

SYLLABUS

Quantitative Foundations for Data Analysis

ECN 5150

CRN: TBD

Credit Hours = 3

Instructor: Yu Peng Lin, Ph.D.

Office: Briggs 323

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**Class Time
& Location:** TBD

Office Hours:

Instructor is generally available during regular business hours. Students are encouraged to email the instructor with any questions or requests and he will respond promptly.

Prerequisites

None.

Required Texts

"Statistics for Business & Economics", 14th Edition, by Anderson D., Sweeney, D., Williams, T., Camm, J., and Cochran, J., Cengage Learning

Course Description

This course is designed to introduce students to data science and analytics with attention given to understanding how to apply critical reasoning to This course will provide a survey of fields related to data analytics and will expose students to data analytic techniques with emphasis given to the cultivation of skills in identifying and interpreting simple relationships in data to inform decision-making. In this course we will cover some key concepts in statistics and econometrics. Statistics is the science that is concerned with data collection and analysis and with the decision-making process regarding the importance of the results. Statistics, like any tool, requires that the user understand the appropriate use of that tool and to develop some skill in using it. We are all consumers of statistics and hence it is critical to be competent consumers of statistics. Econometrics is an extension of Statistics. It has been defined as "the application of mathematics and statistical methods to economic data" and described as the branch of economics "that aims to give empirical content to economic relations". An influential introductory economics textbook describes Econometrics as allowing economists "to sift through mountains of data to extract simple relationships."

Course Objectives

- ✓ This course is designed to offer students a starting point to understand deeper statistics and econometrics theories and applications. Through learning the key concept of this course, students are expected to understand and apply some key statistical and econometric tools, such as the data visualization, probability distributions, statistical inferences, ANOVA, simple and multivariate regression models, and data analytic modeling.

Specific Learning Outcomes

- ▷ 1. An understanding of data, statistics and the structure of Economic data.
- ▷ 2. Data visualization, random sampling and probability distributions.
- ▷ 3. Statistical hypotheses testing.
- ▷ 4. Experimental design and analysis of variance
- ▷ 5. An understanding of statistical inferences
- ▷ 6. Simple and Multivariate regression and OLS estimates.
- ▷ 7. An understanding of collinearity and spurious correlation and their implications on regression analysis.
- ▷ 8. Regression analysis and the various aspects of model building.

Course Requirements

- ✓ Online discussion: Each online discussion will be graded on a 100 scale and each accounts for 5% of the final course grade.
- ✓ Online assignments: The online assignments will be graded based on a 100 scale. Each assignment accounts for 10%.
- ✓ NOTE: the lowest graded assignment (but NOT online discussion) will be automatically dropped.
- ✓ The final assignment occupies 20% of the course grade and it is graded on a 100 scale.
- ✓ At the end of the semester, students will need to fill out an electronic course evaluation form. Once complete, please have the system send a notification email to the instructor as the proof of completion. The completion of the course evaluation worth 5%.

Course Grading Policy

Final Course Grade = [5 Online Discussion]*5% + [5 Online Assignments]*10% + Final Assignment*20%+ Course Evaluation*5%

The Final Assignment is comprehensive and worth 20% of the final grade in the course.

Online Section Participation Guidelines

There are two categories of online section – online discussions and online assignments (including the final assignment). Please read the following guidelines carefully.

- Online Discussions: every student is required to post an online discussion with at least 250 ~ 300 word counts on the assigned topic and respond to at least **one** of others' postings. The response is required to have at least 100 ~ 150 word counts. Please post your discussions as early as possible during the week to let others have time to respond.
- Online Assignments: Students are required to answer the assigned questions thoroughly with required graphs and discussions. The discussions are required to have **at least 250 ~ 300 word counts per assignment**.
- The deadline for both online discussions and assignments is at 4:00pm on the due day. To ensure every student be treated fairly, late submission is barely accepted.
- All online assignments, ***not*** online discussions, are required to be submitted in a **Word document**. **No** other formats are acceptable.
- Final assignment: The final assignment is **comprehensive** and serves as the final exam of this course. Students are required to complete the assignment with **at least 700 ~ 800 word counts**.
- Students are required to submit the assignments to **Knowledge/Blackboard**. Please **DO NOT** submit your work via email.
- Every submission will be graded within **7 working days** after the submission deadline. Once graded, the grade will be available in Knowledge/Blackboard and comments (if provided) will also be provided.
- The assignments are considered as individual work. Hence, students must **NOT** work on the assignments collaboratively. If violated, students will face University policy actions on Academic Dishonesty.

The assignments and online discussion alternate each week and comprises 75% of the final grade in the course.

Assessment Standards

Assessment Standard for Online Assignments:

Requirements	Excellent	Average	Below Average	Did not participate
Summary	Students submitted an original posting with at least 300 word counts. 30 ~ 40 points	Students submitted an original posting with word counts of 250 ~ 300. 20 ~ 30 points	Students submitted an original posting with word counts of 200 ~ 250. 10 ~ 20 points	Students submitted an original posting word counts below 200. 0 ~ 10 point
Quality of summary	Students submitted original posting containing clear and very understandable information. 50 ~ 60 points	Students submitted original posting containing average clear and understandable information. 40 ~ 50 points	Students submitted original posting containing barely clear and understandable information. 30 ~ 40 points	Students submitted original posting containing unclear and confusing information. 0 ~ 30 point
Earned points/Category	points _____	points _____	points _____	points _____
Total points	Total _____			

Assessment Standards

Assessment Standard for Final Assignment:

Requirements	Excellent	Average	Below Average	Did not participate
Summary	Students submitted an original summary with at least 800 word counts. 30 ~ 40 points	Students submitted an original summary with word counts of 700 ~ 800. 20 ~ 30 points	Students submitted an original summary with word counts of 600 ~ 700. 10 ~ 20 points	Students submitted an original summary word counts below 600. 0 ~ 10 point
Quality of summary	Students submitted original summary containing clear and very understandable summary of the chapter/article. 50 ~ 60 points	Students submitted original summary containing average clear and understandable summary of the chapter/article. 40 ~ 50 points	Students submitted original summary containing barely clear and understandable summary of the chapter/article. 30 ~ 40 points	Students submitted original summary containing unclear and confusing summary of the chapter/article. 0 ~ 30 point
Earned points/Category	points _____	points _____	points _____	points _____
Total points	Total _____			

Grading Schema and Miscellany

A	93 100
A-	90 92
B+	87 89
B	83 86
B-	80 82
C+	77 79
C	73 76
C-	70 72
D+	66 69
D	60 65
F	59 or lower

Course Evaluations:

Student course evaluations are a highly valued in the College of Liberal Arts and Education. Feedback from students serves as an important source of information that enables instructors to improve upon the quality of the course in terms of its content and delivery. Students are required to complete the online course evaluations for this course and all courses for which they are formally registered. The online evaluation form for this course will be made available during the week preceding final examinations each term. Students who are enrolled in the course will receive an email from the university near the end of the term that provides instructions on how to complete the evaluation.

Please complete the evaluation and email the instructor with evidence of having done. The completion of the evaluation worth 5% of the final grade of the course.

Notifications of Important Messages:

Any important messages regarding any aspect of the course will be communicated to students via Blackboard and/or Detroit Mercy email addresses. Please check your email and the course site often!

Subject-to-Change Statement:

The instructor reserves the right to change or modify any aspect of the course or class schedule at any time. Students will be notified of any changes by the instructor.

Questions, Complaints or Concerns about the Course:

If you have any questions, complains or concerns about the course, then please let the instructor know via email. If you are not satisfied with the instructor's response, then you are encouraged to contact the Associate Dean of the College of Liberal Arts & Education. Her name is Dr. Victoria Mantzopoulos. Her phone number is 313-993-3254 and her email address is armstrov@udmercy.edu. You are also welcome to contact the Dean of the College of Liberal Arts & Education. His name is Dean Mark Denham. His phone number is 313-993-3250 and his email address is denhamma@udmercy.edu

University of Detroit Mercy Policies Related to Student Behavior

Students at Detroit Mercy are expected to behave in accordance with all university and college policies and practices. A complete list of all policies can be found in the Detroit Mercy Student Handbook.

A specific policy with which all students are required to comply relates to academic dishonesty. Students are expected to demonstrate the highest levels of honesty with respect to their work. Cheating (on homework, quizzes, tests, examinations) and plagiarism (i.e., representing the work of another person as one's own) are unacceptable behaviors and will not be tolerated. If the instructor determines that a student has cheated on an examination or plagiarized the work of another person on an assignment, then the instructor will automatically assign a failing grade on that examination or assignment (i.e., the examination or assignment will be given a numerical grade of 0). In addition, the instructor will bring the behavior to the attention of university officials (e.g., Dean or Associate Dean) to determine if additional sanctions are warranted. Such sanctions could include the assignment of a failing grade for the course and even dismissal from the university.

Title IX:

University of Detroit Mercy is committed to fostering a safe and productive learning environment for all students. Detroit Mercy's Policy Prohibiting Sex and Gender-based Discrimination applies to sex and gender-based harassment, sexual exploitation, sexual assault, attempted sexual assault, intimate partner violence/dating violence, stalking, cyberstalking, and retaliation.

Concerns or complaints regarding potential sex and gender-based harassment, sexual exploitation, sexual assault or attempted sexual assault, intimate partner violence/dating violence, stalking, and retaliation may be conveyed or reported to Marjorie Lang, Title IX Coordinator, by contacting her at langma@udmercy.edu or 313-993-1802. Ms. Lang's office is located on the 5th floor of the Fisher Administration Center on the McNichols campus. You may view the University's Policy Prohibiting Sex and Gender-based Discrimination at <http://www.udmercy.edu/academics/academic-affairs/titleix/>.

Academic Support Services:

Detroit Mercy has a range of resources available to facilitate student academic success. These include Library and Media services, Academic Learning/Writing Center, and Computing Services, among others. Students are encouraged to consult with the instructor and/or their University Student Handbook, to learn how to access these services.

Note. Free tutoring services for statistics are available at the Student Success Center for students who feel they need it. The Student Success Center (aka Learning Center) is located on the third floor of the Detroit Mercy McNichols Library.

Disability Support Services and Accommodations:

If you need an accommodation because of a disability, have emergency medical information to share, or if you need special arrangements in case the building must be evacuated, please contact:

Laura Bagdady, Assistant Director, Student Disability & Accessibility Support Services
Student Success Center, McNichols Campus Library, Room 319
Email: bagdadlm@udmercy.edu
Phone: 313-993-1158

It is very important for students to be proactive with regard to requesting their disability accommodations every semester. While it is never required that you disclose your disability to your professors, all students at the university are encouraged to talk to their professors to discuss their needs and concerns. However, you must be registered with Disability Support Services, and your faculty must receive official notification from the DSS office before they can make arrangements for your accommodations.

Religious Observances:

It is the policy of the University of Detroit Mercy to respect the faith and religious obligations of each student. Students with exams and classes that conflict with their religious observances should notify the instructor at the beginning of the semester in order to work out a mutually agreeable alternative. Please note that, regardless of whether an absence is "excused" or "unexcused," the student is responsible for all missed course content and activities.

University of Detroit Mercy Policy on Plagiarism and Academic Integrity

As members of an academic community engaged in the pursuit of truth and with a special concern for values, students are expected to conform to a high standard of honesty and integrity in their academic work. The fundamental assumption under which the University operates is that work submitted by a student is a product of his/her own efforts.

Among the most serious academic offenses is plagiarism, submitting the style of another author or source without acknowledgment or formal documentation. Plagiarism occurs when specific phrases or entire passages, whether a sentence, paragraph or longer excerpt, are incorporated into one's own writing without quotation marks or documentation. One also plagiarizes by paraphrasing the work of another, that is, retaining another writer's ideas and structure without documentation.

Students are advised always to set off another writer's exact words by quotation marks, with appropriate references. Students avoid plagiarism by concentrating on their own words and ideas and by fully crediting others' words and ideas when they find their way into the writing. Whenever in doubt, cite the source.

Students that purchase essays from other students or agencies or who copy from one another or from prohibited sources, commit the most serious type of academic dishonesty. The consequences of plagiarism, or any act of academic dishonesty, may range from failure on an assignment or in a course to dismissal from the University.

Forms of academic dishonesty

- 1) Cheating: deception in which a student misrepresents that he/she has mastered information on an academic exercise that he/she has not mastered; giving or receiving aid unauthorized by the instructor on assignments or examinations.
- 2) Academic misconduct: tampering with grades or taking part in obtaining or distributing any part of a scheduled test.
- 3) Fabrication: use of invented information or falsified research.
- 4) Plagiarism: unacknowledged quotation and/or paraphrase of someone else's words, ideas, or data as one's own in work submitted for credit. Failure to identify information or essays from the Internet and submitting them as one's own work also constitutes plagiarism.
- 5) Please be aware that the University subscribes to the Turnitin plagiarism detection service. Your paper may be submitted to this service at the discretion of the instructor.

Tentative Course Schedule

<u>Week/Day</u>	<u>Topic</u>	<u>Book Chapters</u>	<u>Assignments</u>	<u>Due Day</u>
1/	Introduction – Data and Statistics	Ch.1	Assignment Tryout	
2/	Descriptive Statistics, Data Visualization	Ch.2-Ch.3	Assignment (a)	
3/	Probability	Ch.4	Online Discussion (b)	
4/	Discrete Probability Distribution	Ch.5	Assignment (c)	
5/	Continuous Probability Distribution	Ch.6	Online Discussion (d)	
6/	Sampling Distribution	Ch.7	Assignment (e)	
7/	Interval Estimation and Hypothesis Tests	Ch.8-Ch.9	Online Discussion (f)	
8/	Two populations inference	Ch.10	No Assignment	
9/	Two populations inference	Ch.10	Assignment (g)	
10/	Experimental Design and ANOVA	Ch.13	Online Discussion (h)	
11/	Simple Linear Regression	Ch.14	Assignment (i)	
12/	Multiple Regression	Ch.15	Online Discussion (j)	
13/	Multiple Regression	Ch.15	Assignment (k)	
14/	Regression Analysis: Model Building	Ch.16	No Assignment	
15/	Regression Analysis: Model Building	Ch.16	Final Assignment available in Blackboard	