FLORIDA POLYTECHNIC
UNIVERSITY

Course Syllabus

Course Information

- **Course Number and Title**: IDC 4942 Data Analytics Capstone I
- **Credit Hours:** 3 credits
- **Current Academic Term**: Fall 2021

Instructor Information

- **Instructor**: Dr. Jim Mennie
- **Office**: IST 2037
- **Office Hours**: Office Hours: IST-2037 Monday-3:00-4:00PM & Wednesday 2:00PM-3:00PM as well as by appointment
- **Cell Phone**: 813-838-4572
- **E-mail**: jmennie@floridapoly.edu
- **Class Meeting Day, Time & Location**: M & W 4:00pm-5:15PM IST 1015

Course Details

- **Class Delivery Mode**: The class will be delivered by a live professor in the classroom.
- **Course Website**: https://floridapolytechnic.instructure.com/courses/5538
- **Official Catalog Course Description**: This course is part one of the senior capstone sequence for data science and business analytics. This advanced course covers critical thinking and problem-solving techniques applied to data analytics projects. The goal of this course is to carry out an industry-relevant project in applied data science and business analytics that synthesizes concepts from data acquisition, analytics, visualization, data management, and modeling
- **Course Pre and/or Co-Requisites:** Senior-level status
- **Communication/Computation Skills Requirement (6A-10.030)**: No
- **Required Texts**: None
- **Suggested Texts**:
  - "Data Visualization: A practical introduction" by Kieran Healy https://socviz.co/
  - "The Art of Data Science" by Roger Peng and Elizabeth Matsui ISBN-13: 978-1365061462 https://leanpub.com/artofdatascience
- **Course Objectives**: Students will work in interdisciplinary teams to complete an industry-sponsored project where data and business analytics tools and methods are put into practice. This course is designed to assess students' abilities to apply the concepts, terminologies, foundations and principles practiced during their academic career and enforce good development techniques as learned throughout the data and business analytics curriculum. All students will be required to utilize project management techniques, professional communication skills and demonstrate transferable skills in team management and leadership.
- **Course Learning Outcomes**:

  1. Demonstrate ability to collect and organize relevant data

2. Demonstrate ability to work effectively as part of a team
3. Analyze, identify and define the technology requirements appropriate to the solution of a data analytics problem.
4. Demonstrate mastery of analytical approach
5. Gain experience communicating with both internal and external project stakeholders.
6. Complete the project assigned through proof of concept (mid-point) so that the project may be seamlessly picked up and advanced to completion in the continuation course.

- **Alignment with Program Outcomes**:

Data Science Program Student Outcomes	Course Learning Outcome					
	1	2	3	4	5	6
(1) Apply current data science concepts, techniques, and practices to solve complex problems.	X	X	X	X		
(2) Analyze a given data science problem and formulate a solution in terms of the datasets needed, the techniques required or the technologies to be utilized.	X	X	X	X	X	X
(3) Communicate effectively insights, analysis, conclusions, or solutions to a diverse audience.		X	X			X

Business Analytics Program Student Outcomes	Course Learning Outcome					
	1	2	3	4	5	6
(1) Apply current business analytics concepts, techniques, and practices to solve business problems.	X	X	X	X		
(2) Analyze a given business problem using appropriate analytics techniques to generate insights and solutions.	X	X	X	X	X	X
(3) Communicate effectively insights, analysis, conclusions, and solutions to a diverse audience.		X	X			X

Academic Support Resources

- **Library**: Students can access the Florida Polytechnic University Library through the student portal Pulse and Canvas, on and off campus. Students may direct questions to the Success Desk in the Commons or by email, library@floridapoly.edu. The Florida Polytechnic University Library provides specialized resources and learning opportunities for students, faculty, and staff to successfully work with, interpret, and utilize information. The Library's core online collection features full-text journals as well as over 105,000 electronic books and other content covering all academic subject areas. As a member of the State University System of Florida, Florida Polytechnic University students can search and request materials from other state university libraries.
- **ASC**: The Academic Success Center provides essential services that directly support the student experience at Florida Polytechnic University. Located on the first floor of the Innovation, Science & Technology Building in room 1019 and at ASC East in Phase 2 Dorms, Academic Support Services is a hub that connects the community with the resources needed to succeed academically. The desk is staffed by success coaches who provide academic coaching on a variety of topics, including time management, test preparation, and test-taking skills. Success

coaches also provide academic guidance and help students manage their schedule and academic progress. Additionally, coaches lead career development initiatives on campus and are available to review resumes and conduct mock interviews. Students may direct questions to success@floridapoly.edu.

- **Writing Services:** Writing Services offers a full spectrum of writing support for Florida Poly students, including assistance with:
    - o Understanding written assignment prompts
    - o Researching writing genres and specific topics
    - o Brainstorming
    - o Organization
    - o Revision Strategies
    - o Citation and Formatting
    - o Grammar and Punctuation
    - o Preparing Presentations and Visual Aides

<u>**Course Policies**</u>:

- **Attendance:** Students are expected to attend all of their scheduled University classes and to satisfy all academic objectives as defined by the instructor." Attendance in this environment does not, of course, mean actual physical attendance in the classroom, although it may include that. Also see also University Policy.

> **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 the CARE Manager 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.

- **In-Class Quizzes:** In-class pop quizzes will be given occasionally to assist students in practicing problem-solving and conceptual understanding. These will be graded and account for a portion of your final grade.

- **Grading Scale**: The following grading scale will be used for this class. See also University Grading Policy.

A	93% – 100%	B	83% – <86%	C	73% – <76%	D	63% – <66%
A–	90% – <93%	B–	80% – <83%	C–	70% – <73%	D–	60% – <63%
B+	86% – <90%	C+	76% – <80%	D+	66% – <70%	F	0% – <60%

- **Assignment/Evaluation Methods**:

    - o Weekly Reports: These weekly reports are used to track the progress of the projects and address any issues, concerns or difficulties. Students are provided with a template that has questions on their progress and accomplishments for the week, any difficulties encountered, goals and action items for next week etc. Twelve weekly reports will be submitted throughout the entire semester.

- o Assignments: The assignments are designed to build on each other to help students in completing the final project report. Throughout the semester, each of the assignments will comprise a portion of the final report. By completing each assignment, the students will be able to combine the concepts learned from each assignment to make up the majority of the final report.
- o Midterm and Final Report and Presentations: These will be graded based on the rubrics provided at the end of this document and more details will be discussed in class.

Assignment	*Percentage*
Discussions/ Assignments/ Quizzes	20%
Weekly progress reports	10%
Midterm Presentation	15%
Midterm Report	15%
Project Final Report	20%
Project Final Presentation	20%
Total	100%

- **Late Work/Make-up work**: All class assignments will have due dates communicated at the time of assignment. **It is the student's responsibility to know the deadlines and turn work in ON TIME.** The make-up policy applies only to missed exams (midterm and final). If you miss an exam with an excused absence, you must meet with your professor as soon as possible to deal with the issue. In most cases your final score will be calculated with that exam, you missed, so it is in your best interest to not miss any exams. In-class quizzes and the Final exam cannot be made up. If you have a schedule conflict for the final let your professor know as soon as possible.

- **Lecture Expectations:** Lecture meets for seventy-five minutes, twice per week and attendance is in person. 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, express your thoughts, ask and answer questions, discuss ideas, patiently listen to and respect other's ideas.

- **CANVAS Policy:** 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. Please see the end of this document for guidelines for submission of assignments.

- **Email Policy:** 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.

University Policies

- **Academic Integrity**: All students must commit to the highest ethical standards in completion of all academic pursuits and endeavors: Academic Integrity. "Behaviors of academic dishonesty in violation of this policy are listed below and are not intended to be all inclusive. Violations may result in the imposition of academic sanctions under this regulation and/or disciplinary sanctions under the Student Code of Conduct.
  - o Intentionally using or attempting to use unauthorized materials, information, or study

aids in any type of academic exercise.
- o Intentionally or knowingly representing the words or ideas of another as one's own in any academic exercise.
- o Intentional and unauthorized falsification or invention of any information or citation in an academic exercise.
- o Multiple Submission. Submission of the same or substantially the same work for credit in two or more courses. Multiple submissions shall not include those situations where the instructor gives the student prior written approval to use such prior academic work or endeavor.
- o Facilitating Academic Dishonesty. Intentionally or knowingly assisting or attempting to assist another in violating any provision of this regulation.
- o Misconduct in Research and Creative Endeavors. Serious deviation from the accepted professional practices within a discipline or from the policies of the University in carrying out, reporting, or exhibiting the results of research or in publishing, exhibiting, or performing creative endeavors. This does not include honest error or honest disagreement about the interpretation of data.
- o Misuse of Intellectual Property. Illegal use of copyright materials, trademarks, trade secrets, or intellectual properties."

Student Record of 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 accidently, 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 other than class lectures, 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**.*

For further information, go to the Registrar's webpage and click on HB233 Guidance.

- **Reasonable Accommodations**: Florida Polytechnic University is committed to assisting students with disabilities and offering reasonable accommodations to those with documented eligibility. The Office of Disability Services (ODS) coordinates accommodations for students with disabilities in accordance with the ADA Amendments Act of 2008 (ADAAA), the Americans with Disabilities Act of 1990 (ADA), and Section 504 of the Rehabilitation Act of 1973. Reasonable accommodations are determined on an individual basis through an interactive process between you, ODS, and your instructor(s). If you have already registered with ODS, please ensure that you have requested an accommodation letter for this course and communicate with your instructor about your approved accommodations at your earliest convenience. 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 at DisabilityServices@floridapoly.edu or (863)874-8770 or ASC East building or ODS website: www.floridapoly.edu > Student Affairs > Health Wellness > Disability Services

- **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 the Florida Poly policy on Reasonable Accommodations for Religious Observances, Practices and Beliefs for more details.

- **Title IX**: Florida Polytechnic University is committed to ensuring a safe, productive learning environment on our campus that prohibits sexual misconduct, including discrimination based on sex or gender, harassment, stalking, sexual assault, sexual exploitation, or intimate partner violence. If you or someone you know needs assistance, you may speak to any university employee; however, they have an obligation to report the incident to the Title IX Coordinator, who will keep that information private to the greatest extent possible. If you want to speak to someone permitted to keep your disclosure confidential, seek assistance from the Florida Polytechnic University Ombudsman, BayCare's Student Assistance Program, 1-800-878-5470 and locally within the community at Peace River Center, 863-412-2700 (24-hour hotline) or 863-412-2708 to schedule an appointment. If you or someone you know feels unsafe or may be in imminent danger, please call the Florida Polytechnic University Police Department 863-874-8472 or the local Police Department 911 immediately. For more information about policy, reporting options and resources at Florida Polytechnic University and the community, please visit the Title IX Website.

- **Statement of Academic Continuity**: In the event of an emergency (such as a hurricane), it may be necessary for Florida Poly to suspend normal operations. During this time, Florida Poly may opt to continue delivery of instruction through methods that include but are not limited to: the Learning Management System (Canvas), online conferencing, email messaging, and/or an alternate schedule. It is the responsibility of the student to monitor the Learning Management System for each class for course-specific communication, and the Florida Poly website and emails for important general information. For additional guidance on emergency protective actions and hazards that affect the University please visit Safety and Security at Florida Poly.

- **Covid-19 Syllabus Statement**
  Regardless of the mode of course delivery, all Florida Poly students are asked to make a Campus Commitment demonstrating respect and consideration for themselves or others, and for the people they care about. This Campus Commitment includes monitoring one's health and seeking medical care when appropriate; wearing face-coverings and respecting social-distancing, especially in the classroom and in gatherings; washing one's hands frequently (and when not possible using hand-sanitizer); following medical guidance; and participating in keeping shared spaces clean. If you are experiencing any symptom(s) of COVID-19 outlined by the CDC, you must stay home or in your residence hall room and immediately contact the associate director of campus wellness management at 863-874-8599 or email care@floridapoly.edu.
  Basic rules for in the classroom, IST, and Campus:
  1. You MUST have a face-covering.
  2. Leave the furniture on its correct floor markings, or if it is moved, please return it to those markings.
  3. Whenever possible, clean your space with a sanitizing wipe before you start and when you are finished with class.
  4. Do not remove sanitizing wipes or hand sanitizers from their set locations—they are put there for everyone.
  5. Follow directional signs throughout the buildings and respect appropriate social distancing.

6. Study hard and engage with all of your courses!

Course Schedule

Week	Topic
1	*Course Introduction*
2	*Project Management Techniques- Microsoft Project Overview, Project conception, definition, execution, WBS, Gantt Charts*
3	*Statistics Primer* Descriptive Statistics, Probability Distributions, Inferences, Hypothesis Testing and Confidence Intervals
4	*Team Mentorship*
5	*Career Preparation* Resumes and Cover Letters, Networking, Job search Methodologies
6	*Data Collection and Pre-Processing* Methods and best principles, Data pre-processing tips, Working with APIs
7	*Version Control*
	Git/GitHub introduction, core concepts, and project setup Collaboration, tracking changes
8	*Data Wrangling Primer* Working with categorical and continuous variables. Dealing with missing values. Transforming dates/times data
9	*Midterm Update*
10	*Data Visualization Overview* Best practices, Data and storytelling, Types of charts and graphs.
11	*Data Mining Overview* CRISP-DM methodology, Clustering, Text Mining, Outlier detection *Machine Learning Overview* Supervised and unsupervised learning, Performance metrics
12	*The practice of Reproducible Research* Practicing and assessing reproducibility, Basic Reproducible Workflow Template, Case Studies and Lessons from the Data-Intensive Sciences
13	*Good Enough Practices in Scientific Computing* Data management and documentation, Software, collaboration, unit tests, profiling and performance tuning
14	*Report Generation/Report Requirements* Report Generation and Distribution, Communication plans
15	*Communicating Results* Audience and content, Style and medium
16	*Project Presentation and Report*

This is a tentative schedule and I reserve the right to modify this schedule as required by the

progression of the class. Guest lecturers will be invited to participate in our classes

Important Dates

August 25	Th	First Day of Classes
August 24-30	Th-W	Drop/Add Week
August 30	W	Withdrawal Deadline - No Academic or Fee Liability
Sept. 6	M	Labor Day Holiday - No Classes
Nov. 11	Th	Veteran's Day Holiday – No Classes
Nov. 23	W	Withdrawal without Academic Penalty Deadline (W assigned)
Nov. 24-26	W-F	Thanksgiving Holiday Break – No Classes
Dec. 8	T&Th	Last Day of Classes
Dec. 9-10	TH-F	Reading Days - No Classes Final
Dec. 13-16	M-Th	Final Exams
Dec. 22	W	Final Grades Available Online

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	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	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
	Peer Evaluation	10 points				
Total points for Report = 50						

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 (weighted twice)	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 and information	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
	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 sufficent 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.
Total Points = 50						