Course Syllabus IS 465: Advanced Information Systems

Semester: Spring 2025 Section 004: Tuesday and Friday 1:00-2:20 PM at GITC 3600

Instructor: Keita Ohshiro E-Mail: <u>keita.ohshiro@njit.edu</u> Office Hours: Tuesday and Thursday, 11:45 AM - 12:45 PM, and by appointment Office: Guttenberg Information Technology Center (GITC) 3902

TA: TBA Grader: TBA

General Information

Course Description

Prerequisites: Statistical GER (MATH 105, MATH 120, MATH 225, MATH 244, MATH 279, MATH 305, MATH 333, IE 331, ECE 321 or MNET 315), and (IS 265 or MIS 245) and IS 344, and (IS 331 or CS 331).

This course serves as an introduction to data analysis, probability and statistics from an information systems perspective, including many of the techniques that are most relevant to the profession of Data Scientist for business, data and web analytics, as well as current research areas. The course emphasizes manipulation and analysis of relevant data sets. Course topics include the rudiments of probability and random variables, estimation, hypothesis testing, graphics and visualization, data warehousing and OLAP analysis, dashboard, scorecard, data mining algorithms, optimization techniques, DSS and knowledge systems. Students will get hands-on experience in designing and building a data warehouse. They will get hands-on experience building a dashboard with real-world data, and they will apply various data mining algorithms learned in class to solve real world problems.

Learning Outcomes

At the end of this course, the student should be able to:

- 1. Build a foundation of data analysis such as statistics, probability theories, data structure and algorithms, database and data warehouse, data visualization, basic data mining techniques (e.g. decision trees, clustering, etc), and Python programming.
- 2. Apply them to real-world data sets for data analysis.
- 3. Communicate the results of data analysis.

Tools

The students will learn to work with the following tools. Please bring your laptop.

- Tableau
- Python

Textbooks

Textbooks are not required.

About Grading

Grading Policy

The class will be graded on a 100-point scale. (Also, see Grading Legend)

A	B+	B	C+	C	D
Superior	Excellent	Very Good	Good	Acceptable	Minimum
> 90	85 - 90	80 - 85	75 - 80	70 - 75	60 - 70

Grading Categories

- 20% Individual assignments and lab work
- 25% Project 1 (Group Project): Data visualization using Tableau
 - 15% Presentation and documentation
 - 10% Individual contribution
- 25% Project 2 (Individual Project): Data mining using Python
- 15% Midterm exam
- 15% Final Exam

Please note that there may be slight modifications to the grading policy depending on issues that arise during the semester. I can add or reduce points based on various situations. For instance, exceptional participation and contributions in class may result in additional points, while poor participation and lack of thoughtful contributions may lead to point deductions. Additionally, I may make slight adjustments to the grading scale or apply a curve as needed to ensure fairness in the overall grading process.

Projects overview

- Objective: To demonstrate the ability to apply Data Analytics techniques to solve real-world problems.
- Two projects will be assigned throughout the semester. Details will be provided in Canvas.
 - Project 1: Data Visualization (Group project)

- Teams are expected to find an interesting data set and visualize it using Tableau. Since we have no midterm exam in this class, this will count as the midterm milestone.
- Project 2: Data Mining (Individual project)
 - Individuals are expected to work with a real-world data set, analyze it, and try to extract insightful information/knowledge using Python. This project is due at the end of the semester.

Exams

We will have midterm exam on March 7 and final exam (date TBD). Further details will be provided during the semester. If you cannot take the midterm exam that day, please contact me as soon as possible to discuss alternative arrangements. Failure to notify me in advance may result in a zero point.

Attendance Policy

Students are expected to attend every class on time.

- If you miss 6 class sessions, you will automatically be deducted a letter grade.
- If you miss 10 class sessions, you will automatically fail the course.
- Students who arrive after the attendance call/quiz or leave before the class officially ends will be marked as late. Accumulating 3 late attendance will count as 1 absence.

Please contact the Office of the Dean of Students (DOS) to verify your absence. For more details, please see the Student Absence Verification section below.

Even when you don't have a valid (DOS verifiable) reason and cannot attend class, **I strongly encourage you to notify me in advance** (not after the class). I will try to consider your situation, though I cannot guarantee to what extent.

Student Absence Verification

Students should contact the Office of the Dean of Students (DOS) to verify their absence when missing class due to bereavement, medical concerns, military activity, legal obligations, or university-sponsored events. Once the absence has been verified, the DOS will communicate to your professor(s) on your behalf. Please note that our office only verifies documentation and it is at the discretion of your professor(s) or their department's policy to provide any accommodation. It is the student's responsibility to follow up with the professor(s). Students who select an option (bereavement, medical concerns, etc.) that does not match the presenting concern and supporting documentation will be rejected.

For more information, please see <u>https://www.njit.edu/dos/student-absence-verification</u>.

Late Assignment Submissions

If an assignment is submitted late, one-fourth of the total points will be deducted per day. For example, if an assignment is due by 6:00 pm and you submit it after 6:00 pm but before 6:00 pm the following day, 25% of the total points will be deducted (50% on the second day, 75% on the third day, and 100% after that). I strongly encourage you to submit your assignments on time, even if you feel they are not yet ready or perfect.

And, I still strongly encourage you to submit the assignments, no matter how late they are. I cannot promise, but there may be a remedy. I will try to consider your effort, though I cannot guarantee to what extent.

Academic Integrity

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: <u>NJIT Academic Integrity Code</u>.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu.

Use of Generative AI

Generative AI tools are permitted in this course for reference purposes only, and no citation is necessary when used for inspiration or guidance. However, you are expected to understand any AI-generated content before including it in your work. Simply copying and pasting AI outputs without comprehension is not acceptable. Additionally, in most assignments and labs, I require you to demonstrate not only the final results but also the process of how you arrive at them. For example, when using tools like Excel, you should show your use of formulas and functions rather than just providing the final output. If you have any questions or concerns about the appropriate use of AI technology in this course, please contact me before submitting any assignments.

Schedule Outline

(Subject to modification)

Topics

Class 1: 1/21	Course Introduction		
Class 2: 1/24	Data basics		
1/27	Last Day to Add/Drop a Class		
Class 3: 1/28	Descriptive statistics		
Class 4: 1/31	Data cleaning with Spreadsheet		
Class 5: 2/4	Data visualization 1: basics		
Class 6: 2/7	In-class group work		
Class 7: 2/11	Data visualization 2: storytelling, dashboard		
Class 8: 2/14	In-class group work		
Class 9: 2/18	Lecture: Inferential statistics (Hypothesis testing, t-tests)		
Class 10: 2/21	In-class group work		
Class 11: 2/25	Data management (database, data warehouse, OLTP, OLAP, etc)		
Class 12: 2/28	(Buffer)		
Class 13: 3/4	Midterm milestone: Group project submission and presentation		
Class 14: 3/7	Midterm exam		
Class 15: 3/11	Data Mining - Introduction		
	 Python basics with NumPy, Pandas, and Matplotlib 		
3/16-22	Spring Recess - No classes		
Class 17: 3/25	Data Mining - Classification		
Class 18: 3/28	Lab: Python		
	Mining Regrossion		
Class 19: 4/1 Class 20: 4/4	Data Mining - Regression		
11/11	Last day to withdraw from classes		
Class 21: 4/8	Data Mining - Association rule		
Class 22: 4/11			
Class 23: 4/15	Data Mining - Clustering		
4/18	Good Friday - No Classes Scheduled - University Closed		
Class 24: 4/22	Final project checkup		
Class 25: 4/25	Course review		
Class 26: 4/29			
Class 27. 5/2			
Class 27: 5/2	(Builer)		

Class 28: 5/7 (Wed)	Friday Classes Meet Final project submission due Final project show and tell
Final Exam Day (TBD)	Final exam

Others

Center for Counseling and Psychological Services

C-CAPS provides free counseling for full-time students. For more information, see <u>https://www.njit.edu/counseling/</u>.

Getting Technical Help

The <u>IST Service Desk</u> is the central hub for all information related to computing technologies at NJIT. This includes being the first point of contact for those with computing questions or problems.

Accessibility

If you are in need of accommodations due to a disability, please contact Scott Janz, Associate Director of the Office of Accessibility Resources & Services (OARS), Fenster Hall Room 260 to discuss your specific needs. A Letter of Accommodation Eligibility from the OARS authorizing your accommodations will be required.