FLORIDA POLYTECHNIC
UNIVERSITY

DATA SCIENCE AND BUSINESS ANALYTICS DEPARTMENT
CAP 3774/CAP 5775 –Data Warehousing Course Syllabus
Spring 2026

Course Information
- **Course number and title:** CAP 3774/ CAP 5775 –Data Warehousing
- **Credit Hours**: 3 credit hours
- **Academic Term**: Spring 2026

Instructor Information
- **Instructor**: Shailik Sarkar
- **Office Location**: BARC 1113
- **Office Hour**: TBD
- **Email**: ssarkar@floridapoly.edu

Course Delivery and Course Description
- **Delivery Mode:** In-Person Class
- **Class Meeting:** TR-5:30-5:45PM BARC 1123
- **Course Website**:
- **Official catalog course description:** Fundamentals of building and populating a data mart to support the planning, designing and building of business intelligence applications and data analytics are covered in this course.
- **Prerequisites:** COP 3710 - Database 1
- **Communication/Computation skills required (6A-10.030):** No
- **Required Textbook:**
    - The Datawarehouse Toolkit: by Ralph Kimball(Author) and Margy Ross" by Wiley: 978-1118530801
- **Supplementary Book:** Will update as the course progresses.

- **Equipment and Materials:**
  This course is an application-driven introduction to data warehouse development. We will use the Microsoft SQL Server Stack which is freely available from Microsoft. The course covers designing, building and testing a data warehouse solution using working examples. The format of the course will include lectures by the instructor, class discussions, hands on development, directed readings, and students' presentations. You must bring a laptop to each class so that you can perform the in class portion of assignments that you will finish outside of class.

- <u>Required:</u> Download and install SQL Server from https://www.microsoft.com/en-us/sql-server/developer-tools
- **Course Objectives:**The specific objective is for students to understand and apply basic *concepts and methods in data warehousing.* The broader objective is for students hone their ability to *apply modern techniques of data warehousing to* provide insights that help in making real world decisions.
- **Course Learning Outcomes:**

Upon successfully completing this course, learners will be able to:

a. Explain data warehousing and dimensional bus model design.

b. Solicit business requirements, identify data sources and design ETL processes.

c. Monitor performance of the data warehouse and ensure data quality.

d. Effectively communicate the resulting data warehouse to support business intelligence and analytics use cases.

- **Alignment with Program Outcomes**:

MS in Data Science PLOs *	Course Learning Outcome and Learning Level*			
	CLO1	CLO2	CLO3	CLO4
(1) Demonstrate mastery in analyzing complex problems and applying knowledge of data science to formulate solutions.	Analyze	Apply		Evaluate
(2) Communicate data science information clearly and effectively through presentations and technical writings to both expert and non-expert audiences.		Evaluate	Analyze	Apply
(3) Demonstrate critical evaluation of recent research literature			Evaluate	Analyze
(4) Identify a novel relevant research problem in a chosen data science research field, perform the literature survey for the problem, create a plan to solve the problem, carry on the plan, and defend the research.			Analyze	Apply
(5) Recognize appropriate practices in the field of data science and their ethical implications.	Apply	Analyze	Apply	
	Course Learning Outcome			

BS in Data Science PLOs *	1	2	3	4
(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.	Applying	Applying		
(2) An ability to formulate or design a system, process, procedure, or program to meet desired needs.		Applying		
(3) An ability to develop and conduct experiments or test hypotheses, analyze, and interpret data and use scientific judgment to draw conclusions.		Applying	Applying	
(4) An ability to communicate effectively with a range of audiences.			Synthesis	Synthesis
(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.		Applying	Applying	
(6) An ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty.		Creating	Creating	Creating

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

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. 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.

Course Schedule (Tentative): This may significantly change

Week	Topic	Reading/HW
1	*Data Warehousing, Business Intelligence, and Dimensional Modeling Primer* Goals, Architecture and database 1 fundamentals	*Ch. 1*
2	*Kimball Dimensional Modeling Techniques Overview* Concepts and Techniques Examples and applications **Quiz 1**	*Ch.2*
3	*BEAM Agile Development* Agile Requirements Gathering Sessions Templates for conducting BEAM Sessions **Quiz 2**	*Slides*
4	*Retail Example* 4 Step Design Sales Case Study	*Ch. 3, HW 1 design and build Retail Marts*
5	*Education Example* University Case Study Accumulating Snapshot Fact	*Ch. 12, HW 2 design and build Education Marts*
6	*ETL Subsystem and techniques*	*Ch. 19*

	Requirements and Constraints 34 Subsystems	
7	*ETL System Design and Development Tasks* **Quiz 3** **Midterm**	*Ch. 20*
8	*Hands on ETL Extract Data using SSIS* Connecting to Data Sources Extracting to Stage Tables **Quiz 4**	*HW 3 Complete Connection to Sample Database and Load Stage 1 tables*
9	*Hands on ETL Transform Data using SSIS* Common Transformations Surrogate Key Pipeline loading Dims and Facts	*HW 4 Complete transformations and load stage 2 tables*
10	*Hands on ETL Populate Dims and Fact Tables using SSIS* Dimension Load Key generation Surrogate Key Pipeline	*HW 5 Complete loading Dim and Fact tables*
11	*Data Warehouse Lifecycle* Roadmap Progression	*Ch. 17/18*
12	*Monitoring the DW Environment* Indexes and Partitions Job Execution Runtimes	*Ch. 14*
13	*Big Data Analytics* Practical issues in clustering Self-organizing maps, independent component analysis	*Ch. 21*
14	*Using the Data Warehouse* Connecting Tableau to DW Querying the DW	*Slides and Handout* ***Presentations Due***
15	*Other recent advances in data warehousing implementation and automation* *(as time permits)*	*Group Presentations*

I reserve the right to modify this schedule as required by the progression of the class.

Exercises listed as suggested problems may be used as part of some of the homework assignments and/or quizzes this term.

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 10 minutes to share their final project and summarize their findings. *The final project presentation accounts for 15% of your final project grade.*

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.)

Course Policies

- **Attendance** (see also University Policy)
  Students are expected to attend class. If you know that you will miss a class for any reason discuss the situation with your instructor BEFORE the class is missed. Only valid and documented excuses will be considered. Any documentation must be submitted within 1 week of your absence. Class attendance will be taken at every class period. The department considers attendance a vital part of the learning process and as a result, there will be a penalty for missed classes. Also, due to the disruption caused to your classmate's learning process late arrivals will likewise incur a penalty. As a result, this course is implementing the following final grade reduction policy for absences or late arrivals

Number of unexcused missed meetings	Effect on final grade
0 to less than 10 %	No penalty
From 10% up to 20%	1/3 of a Letter Grade reduction
From 20 % up to 30 %	2/3 of a Letter Grade reduction
30% or more	1 Letter Grade reduction

- **Grading Scale**: (See also University Grading Policy).
  Grades will be determined according to the following scale:

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**:

Assignment	Percentage
Discussions	10%
Midterm Exam	15%
Final Exam	15%
Quizzes	20%
Homework	20%
Final Project	20%

Total	100%

Participation in all course activities is a very important element of this course, is a basic expectation, and counts for part of your grade. Course participation consists of active and respectful involvement in class discussions, presentations, peer feedback, postings, replies, projects, and other interactions. The course grade takes into account quality, quantity, and timeliness of student participation.

- **Late Work/Make-up work**:
  Each student must keep current on assignments. *Late assignments until 24 hours will incur 10 percent penalty and from 1-5 days will incur 30 percent penalty and are not graded afterwards, unless permission has been obtained from the instructor in advance*. Medical emergencies with valid documentation would be about the only exception. Any other documentation will be evaluated on a case by case basis.

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**.*

*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**.*

Important Dates

January 12 – 16 M-F Drop/Add Week

January 19 M Martin Luther King Jr. Holiday – No Classes

February 10 T Career Day – No Classes

Mar 3 M Midterm grades due

March 16 – 20 M – F Spring Break - No Classes

April 17 F Withdrawal Without Academic Penalty Deadline (W assigned)

April 28 W Last Day of Classes

April 29 – May 1 W-F Reading Days - No Classes

May 4 – 8 M – F Final Exams

May 11 W Final Grades Available Online

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	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

quality documents						Correct formatting, strong clarity and organization in the development of main points
	Organization	Disorganized; incorrect format; unclear direction	Somewhat organized; incorrect format; unclear direction	Organized; correct format; unclear direction	Organized; correct format; clear direction	

	Category					
	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 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 sufficient coverage of material	Well-paced coverage of material within the allotted time
Students can deliver an oral talk with clarity and	Delivery Techniques	Does not participate in the oral presentation	Delivery techniques (posture, gesture, eye contact, and vocal	Delivery techniques (posture, gesture, eye contact, and vocal	Delivery techniques (posture, gesture, eye contact, and vocal	Delivery techniques (posture, gesture, eye contact, and vocal
appropriate poise			expressiveness) detract from the understandability of the presentation, and speaker appears uncomfortable.	expressiveness) make the presentation understandable, and speaker appears tentative.	expressiveness) make the presentation interesting, and speaker appears comfortable.	expressiveness) make the presentation compelling, and speaker appears polished and confident.
	Peer Evaluation			5 points		

Total Points = 50