and other drugs, hazing prevention, nutrition and body image, sexual health, and power based personal violence prevention. For more information, go to `https://uhs.fsu.edu/`
University Health Services
Health and Wellness Center
960 Learning Way
Tallahassee, Florida 32306
Hours: M-F, 8 am – 4 pm
Phone: 850-644-6230

Syllabus Change Policy

Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice.