FLORIDA POLYTECHNIC UNIVERSITY

STA 3036 - Probability and Statistics 2 for Business, Data Science, and Economics

Spring Semester 2026

Course Information:

Course Number and Title: STA 3036 Probability and Statistics 2 for Business, Data Science, and Economics

Credit Hours: 3 credits

Academic Term: Spring 2026

Instructor Information:

Instructor: Alexandra Hurtado Desaulniers

Office Location: IST 2074

Office Hours: MWF 11am – 12:30pm or by appointment

Email address: adesaulniers@floridapoly.edu

Course Delivery and Course Description:

Delivery Mode: Face-to-face

Course Website: **https://floridapolytechnic.instructure.com/courses/10010**

Official Catalog Course Description:

- This course is intended to follow an introductory statistics course and to support a rigorous curriculum in Business, Data Science, and Economics. It provides a strong foundation in probability and inferential statistics, an introduction to causal inference, in depth coverage of regression analysis, and an introduction to models for limited dependent variables. **This course is not equivalent to STA 3032 - Probability and Statistics and will not be approved as a substitution if you change majors.
- **Course Prerequisites**: STA 2023 Statistics 1, MAC 2311 Analytic Geometry and Calculus 1, and COP 2073 Foundations of Data Analytics

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Required Texts and Materials:

1. Introductory Business Statistics 2e

- **Authors:** Alexander Holmes, Barbara Illowsky, Susan Dean
- **Edition:** Second Edition (2023)
- **ISBN:** 978-1-961584-33-4 (digital), 978-1-711472-59-1 (print)
- **Location / Link:** OpenStax book page
- **Cost:** Free online version; inexpensive print versions available.

2. OpenIntro Statistics

- **Authors:** David Diez, Mine Çetinkaya-Rundel, Christopher Barr
- **Edition:** Fourth Edition (2019)
- **ISBN:** 1943450072 (ISBN-10), 978-1943450077 (ISBN-13)
- **Location / Link:** OpenIntro Statistics book page
- **Cost:** Free PDF download; paperback version available at modest cost.

3. Introduction to Probability and Statistics Using R

- **Author:** G. Jay Kerns
- **Edition:** First Edition (2010)
- **ISBN:** 0557249791 (ISBN-10), 978-0-557-24979-4 (ISBN-13)
- **Location / Link:** R-Project conference PDF / free digital version
- **Cost:** Free (digital version); print copies may cost.

Additional Materials: We will use the R programming language, RStudio, Excel and PowerBI

Course Objectives and Outcomes

- **Course Objectives:**
    - Familiarize the learner with the several concepts in probability and inferential statistics such as probability distributions and interval estimation.
    - Learn the fundamentals of linear regression (including limited dependent variable models).
    - Apply statistical procedures in Excel and R.

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Course Learning Outcomes:

At the end of the semester, learners will be able to:

1. **Understand** fundamental tools from probability and statistics
2. **Apply** these tools to analyze sample data.
3. **Implement** code for data analysis.

- **Alignment with Data Science and Business Analytics Program Outcomes**

	Course Learning Outcome and Learning Level*		
Data Science Program Level Outcomes	1	2	3
(1) Identify, formulate, and solve broadly defined technical or scientific problems by applying knowledge of mathematics and science and/or technical topics to areas relevant to the discipline.	Apply	Apply	Create
(2) Formulate or design a system, process, procedure or program to meet desired needs.	Apply	Apply	Create
(3) Develop and conduct experiments or test hypotheses, analyze and interpret data and use scientific judgment to draw conclusions.	Evaluate	Apply	Create
(4) Communicate effectively with a range of audiences.		Create	

(5) Understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts.			
(6) Function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty.	Evaluate	Apply	Evaluate

	Course Learning Outcome and Learning Level*		
Business Analytics Program Level Outcomes	1	2	3
(1) Apply current business analytics concepts, techniques, and practices to solve business problems.	Apply	Apply	Create
(2) Analyze a given business problem using appropriate analytics techniques to generate insights and solutions.	Evaluate	Evaluate	Evaluate
(3) Communicate effectively insights, analysis, conclusions, and solutions to a diverse audience.	Create	Create	

* learning level as described in Bloom's taxonomy and Anderson and Krathwohl's taxonomy.

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Technology Requirements

- **You MUST use your Florida Poly email address for all communication in this course.**
    - All students are provided a university email address (access through https://floridapoly.edu)
- You will need to have access to a computer and a reliable internet connection.
- Web browsers should be up to date
- You will participate in the course using our Canvas learning management system (https://floridapolytechnic.instructure.com).
- Microsoft Office Word, Excel, and PowerPoint. These are part of the Office 365 suite available free of charge to students.
- Adobe reader for .pdf files; media player for videos
- For technology issues, contact the University's tech support team: https://floridapoly.edu/technologyservices/help-desk.php

University Policies

Reasonable Accommodations

The University is committed to ensuring equal access to all educational opportunities. The Office of Disability Services (ODS), facilitates reasonable accommodations for students with disabilities and documented eligibility. It is the student's responsibility to self-identify as a student with disabilities and register with ODS to request accommodations. If you have already registered with ODS, please ensure that you have requested an accommodation letter for this course through the ODS student portal, and communicate with your instructor about your approved accommodations as soon as possible. Arrangements for testing accommodations must be made in advance. Accommodations are not retroactive. If you are not registered with ODS but believe you have a temporary health condition or permanent disability requiring an accommodation, please contact ODS as soon as possible: *DisabilityServices@floridapoly.edu*; (863) 874-8770; *www.floridapoly.edy/disability*.

Accommodations for Religious Observances, Practices and Beliefs

The University will reasonably accommodate the religious observances, practices, and beliefs of individuals in regard to admissions, class attendance, and the scheduling of examinations and work assignments. (See University Policy.)

Title IX

Florida Polytechnic University is committed to ensuring a safe, productive learning environment on our campus that prohibits sex discrimination and sexual misconduct, including sexual harassment, sexual assault, dating violence, domestic violence and stalking.

Resources are available if you or someone you know needs assistance. Any faculty or staff member you speak to is required to report the incident to the Title IX Coordinator. Please know, however, that your information will be kept private to the greatest extent possible. You will not be required to share your experience. If you want to speak to someone who is permitted to keep your disclosure confidential, please seek assistance from the Florida Polytechnic University Ombuds Office, BayCare's Student Assistance Program, 1-800-878-5470 and locally within the community at Peace River Center, 863-413-2707 (24-hour hotline) or 863-413-2708 to schedule an appointment. The Title IX Coordinator is available for any questions to discuss resources and options available.

Academic Integrity Violations of academic integrity regulation include actions such as cheating, plagiarism, use of unauthorized resources (including but not limited to use of Artificial Intelligence tools), illegal use of intellectual property, and inappropriately aiding other students. Such actions undermine the central mission of the university and negatively impact the value of your Florida Poly degree. Suspected violations will be fully investigated, possibly resulting in sanctions up to and including expulsion from the university.

Recording Lectures

Students may, without prior notice, record video or audio of a class lecture for a class in which the student is enrolled for their own personal educational use. Recordings may not be used as a substitute for class participation or class attendance. Recordings may not be published or shared in any way, either intentionally or accidentally, without the written consent of the faculty member. Failure to adhere to these requirements is a violation of state law (subject to civil penalty) and the student code of conduct (subject to disciplinary action). Recording class activities including, but not limited to, lab sessions, student presentations (whether individually or part of a group), class discussion (except when incidental to and incorporated within a class lecture), and invited guest speakers is prohibited.

Academic Support Resources

Library: Students can access the Florida Polytechnic University Library through the University website and Canvas, on and off campus. Students may direct questions to *library@floridapoly.edu*.

Tutoring and Learning Center: The Tutoring and Learning Center (The TLC) provides tutoring to all Florida Poly students who may need additional academic support. The TLC is staffed by students who have excelled in the courses they tutor. They offer support by reviewing concepts and materials from class, clarifying points of confusion and providing assistance with learning strategies. While the focus of TLC is to provide support to students in freshman-level courses, upper-level courses are also tutored at the Center. The TLC is located in the IST Commons (second floor).

Knack Tutoring: Students looking for additional assistance outside of the classroom are advised to consider working with a peer tutor through Knack. Florida Polytechnic University has partnered with Knack to provide students with access to verified peer tutors who have previously aced this course. To view available tutors, visit floridapoly.joinknack.com and sign in with your student account.

Academic Success Coaches: All students at Florida Poly are assigned an Academic Success Coach. Your Academic Success Coach can assist you with academic success strategies. Please visit the Student Success Center on the second floor of the IST building to meet with an Academic Success Coach.

Writing Center: Located on the second floor of the IST (2059/2061), the Writing Center helps students to develop their writing and presentation skills. Consultations are available in person and virtually. For more detail, visit floridapoly.edu/writing center.

Civility and Collegiality

Faculty and students come to the university for the same reason, which is to participate in a highly professional educational environment. To that end, both students and faculty are expected to treat each other with mutual regard and civility. Communication, written, oral and behavioral, between faculty and students must remain respectful. Within and outside of the classroom, students must refrain from derogatory comments toward the faculty member and their fellow students, and faculty as well must refrain from derogatory comments toward their students. Faculty and students should address each other with respect, in accordance with the wishes of the faculty and the students: for example, no one should be addressed by their last name alone.

Faculty from the outset of a course can and should specify what constitutes activities and behavior that take away from, that diminish, the educational environment. An individual student's distracting behavior impedes the education of fellow students, which itself is a form of disrespect. Civility and collegiality also include respecting each other's time: for example, neither students nor faculty should arrive late to class (unless unforeseen, pressing circumstances prevail); faculty should be present at the posted office hours; and students and faculty should be punctual when meeting times are scheduled. In more general terms, collegiality means respecting the right of both faculty and students to participate fully and fairly in the educational enterprise.

Netiquette

The same rules apply online as they do in person. Be respectful of other students. Foul discourse will not be tolerated.

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Course Policies

Attendance:

Students in face-to-face (this includes labs and C-courses) courses are expected "to attend all of their scheduled University classes and to satisfy all academic objectives as defined by the instructor" (University Policy, FPU-5.0010AP). Being that this course is hybrid, attendance for online will be considered satisfied if students participate in live scheduled meetings, watch their course lectures within the allotted time frame, partake in attendance quizzes on assigned days, and participate in discussion.

If you know that you will miss a class for any reason discuss the situation with your instructor in a timely manner. Attendance and participation accounts for 5% of your final grade in this course. To implement this, every class meeting will include an "exit-quiz" (2-3 questions) through Canvas, with an optional access code provided by your instructor during class, and questions related to concepts discussed in class. Students Should not share the access code with anyone not in the classroom. Sharing an access code with others not attending the class session is considered a violation to the university academic integrity policy.

Students Feeling Sick: I am a student; what should I do if I think I may have COVID-19?

Students who are showing symptoms or who have been exposed to COVID-19 are expected to stay in their residences (at home or in their dorm rooms) and immediately notify the FL Poly CARE manager at care@floridapoly.edu. The CARE manager will work with each student to triage their individual situation and will notify faculty of students who are not attending courses due to COVID-19 symptoms.

Class Participation: Asking and answering questions and solving problems in class is strongly encouraged. There will also be attendance quizzes used to measure attendance and participation.

Late Work/Make-up work:

Each student must keep current on assignments. *Late assignments are not graded unless permission has been obtained from the instructor*. In case of a medical emergency, please notify your instructor as soon as possible who will evaluate any exceptions on a case-by-case basis.

Course Communication and Feedback

Office hours will occur regularly. E-mails, canvas messages, and Teams meetings will be available to all students. Students will receive feedback on assignments and projects via comments through canvas grading. Announcements will be made for are additional

information the course requires which does not exist in modules. Information will also be delivered in class face-to-face.

Grading Scale:

The following grading scale will be used for this class.

A	93% – 100%	B	83% – 85%	C	73% – 75%	D	63% – 65%
A–	90% – 92%	B–	80% – 82%	C–	70% – 72%	D–	60% – 62%
B+	86% – 89%	C+	76% – 79%	D+	66% – 69%	F	0% – 59%

Assignment/Evaluation Methods

Exams: There will be one midterm exam and one final exam.

Assignments: There will be several homework assignments that may involve the use of R, Excel, PowerBI, or written by hand.

Project: This is a data analysis assignment that involves application and analysis of the statistical concepts covered in the class on given data sets.

Assignment	Percentage
Attendance	5%
Discussion	10%
Assignments	15%
Quizzes	15%
Project	15%
Midterm Exam	20%
Final Exam	20%
Total	100%

Participation in all course activities is a very important element of this course and is a basic expectation. Course participation consists of active and respectful involvement in class

discussions, peer feedback, postings, replies, projects, and other interactions. The participation grade considers quality, quantity, and timeliness of student participation.

General Expectations:

Assignments, announcements, and information will be posted on CANVAS. **Students are responsible for checking CANVAS regularly to be aware of their assignments** and other class information.

All students are required to use **studentuserID@floridapoly.edu** email system (most preferable) OR the CANVAS e-mail system to communicate with the instructor. On occasion, email may be used to disseminate important class-related assignments, announcements, and information. Students are responsible for any information or assignments given in e-mail.

Generative AI Policy

Generative AI Permitted Within Guidelines

The best-known example of Generative AI (Artificial Intelligence) is ChatGPT, a chatbot that allows you to type a question as if you were talking to a real person, and it quickly offers a seemingly meaningful, original answer. Tools like this are powerful and can be useful in many contexts, but you must be aware of their limitations, as they can produce inaccurate, fabricated, and even offensive content. In addition, the work produced is not technically your own. In order to avoid violating Florida Polytechnic University academic integrity policy, students must be sure to follow the course's policies regarding the use of artificial intelligence in academic work. The AI policies for this class are outlined below.

You are welcome to use Generative AI (Artificial Intelligence), including ChatGPT and similar AI tools, in your work for this course. However, AI is not a replacement for your own thinking and research. AI-generated text or other content must be clearly marked and cited properly. In addition, you are responsible for confirming the veracity of any information or sources produced by artificial intelligence. If you have any questions about this, please reach out to me.

Additionally, copy paste of AI will not be tolerated. You are required to use your own words/code.

Tentative Course Schedule

- Important Dates: https://floridapoly.edu/academics/academic-calendar/index.php

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All dates are tentative and subject to change. Indicated readings are from the Camm et al. *Statistics for Business and Economics* textbook. Other readings will be made available for each unit via Canvas.

Week	Topic	Due
Week 1	**Topics:** Course Intro Statistics Review and Assessment **Learning Outcomes** After completing this week, the learner will be able to • describe and explain the course structure, evaluations/assessments, and course policies for STA 3036. • evaluate their preparation for STA 3036.	Syllabus
Week 2	**Topics:** Probability – focus on independence, conditional probability, Bayes' Rule **Learning Outcomes** After completing this week, the learner will be able to: • Calculate and interpret the conditional probability associated with two events. (CLO 1) • Identify and interpret mutually exclusive events and independent events. (CLO 1) • Create and interpret joint probability tables. (CLO 1) • Identify and interpret prior probabilities and posterior probabilities; apply Bayes' theorem to calculate posterior probabilities. (CLO 1, 2)	

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Week 3	**Topics:** Probability Distributions • Discrete distributions w/ examples (Bivariate, Binomial, Poisson) • Continuous distributions w/ examples (Uniform, Normal) **Learning Outcomes** After completing this week, the learner will be able to: • Define and describe common probability distributions. (CLO 1) • Apply knowledge of probability distributions to solve applications from business, finance, and other fields. (CLO 2) • Use R to compute probabilities for discrete and continuous random variables. (CLO 3)	Assignment 1
Week 4	**Topics:** Sampling and Sampling Distributions • Sampling methods • Sampling distributions of sample mean, sample proportion • Properties of point estimators **Learning Outcomes** After completing this week, the learner will be able to: • Explain various sampling methods. (CLO 1) • Explain the characteristics of sampling distributions and solve related application problems. (CLO 1, 2) • Define and explain the properties of point estimators. (CLO 1) • Generate a random sample from a dataset using R. (CLO 3)	

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Week 5	**Topics:** Interval Estimation • Population mean (known and unknown □) • Population proportion • Sample size, big data	Assignment 2

	Learning Outcomes After completing this week, the learner will be able to: • Explain interval estimation. (CLO 1) • Calculate interval estimates using R and apply to solve problems from business, finance, and other fields. (CLO 2, 3)	
Week 6	**Topics:** Hypothesis Tests • Null and alternative hypotheses • Error types • Hypothesis test about population mean (known and unknown □) • Calculating probability of Type II errors **Learning Outcomes** After completing this week, the learner will be able to: • Explain hypothesis testing, define related terms, conduct hypothesis tests related to population mean. (CLO 1, 2, 3)	
Week 7	**Topics:** Inference • Inferences about two population means (known and unknown □) • Inferences about two population proportions • Inferences about two population variances **Learning Outcomes** After completing this week, the learner will be able to: • Create confidence intervals and conduct hypothesis tests about two population means, proportions and variances using R and interpret results. (CLO 1, 2, 3)	Assignment 3
Week 8	Review/Catch Up	Midterm Exam/Project 1

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Week 9	**Topics:** Simple Regression • Least squares method • Coefficient of determination/goodness of fit • OLS assumptions **Learning Outcomes** After completing this week, the learner will be able to: • Define and intuitively explain the least squares regression method and the assumptions of the simple linear regression model. (CLO 1) • Calculate simple linear regression coefficients and the coefficient of determination. (CLO 2, 3)	
Week 10	Spring Break	
Week 11	**Topics:** Simple Regression (continued) • Significance tests • Interval estimation • Residual analysis **Learning Outcomes** After completing this week, the learner will be able to: • Conduct t-tests and F-tests on simple regression results and interpret the results. (CLO 1, 2)	Assignment 4

	• Create prediction intervals for simple regression results (using R) and interpret and explain these results. (CLO 1, 2, 3) Use residual analysis to determine the appropriateness of the assumed regression model. (CLO 1, 2, 3)	
Week 12	**Topics:** Multiple Regression • Least squares method in multiple regression • Coefficient of determination • Assumptions of the CLRM • Significance tests **Learning Outcomes** After completing this week, the learner will be able to: • Apply the least squares method to estimate multiple regression models (CLO 1, 2, 3) Conduct t-tests and F-tests on multiple regression results and interpret the results. (CLO 1, 2)	
Week 13	**Topics:** Multiple Regression (continued) • Residual analysis • Categorical independent variables • Logistic regression **Learning Outcomes** After completing this week, the learner will be able to: • Use residual analysis to determine the appropriateness of the assumed regression model. (CLO 1, 2, 3) • Use categorical independent variables to model a variety of situations involving qualitative data. (CLO 1, 2, 3) Use logistic regression to estimate models with binary dependent variables. (CLO 1, 2, 3)	Assignment 5
Week 14	**Topics:** Regression Model Building • Linear models and non-linear relationship • Variable selection methods **Learning Outcomes** After completing this week, the learner will be able to:	

	• Describe and apply methods of modeling non-linear relationships in linear regression models. (CLO 1, 2, 3) Describe various variable selection methods and evaluate the appropriateness of each. (CLO 1)	
Week 15	**Topics:** Regression Model Building (continued) • Autocorrelation • Heteroskedasticity • Multicollinearity **Learning Outcomes** After completing this week, the learner will be able to: Describe the effects of violations of the CLRM assumptions and rigorously test for these violations. (CLO 1, 2, 3)	Assignment 6
Week 16	Catchup and review/ Reading Days	
Final Exams		Project 2 /Final Exam