

Regression Analysis for Business

Sections: 001, 002, 003

Instructor:	Dr. Darin T Kapanjie
Office:	327 ARB (Academic Research Building)
Class Hours:	Monday/Wednesday: 001 ~ 8:30 AM – 10:00 AM; 002 ~ 10:15 AM – 11:45 AM; 003 ~ 1:45 PM – 3:15 PM
Classroom:	F85 JMHH (Jon M. Huntsman Hall)
Office Hours:	Monday/Wednesday 3:30 PM – 4:30 PM or by appointment
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Course Overview: This course provides the fundamental methods of statistical analysis, the art and science of extracting information from data. The course will begin with a focus on the basic elements of exploratory data analysis, probability theory and statistical inference. With this as a foundation, it will proceed to explore the use of the key statistical methodology known as regression analysis for solving business problems, such as the prediction of future sales and the response of the market to price changes. The use of regression diagnostics and various graphical displays supplement the basic numerical summaries and provides insight into the validity of the models. Specific important topics covered include least squares estimation, residuals and outliers, tests and confidence intervals, correlation and autocorrelation, collinearity, and randomization. The presentation relies upon computer software for most of the needed calculations, and the resulting style focuses on construction of models, interpretation of results, and critical evaluation of assumptions.

Textbook: *The Manager's Guide to Statistics* 2020 Edition by Erol A. Pekoz (Required)
Statistics for Business: Decision Making and Analysis 3rd Edition by Stine and Foster (Optional)

JMP/Excel: JMP and Excel will be used throughout this course. You will be asked to bring your laptop to class to participate in classroom activities. (No calculator is required for this course; JMP/Excel will be used as your "calculator").

Course Site: canvas.upenn.edu

Final Grade: will be based on the weighted average of

Classwork	10%
Homework	20%
Quizzes	15%
Exams (two)	45%
Final Project	10%

Classwork (10%): Classwork will be assigned during each live class. The assignments will vary between group and individual work. Groups will be random and assigned during each class, you will work with different peers throughout the semester. It is each student's responsibility to submit classwork assignments through Canvas before the due date/time. The lowest three (3) classwork scores will be dropped (they are grayed out in your Canvas gradebook and Canvas will dynamically drop the lowest three after each grade is uploaded). These drops are for any reason whatsoever, there are no excused or unexcused absence regarding classwork. You are either in-class where you can submit an assignment for credit, or you are not in-class and receive a zero for that day's assignment. The drops are designed for any missed class, any technical issues, any "I forgot to submit" issues, any "my dog ate my internet" issues, any reason whatsoever.

Assignments are graded for correctness.

Homework (20%): Homework assignments will be dispersed each week. Most homework assignments will be due at 11:59 p.m. on the Sunday after it was assigned (see course schedule). These assignments will be a mix of individual and team assignments. The homework must reflect the work you (individual assignments) or your learning team (team assignments). You are strictly forbidden from discussing the homework's with anyone (individual assignments), or anyone outside your learning team (team assignments).

Quizzes (15%): There will be five (5) brief in-class quizzes throughout the semester, see course schedule. There will be no make-up opportunities for missed quizzes. Your lowest quiz score will be dropped (it will be grayed out in your Canvas gradebook and Canvas will dynamically drop the lowest quiz score after each grade is uploaded).

Exams (45%): There will be two major exams in this course. Each exam will be administered in class (see course schedule). There will be multiple versions of each exam. If you miss an exam, you will receive a zero. Please be sure to use the restroom or take care of any personal needs before the exam. No students will be allowed to leave the exam room until their exam is completed and submitted.

Final Project (10%): The final project will be comprised of a multiple regression model, analysis, and predictions on a live data set.

Grading Scale:	100 – 93 A	92 – 90 A–
89 – 87 B+	86 – 83 B	82 – 80 B–
79 – 77 C+	76 – 73 C	72 – 70 C–
69 – 67 D+	66 – 63 D	62 – 60 D–
	59 – 0 F	

All final course grades will be rounded to the nearest whole number (i.e. 69.5 rounds to 70, but a 69.49 rounds to 69).

Code of Academic Integrity: Academic Dishonesty is a serious offense and will not be tolerated. Activities that have the effect or intention of interfering with education, pursuit of knowledge, or fair evaluation of a student's performance are strictly prohibited. Any student caught breaking the Code of Academic Integrity will be subject to University disciplinary action. See [Pennbook](#) for details. *Leges Sine Moribus Vanæ*. If you know of someone committing a violation and do nothing, that is just as serious as committing the violation.

Late Assignment Policy: No late assignments will be accepted.

Extra Credit Policy: No extra credit opportunities will be provided.

Attendance: Attendance is considered mandatory. It is important for you to attend all live classes and be on time. There's no such thing as an excused or unexcused absence, only present or absent. If you are not in class, then you will not have the opportunity to submit the daily classwork activities (see above) and receive a zero for that day's assignments. If you miss a quiz or exam, you will receive a zero.

Classroom Expectations: Classes will begin on-time and never run late. Please be prepared to begin class on-time. Late entry will not be tolerated. Please have your name tent displayed during class at all times.

Disability Statement:

The University of Pennsylvania provides reasonable accommodations to students with disabilities who have self-identified and received approval from the Office of Student Disabilities Services (SDS). If SDS has approved your request for accommodations, please make an appointment to meet with me as soon as possible to discuss the arrangements for your accommodations.

If you have not yet contacted Student Disabilities Services, and would like to request accommodations or have questions, you can make an appointment by calling 215.573.9235.

The office is in the Weingarten Learning Resources Center at Stouffer Commons, 3702 Spruce Street, Suite 300.

Please visit the SDS website at <https://weingartencenter.universitylife.upenn.edu/disability-services/> for more information. SDS services are free and confidential.

Course Schedule

**Subject to Change – please refer to our Canvas course for updates*

Week	Activities/Topics/Assignments	Date
Week 1	Attend Class: Course & Technology Overview; What is Statistics? Who is Regression? Won't Be Fooled Again	Monday, 8/28
	Submit Classwork	
	Download and Install: JMP	
	Attend Class: Numerical Measures of Center and Spread; Summarizing & Displaying Data (Data Viz I)	Wednesday, 8/30
	Submit Classwork	
Week 2	Labor Day: No Class	Monday, 9/4
	Submit Homework: Ch 1 & Ch 2	Tuesday, 9/5
	Attend Class: Normal Distribution; Empirical Rule	Wednesday, 9/6
	Submit Classwork	
	Submit Homework: Ch 3 & Empirical Rule	Sunday, 9/10

Week 3	Attend Class: Data Viz II	Monday, 9/11
	Submit Classwork	
	In-class Quiz I	
	Attend Class: Correlation I	Wednesday, 9/13
	Submit Classwork	
	Submit Homework: Correlation	Sunday, 9/17
Week 4	Attend Class: Correlation II	Monday, 9/18
	Submit Classwork	
	Attend Class: Simple Linear Regression?; Residuals	Wednesday, 9/20
	Submit Classwork	
	In-class Quiz II	
	Submit Homework: Correlation & Linear Regression	Sunday, 9/24
Week 5	*Watch Recording: A Picture is Worth a Thousand Words; The Graph Builder in JMP*	*Monday, 9/25*
	Submit Asynchronous Classwork	
	Attend Class: Non-Linear Models	Wednesday, 9/27
	Submit Classwork	
	Submit Homework: JMP & Non-Linear Models	Sunday, 10/1

Week 6	Attend Class: Multiple Regression Model (MRM)	Monday, 10/2
	Submit Classwork	
	Attend Class: Categorical Variables in MRM, Interactions	Wednesday, 10/4
	Submit Classwork	
	Submit Homework: Multiple Regression	Sunday, 10/8
Week 7	ATTEND CLASS: Exam I	Monday, 10/9
	MBA Core Exams – NO CLASS	Wednesday, 10/11
Week 8	MBA Opportunity Week – NO CLASS	9/16 – 9/20
Week 9	Attend Class: Categorical Variables in MRM; Collinearity	Monday, 10/23
	Submit Classwork	
	Attend Class: Probability	Wednesday, 10/25
	Submit Classwork	
	Submit Homework: Probability	Sunday, 10/29
Week 10	Attend Class: Conditional Probability; Bayes Rule	Monday, 10/30
	Submit Classwork	
	Attend Class: Random Variables; Expected Value & SD	Wednesday, 11/1
	Submit Classwork	
		In-class Quiz III
	Submit Homework: Conditional Probability & Expected Value	Sunday, 11/5

Week 11	Attend Class: Sampling Variation; Law of Averages	Monday, 11/6
	Submit Classwork	
	Attend Class: Central Limit Theorem; Confidence Intervals	Wednesday, 11/8
	Submit Classwork	
	Submit Homework: Sampling Variation & Confidence Intervals	Sunday, 11/12
Week 12	Attend Class: Hypothesis Testing: One Sample	Monday, 11/13
	Submit Classwork	
	Attend Class: Hypothesis Testing: Two Sample Design; A/B Testing	Wednesday, 11/15
	Submit Classwork	
	In-class Quiz IV	
	Submit Homework: Hypothesis Testing	Sunday, 11/19
Week 13	Attend Class: CI in Single Variable Regression, p -value	Monday, 11/20
	Submit Classwork	
		Thanksgiving Break – NO CLASS
Week 14	Attend Class: CI in Multiple Regression Model; Diagnostics	Monday, 11/27
	Submit Classwork	
	Attend Class: Building a Regression Model; Stepwise; Data Mining	Wednesday, 11/29
	Submit Classwork	
	In-class Quiz V (optional)	
	Submit Homework: MRM	Sunday, 12/3
Week 15	ATTEND CLASS: Exam II	Monday, 12/4
Final Exam	TAKE HOME FINAL PROJECT	Sunday, 12/17