

MDA 620—Data Driven Decision Making

Semester 2022

Meeting Days: Thursdays (8 Sep 2022 – 22 Dec 2022)

Time: 8:30 pm – 10:50 pm

Gurpreet Singh

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Professor's Office Location:

Department Phone: 516-299-2310

Classroom LB385

Office Hours: Wednesdays 8:30 pm – 9:30 pm
by Appointment

Course Description:

This course first trains students on the fundamental concepts needed for the role of a Business Analyst/a Business Intelligence Engineer/ a Data Scientist in companies. Then, this course equips students with the latest available tools to implement these concepts in answering business questions in a data driven way. This course uses hands-on project in business application of data analytics in an area of student interest

Course Outcomes:

Students in this course will learn how to:

- Understand a business question (scenario) and construct an analytical framework to
- answer that question in a data driven way.
- Given the specific type of data (often a limiting factor), choose the right analytical
- framework and best possible set of models.
- Use software packages for data analytics (from exploratory/descriptive analysis phase to
- the final estimation phase)
- Provide actionable insights from the available data to the stakeholders in the business

Prerequisites:

None

Course Credits:

3 hrs.

Required Texts:

Business Analytics 4th ed by Jeffrey D. Camm (Cengage)

ISBN-13: 978-0357131787

ISBN-10: 0357131789

Data Mining for Business Analytics: Concepts, Techniques, and Applications in Python by Galit Shmueli

ISBN-13: 978-1119549840

ISBN-10: 1119549841

Other Required Materials:

Github -<https://github.com/>
Stackoverflow <https://stackoverflow.com/>
Kaggle <https://www.kaggle.com/datasets>
UCI <https://archive.ics.uci.edu/ml/index.php>

Core Curriculum Goals:

- Problem solving in a data driven way
- Analytical skills (conducting research, case analysis, etc.)
- Critical thinking (ability to apply a set of operations to impact an appropriate outcome, examples, etc.)
- Use of software packages and libraries in conducting analysis.
- Development of communication abilities (oral presentation, class demonstration, etc.)
- Learn how to present technical concepts and results for non-technical stakeholders

Course Organization:

Course work in class will consist of one hour of covering the related topics/lectures, one hour of class discussions, and in class coding, quizzes.

Course Assessments:

In class/ live coding, quizzes and coding homework will be used to assess the student knowledge and will collectively make up for 40% of student's grades.

Breakdown of Course Hours:

In addition to time spent in the class, you are expected to work on supplementary assignments outside of the class. Here is a suggested breakdown of how you might organize your time for this course:

2.5 hours/week class X 14 weeks	35 hours
Supplementary Assignments/Practice	
Textbook/Topics Reading (2 hours/week)	28 hours
Capstone Projects (1 hour/week)	14 hours
Python (and Excel) Coding Practice 4 hours/week	56 hours

Grading Criteria:

Attendance and Participation:	10%
Quizzes and Homework	10%
Live/Flash Coding	20%
Capstone Project 1:	30%
Capstone Project 2:	30%

Attendance Policy:

Attendance/ Class Participation is mandatory

Course/Classroom Policies:

Students must bring their laptops in class for coding practice. Use of cell phones is not allowed in class.

University Policies and Information:

LIU's Academic Affairs policies are located on the University website at:

<https://liu.edu/about/LIU-policy/policy-by-category-listing>

LIU Academic Catalogs may be found at:

<https://liu.edu/enrollment-services/registration/academic-catalogs>

The LU Academic Calendar may be found at:

<https://liu.edu/enrollment-services/registration/academic-calendar>

LIU Student Support Services**Students with Disabilities**

In compliance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, including changes made by the ADA Amendments Act of 2008, I will make accommodations for students with disabilities. It is necessary for those students to provide me with the appropriate DSS Accommodations Form by the end of the second week of classes. Please contact the office of Disability Support Services in the Center for Learning at 516-299-3057 to take appropriate steps to develop an appropriate educational plan.

If you are a student with a documented disability, medical condition, or think you may have a disability, and will need accommodations, academic adjustments, auxiliary aids, or other services, please contact the Office of Disability Support Services by calling 516-299-3057 or emailing Post-LearningSupport@liu.edu to request services, accommodations or for additional information. Additional information is also available on the DSS website: www.liu.edu/post/dss.

The Center for Learning

LIU Post offers free tutoring in subject areas and in writing. For information about how to register for tutoring, contact:

Email: Post-LearningSupport@liu.edu

Phone: 516-299-3057

The Writing Center

Email: Post-WC@liu.edu

Phone: 516-299-2732

The Writing Center at Post provides free writing assistance to all students. Writing assistants can work with you at any point in your writing process from helping to clarify an assignment or prompt, through brainstorming, organizing and developing your ideas, citing your sources, and polishing your writing.

To access information about the Writing Center location and hours of operation or find links to writing resources: 1) click on the Community tab in Blackboard, 2) then click on Writing Center, 3) enroll to join the Blackboard Writing Center organization using the enrollment code: **Wr1tingC&nter**, 4) then select Post Writing Center or visit our blog: <https://postwc.wordpress.com/>. Follow the Writing Center on Instagram for information and updates: @postwc

If you have any questions, please email Post-WC@liu.edu or contact the director, Mary Pigliacelli (Mary.Pigliacelli@liu.edu), 516-299-2732.

Post Psychological Services

The Center for Healthy Living offers supportive psychological and nutritional services Monday – Friday 9 a.m. to 5 p.m. and is located in Post Hall, Lower Level – South Entrance (parking lot side of building.) Additional information is available by emailing Post-HealthyLiving@liu.edu or calling (516) 299-3468.

Withdrawal Dates:

- The last day to withdraw without the instructor's permission is INSERT DATE.
- The last day to withdraw with the instructor's permission is INSERT DATE.

Weekly Course Outline

This schedule is subject to minor change. Please be sure to check your email regularly for announcements regarding any changes to the schedule.

All readings and assignments are due on the day they appear on the schedule.

Date	Reading/In-Class Activity	Assignment Due
<u>Week 1</u>	Course Introduction, Syllabus Discussion, Importance of Data in Business, Making Decisions with Data, Tools used for Data Analysis Data Analysis with Excel: Exploring, analyzing, visualizing data with excel. Basic excel functions (filtering, sorting, descriptive statics)	

<u>Week 2</u>	Time Series Analysis and Forecasting, Introduction to Time Series, Components of Time Series (Trends and Patterns), Time series Models (Moving Averages, Exponential Smoothing), Model Selection	Choose a dataset to build a simple time series model
<u>Week 3</u>	Spreadsheet Models: Introduction to Spreadsheet models, Importance of modeling, functions for modeling (ifs, sumifs, countifs, vlookups). Pivot tables and Pivot Charts)	In class demonstration/flash coding task
<u>Week 4</u>	Linear Optimization Models and Applications - Maximization and Minimization Problems	
<u>Week 5</u>	Decision Analysis – Problem formulation, Decision analysis with and without probabilities.	
<u>Week 6</u>	Data Analysis with Python Pandas Library Data Collection, Data Exploration, Insights, Descriptive statistics, missing values, renaming, combining data frames, summarizing data using group by.	In class programming/demonstration and flash coding assignment
<u>Week 7</u>	Data Visualization Using Pandas- Importance of Data Visualization/Story Telling, defining Key Performance Indicators (KPI's), barplots, histograms, pie charts, line charts	Coding Homework to choose a data frame and use pandas for data insights with visualization
<u>Week 9</u>	Evaluating Predictive Performance of the models, Metrics for evaluating model performance	
<u>Week 10</u>	Linear Regression, Multiple Linear Regression– model implementation in a business context, python scikit for linear regression	Choose a model and build a simple regression model using python
<u>Week 11</u>	Decision Trees, Classification and Regression Trees, Overfitting, Tree Pruning, Advantages/Limitations	Capstone Project 1
<u>Week 12</u>	Logistic Regression, Multinomial Logistic Regression. Regression and Classification explained, model implementation using python	
<u>Week 13</u>	Ensemble and Uplifting Modeling – Types and Applications	
<u>Week 14</u>	Association Rules and Collaborative Filtering, Model and Application in Building Recommendation Engines, Fraud Detection, Market Basket Analysis	Capstone Project 2

