

Syllabus

ENGR-213 Data and Business Analytics

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Course Description (NEW):

There are two ways to make business decisions. We can make decisions based on rules of thumb, experience, or common sense. The problem is, what if our experience is out of date? A better way to make a decision is what we call data-driven decision-making. The only problem with this data-driven decision process is data. What data? How to get the data? And how do you make sense of the data? In this course, we will learn how to acquire and prepare data for analysis as part of data engineering tasks. We will also explore different statistical analysis and data modeling techniques to make sense of the data for business decision-making. Last, we will learn how to tell our story and communicate our messages effectively, leveraging human cognitive factors.

Learning Outcomes:

Upon the successful completion of this course, students will be able to:

- Recognize the skills required to perform data analysis tasks from data acquisition to storytelling with data.
- Demonstrate an understanding of how data analytics projects are approached.
- Use Python programming techniques to prepare and transform data.
- Apply preattentive attributes and visualization theory in storytelling with data.
- Explore machine learning models to solve business problems.
- Analyze data using Python, Tableau, and Excel.
- Explore the concept of Natural Language Processing (NLP).
- Communicate and present analysis results effectively.

Prerequisites:

None

Required Course Materials:

- No textbook is required, but students must have:
 - Windows, Mac, or Linux laptops with WIFI or Internet access
 - Microsoft Excel
 - Tableau (Free Student license from Tableau)
 - Jupyter (open source)

- Python 3+ (open source)

Requirements:

Grades for the course will be determined from the following activities:

- Exercises 80%
- Final Exam 20%

Grade System:

A	94% to 100%
A-	< 94% to 90%
B+	< 90% to 87%
B	< 87% to 84%
B-	< 84% to 80%
C+	< 80% to 77%
C	< 77% to 74%
C-	< 74% to 70%
F	< 70% to 0%

WEEK	TOPIC	ASSIGNMENT
1	Introduction to Data and Business Analytics. Statistics Thinking	PSET 1: Statistical Thinking Exercise
2	Storytelling with Data Storytelling Concepts Preattentive Attributes A look at real-world examples	
3	Storytelling, Visualization, and the use of Tableau to Extract Data Visualization Principles Graphs, Charts, and Maps Exploratory and Visualization using Tableau Random Sample Generation using Tableau Data Extraction and Filtering	PSET 2: Business Storytelling and Visualization Exercise
4	Python Basics / Refresher Python Data, Expressions, and Controls User-Defined Functions	
5	Python Data Acquisition Data Acquisition Approaches Data String Manipulation Working with Data Sources/Files	PSET 3: Manufacturing Data String Decoding Exercise
6	Python Data Engineering	

	Data Cleaning, Filtering, and Pivoting Data Structure and Organization Using Pandas	
7	Business Analysis using Python Risk, Return of Investment, and Portfolio Descriptive Analytics T-TEST and ANOVA	PSET 4 Business Analysis: Cleaning, Filtering, A/B Testing, and Beyond Exercise
8	Data Modeling and Business Analysis Predictive Analytics using Regression Models	
9	Data Modeling and Business Analysis Predictive Analytics using Classification Models Natural Language Processing Text Manipulation and Qualitative Analysis	PSET 5: Business Analysis: Data Modeling and NLP Exercise
10	Final Exam Review Final Exam	Online Final Exam