FLORIDA POLYTECHNIC UNIVERSITY

STA 3241 Statistical Learning Syllabus

Spring Semester 2026

Course Information

Course Number and Title: STA 3241 Statistical Learning
Credit Hours: 3 credits
Current 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
Class Meeting Day, Time & Location: IST-1015 W 2pm-3:50pm

Course Delivery and Course Description

Delivery Mode: The class will be delivered in hybrid format with online class Monday and a face-to-face class Wednesday where the students are expected to attend all their scheduled university classes to satisfy all academic objectives as defined by the instructor.

Course Website: https://floridapolytechnic.instructure.com/courses/10319

Official Catalog Course Description: This is an introductory-level course in supervised learning. Topics include classification and regression, cross-validation and bootstrap, model selection, dimension reduction, tree-based methods, random forests and boosting, support-vector machines, principal components, and cluster analysis. Students will have hands-on experience in model building, machine learning, and implementation.

Course Pre and/or Co-Requisites: QMB 3200 - Advanced Quantitative Methods or (MAS 3114 - Computational Linear Algebra AND STA 2023 - Statistics 1)

Communication/Computation Skills Requirement (6A-10.030): No

Required Texts:
(ISLR) Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani. "An Introduction to Statistical Learning - with Applications in R". Available at: https://www-bcf.usc.edu/~gareth/ISL/

ISBN-13 978-1-4614-7137-0

Equipment and Materials: This course is an application-driven introduction to statistical learning. We will use the R programming language and RStudio, both are free. The course covers fundamental and popular R packages for statistical learning, introduced as working examples. The format of the course will include lectures by the instructor, class discussions, directed readings, and students' presentations. You will need a computer and access to webcam and microphone as well.

Suggested: You can simply create an account in https://rstudio.cloud to access a cloudbased version of RStudio to work on your assignments/projects

Alternative: a local installation of R can be completed by downloading R from the R Project web site. After installing R, a free and open-source Integrated Development Environment (IDE) for R can be downloaded from the RStudio web site.

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

Course Objectives and Outcomes

Course Objectives: The specific objective is for students to understand and apply basic *concepts and methods in statistical learning.* The broader objective is for students to hone their ability to *apply modern techniques of data analysis* to provide insights that help in making real world decisions.

Course Learning Outcomes:
1. Explain statistical learning methodology.
2. Implement the techniques covered, interpret and understand results, and validate models.
3. Monitor performance of ongoing implementations where appropriate.
4. Effectively communicate the results of model implementation orally and in writing.

Alignment with DS Program Outcomes

	Course Learning Outcome and Learning Level*			
Data Science Program Learning Outcomes*	CLO1	CLO2	CLO3	CLO4
(1) An ability to 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.		Evaluate	Analyze	Apply
(2) An ability to formulate or design a system, process, procedure, or program to meet desired needs.	Apply	Evaluate		
(3) An ability to develop and conduct experiments or test hypotheses, analyze, and interpret data and use scientific judgment to draw conclusions.			Analyze	
(4) An ability to communicate effectively with a range of audiences.				Create/Apply
(5) An ability to understand ethical and professional responsibilities and the impact of technical and/or scientific solutions in global, economic, environmental, and societal contexts.			Analyze	

(6) An ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty.	Apply			

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

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 (TLC):
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 on the south side of the commons in the IST building.

- **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.

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 https://floridapoly.edu/writingcenter.

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.

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 will obtain 80 (out of 100) points just by taking the "exit-quiz" and 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.

Pace of Online Activities

The online activities will be paced regularly with scheduled due dates for all items much like in a face-to-face course. Online lectures will be posted weekly and Discussion/quizzes/attendance quizzes will be expected to be done prior to that weeks face-to-face class. Students are expected to participate in live scheduled online activities such as Teams meetings or LUCID activities.

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 will involve the use of R
- Final Project: This is a data analysis assignment that involves application of the statistical learning concepts covered in the class on a given data set, and reporting the inferences from the data analysis and modeling

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:

Lecture meets for 100 minutes, once per week in person and 50 minutes once per week online. The intent of lecture time is for you to develop your conceptual understanding and practice problem-solving. The lecture will be interactive - you are expected, at appropriate times, to work with your neighbor/instructor, express your thoughts, ask, and answer questions, discuss ideas, patiently listen to and respect other's ideas.

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 and paste direct from AI will not be tolerated. All work must be in your own words or code.

Tentative Course Schedule

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

Week	*Topics and Readings*	*Suggested Material:*
1	Syllabus and Course intro Canvas resources Overview of statistical learning Rstudio setup Fundamentals of linear algebra overview	Explore Canvas Website for R: https://education.rstudio.com/learn/beginner/
2	Regression and Classification Problems The bias-variance tradeoff, Flexible vs inflexible models Introduction to operations in R R Lab - Practice/refresher Review of Linear Regression	Ch 3 ISLR
3	MLK Day- **No Classes** Other considerations in regression models Examples and applications Lab	Ch 4 ISLR
4	Overview of classification problems Review of logistic regression Multiple logistic regression Examples and applications Lab	Ch 4 ISLR
5	Linear Discriminant Analysis (LDA) Examples and Applications Quadratic Discriminant Analysis (QDA) Comparison of methods Lab	Ch 4 ISLR
6	Cross-validation, k-fold, leave-one-out Bootstrapping Linear Model Selection Best subset selection, stepwise selection Valentine's Day Lab ❤️	Ch 5 ISLR
7	Ridge regression formulation and examples The LASSO formulation and examples	Ch 6 ISLR

	Selecting the tuning parameters Examples and applications	
	Lab	
8	Principal Component Regression, Partial Least Squares Examples and applications Review MIDTERM EXAM	Ch. 6: ISLR
9	**Spring Break**	
10	Polynomial regression Generalized additive models Basics of decision trees Fitting regression and classification trees	Ch. 7: ISLR
	Lab	
11	Maximal Margin Classifier Support Vector Classifiers Multiclass Support Vector Machines (SVMs) Kernels/Optimization	Ch. 9: ISLR
	Lab	
12	Survival Analysis Kaplan-Meier Curves Log-rank tests Cox method	Ch. 11 ISLR
	Lab	
13	Bagging, Random Forests, Boosting Examples and Applications Explainable models with decision trees More on random forests and tree-based models	Ch. 8: ISLR
	Lab	
14	Principal Component Analysis Examples and applications Kmeans/Hierarchical Clustering Problems in unsupervised learning	Ch. 10: ISLR
	Lab	
15	Review/ Project / Spillover Review/ Project / Spillover Review/ Project / Spillover	

	Final project presentations	
16	Final project presentations	
	Reading Day	
17	Finals week (04/26 – 04/28 & 05/01)	

****This is a tentative schedule, and I reserve the right to modify this schedule as required by the progression of the class.*

Quizzes

The course will have at most 4 in-class quizzes that are either announced before or impromptu. The objective of these quizzes is to ensure students are keeping up with the course material. These do not include attendance quizzes.

Final Project

In the final project you will show your knowledge and skills in statistical learning, using any combination of the different tools and topics discussed throughout the semester applied to an area/field of your Interest.

• *Final Project Report*

Your goal is to submit a cohesive project report that conveys that you have mastered the techniques discussed during the semester.

• *Final Project Presentation*

An important aspect of doing research is taking time to share your findings with others. We will give everyone about 5 minutes to share their final project and summarize their findings.

Your instructor will provide you with specific guidelines for the final project report and final project presentation shortly after the first few weeks of classes (format and length, call for proposals, reference materials, presentation guidelines and logistics, rubric, etc.)

Sample Rubric for Report and Presentations

The final presentations and reports will be evaluated using rubrics similar to the ones included below.

Sample Report Rubric

Objective	Category	Below Expectations	Weak	Average	Good	Excellent
	Score	1	2	3	4	5
Students can write professional quality documents	Introduction	Opening is off-topic and inappropriate to the purpose, not concise and no clarity	Opening is somewhat related to the topic and appropriate to the purpose but is not concise and clear	Opening is related to the topic and appropriate to the purpose. Somewhat clear and concise	Opening is related to the topic and appropriate to the purpose. Clear and concise	Strong opening that is clear and concise
	Organization	Disorganized; incorrect format; unclear direction	Somewhat organized; incorrect format; unclear direction	Organized; correct format; unclear direction	Organized; correct format; clear direction	Correct formatting, strong clarity and organization in the development of main points

	Literature Review	Does not present information from any source	Presents information from irrelevant sources representing limited points of view/approaches	Presents information from relevant sources representing limited points of view/approaches	Presents in-depth information from relevant sources representing limited points of view/approaches	Synthesizes in-depth information from relevant sources representing limited points of view/approaches
	Research Design (weighted twice)	Does not provide information on research design	Inquiry design demonstrates misunderstanding of the methodology or theoretical framework	Critical elements of the methodology or theoretical framework are missing, incorrectly developed or unfocused	Critical elements of the methodology or theoretical framework are appropriately developed however, more subtle elements are ignored or unaccounted for	All elements of the methodology or theoretical framework are skillfully developed and may be synthesized from across disciplines or relevant subdisciplines
	Analysis (weighted twice)	Incorrect, Irrelevant, no supporting evidence	Correct, irrelevant, no supporting evidence	Correct, relevant, no supporting evidence	Relevant and correct with supporting evidence	Relevant, correct, complete, incorporates innovative insights
	Next Steps	Missing or content does not support conclusion	Conclusion irrelevant to the findings	Conclusion somewhat relevant to the findings	Conclusion relevant to the findings	Strong conclusion that is clear, complete and compelling
	Grammar & Spelling	Uses language that often impedes meaning due to errors	Uses language that often sometimes meaning due to errors	Uses language that generally conveys meaning to readers with clarity, although writing includes some errors	Uses straightforward language that conveys meaning to readers. Language has few errors	Uses graceful language that communicates meaning to readers with clarity and fluency and is virtually error free
	Reference Style (APA)	Did not follow APA style	Numerous errors in APA style, did not cite sources correctly, formatting issues	Some errors in APA style, cited correctly but formatting issues persist	Minimum errors in style and formatting but does not detract from readability	No errors in APA style
Total points for Report = 50						

Sample Presentation Rubric

Objective	Category	Below Expectations	Weak	Average	Good	Excellent
	Score	1	2	3	4	5
Students can demonstrate mastery of communication technology	Use of Media	Lack of media detracts from the presentation objective	Misuse of media that detracts from the presentation objective	Use of media barely supports and contributes to the presentation objective	Use of media supports and contributes to the presentation objective	Use of media supports, clarifies and reinforces the presentation objective
	Quality of Slides	Very poor quality. Not enough or too much colors, fonts and animations that detract from project objective	Poor quality. Not enough or too much colors, fonts and animations that detract from project objective	Fonts, colors and animations barely support the presentation objective	Fonts, colors and animations support the presentation objective	Fonts, colors and animations support, clarify and reinforce the presentation objective
Students can develop and deliver a compelling oral talk with relevant facts	Opening statement	Opening is off-topic and inappropriate to the purpose, not concise and no clarity	Opening is somewhat related to the topic and appropriate to the purpose but is not concise and clear	Opening is related to the topic and appropriate to the purpose. Somewhat clear and concise	Opening is related to the topic and appropriate to the purpose. Clear and concise	Strong opening that is clear and concise

and information	Organization	Disorganized; incorrect format; unclear direction	Somewhat organized; incorrect format; unclear direction	Organized; correct format; unclear direction	Organized; correct format; clear direction	Correct formatting, strong clarity and organization in the development of main points
	Literature Review	Does not present information from any source	Presents information from irrelevant sources representing limited points of view/approaches	Presents information from relevant sources representing limited points of view/approaches	Presents in-depth information from relevant sources representing limited points of view/approaches	Synthesizes in-depth information from relevant sources representing limited points of view/approaches
	Analysis	Incorrect, Irrelevant, no supporting evidence	Correct, irrelevant, no supporting evidence	Correct, relevant, no supporting evidence	Relevant and correct with supporting evidence	Relevant, correct, complete, incorporates innovative insights
	Next Steps	Missing or content does not support conclusion	Conclusion irrelevant to the findings	Conclusion somewhat relevant to the findings	Conclusion relevant to the findings	Strong conclusion that is clear, complete and compelling
	Timing	Presentation is too short, insufficient coverage of material	Presentation is too long. Unable to cover all the material	Able to cover all the material within five extra minutes	Utilizes allotted time to provide sufficient coverage of material	Well-paced coverage of material within the allotted time
Students can deliver an oral talk with clarity and appropriate poise	Delivery Techniques	Does not participate in the oral presentation	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation understandable, and speaker appears tentative.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation interesting, and speaker appears comfortable.	Delivery techniques (posture, gesture, eye contact, and vocal expressiveness) make the presentation compelling, and speaker appears polished and confident.
	Peer Evaluation	5 points				
Total Points = 50						