



Statistics for ECE

EEL 4930 Section 0001

Class Periods: MWF, period 9, 11:45 AM – 12:35 AM

Location: NEB 202

Academic Term: Fall 2019

Instructor: Dr. Catia S. Silva

- Office: New Engineering Building 467
- Phone: (352) 392-6502
- Email: catiaspsilva@ece.ufl.edu
- Office Hours: Mondays 2 PM – 3 PM or by appointment

Supervised Teaching Student:

- Dylan Stewart
- Office: New Engineering Building XYZ
- Email: d.stewart@ufl.edu
- Office Hours: TBD

Course Description

(3 credits) Analysis of, simulation of, and reasoning about sampled data and random phenomena. This course covers statistical methods, probability, simulation, and experimental design. Practical implementation guide using Python.

Course Pre-Requisites / Co-Requisites

- MAC 2312 or equivalent
- Basic programming knowledge

Course Objectives

Upon completion of this course, the student will be able to:

- Apply linear algebra for data processing and statistical calculations
- Generate and critic the meaning and uses of summary statistics of data
- Model random phenomena using random variables
- Generate random variables with specified densities or distributions
- Conduct hypothesis tests using simulations and analysis
- Utilize conditioning to simplify problems
- Estimate parameters of distributions from samples
- Assess dependence and independence among random phenomena
- Use statistical tests to determine or characterize dependence among random phenomena
- Design experiments to illustrate random phenomena
- Identify the difference between Bayesian statistics and classical statistics
- Use simulation to calculate Bayesian statistics

Materials and Supply Fees

None

Required Textbooks and Software

- A laptop with Python 3.4.3 or later and [Anaconda](#) installed will be required. Please see: [computer requirements](#)
- Think Stats – Exploratory Data Analysis
 - 2nd edition
 - Allen B. Downey



- O'Reilly Media, 2015
- ISBN: 978-1-491907-33-7

- Introduction to Probability
 - Dimitri P. Bertsekas, John N. Tsitsiklis
 - 2nd edition
 - Athena Scientific, 2008
 - ISBN: 978-1-886529-23-6

- Introduction to Applied Linear Algebra – Vectors, Matrices, and Least Squares
 - Stephen Boyd and Lieven Vandenberghe
 - Cambridge University Press, 2018
 - ISBN: 978-1-316518-96-0

- Python Data Science Handbook – Essential Tools for Working with Data
 - Jake VanderPlas
 - O'Reilly Media, 2017
 - ISBN: 978-1-491912-05-8

Course Schedule

Week 1:	Python Basics
Week 2:	Relative Frequency & Probability
Week 3:	Conditional Probability
Week 3:	One-Dimensional Statistics & Bootstrapping
Week 4:	K-Means Clustering & Conditional Probability
Week 5:	Maximum Likelihood & Maximum A Posteriori
Week 6:	Bayesian Statistical Tests
Week 7:	Discrete Random Variables
Week 8:	Continuous Random Variables/ Midterm Exam
Week 9:	Density Functions & Kernel Density Estimation
Week 10:	Analytical Statistical Hypothesis Tests & ROC Curves
Week 11:	Point Conditioning & Goodness of Fit
Week 12:	Categorical Data & Contingency Tables
Week 13:	Vectors, Linear Combination & Linear Transformation
Week 14:	Basis Functions, Linear Regression & PCA
Week 15:	Non-Linear Regression / Project Due
Week 16:	Final Exam

Attendance Policy, Class Expectations, and Make-Up Policy

- Attendance is not required though graded evaluations, such as exercises/quizzes and participation, will happen during class.
- Students are expected to attend class.
- Students are expected to bring a portable computer to class.
- For maximum credit in any assignment, students must submit correct and elaborated answers, submitted on time, follow submission instructions and, for assignments that require code, clean, easy to read, easy to run, and well commented Python 3.4.3+ code are required.
 - Complete your assignments with care and ensure that your submission is complete and illustrates your understanding of the concepts being assessed;
 - Most assignments will be assigned via e-learning.
- Assignments turned in after the deadline but within 24 hours of due date and time will receive 50% grade penalty. Late assignments will not be accepted 24 hours after due date/time.



- If you feel a graded assignment or exam needs to be re-graded, you must discuss this with the instructor within one week of grades being posted for that assignment/exam.
 - If approved, the entire assignment or exam will be subject to complete evaluation.
- The class will be graded on a curve.
- Any student found to have cheated or plagiarized on an exam or assignment will be given a grade of 0 for that exam or assignment and the evidence will be sent to the Provost’s Office for the determination of any additional disciplinary action.
 - Unless an assignment is specifically structured as a group project, duplicate assignments written in collaboration with others is not acceptable. Although it is permissible to discuss the homework with others, these discussions should be of a general nature. All work at a detailed level must be done on your own. Students submitting the same or similar solutions to the homework will be considered as having cheated. No statements or actions made by anyone can alter this policy. Please review what constitutes plagiarism: <https://guides.uflib.ufl.edu/copyright/plagiarism>

Excused absences must be consistent with university policies in the undergraduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>) and require appropriate documentation.

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Homework and quizzes	100 each	25%
In-class Evaluations	100 each	15%
Midterm Exam	100	30%
Final Exam	100	30%
		100%

Grading Policy

The following is given as an example only.

Percent	Grade	Grade Points
93.4 - 100	A	4.00
90.0 - 93.3	A-	3.67
86.7 - 89.9	B+	3.33
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.67
76.7 - 79.9	C+	2.33
73.4 - 76.6	C	2.00
70.0 - 73.3	C-	1.67
66.7 - 69.9	D+	1.33
63.4 - 66.6	D	1.00
60.0 - 63.3	D-	0.67
0 - 59.9	E	0.00

More information on UF grading policy may be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Students Requiring Accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.



Course Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

University Honesty Policy

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html>

Campus Resources:

Health and Wellness

U Matter, We Care:

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.



Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.
<https://lss.at.ufl.edu/help.shtml>.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.

Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.
<https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.
<https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

On-Line Students Complaints: <http://www.distance.ufl.edu/student-complaint-process>.