E370 - Statistical Analysis For Business and Economics

Indiana University, Department of Economics

Spring 2025, Syllabus

Section 7170

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Class Time:	TTh 9:35 – 10:50 AM
Class Location:	Biology Building (JH) A106
Office Hours (in-person):	TTh 11:00 AM – 11:45 PM, and by appointment

General Information

Course Description: The overall goal of this course is to introduce you to the discipline of statistics as a science of understanding and analyzing economic data and not as a branch of mathematics. The class is designed to *provide you with the tools* needed to answer real-world questions and better understand the process of statistical inference in economics.

We will start from graphical, tabular, and numerical summaries of different types of data and will take us through the topics of probability theory, population and sampling distributions, hypothesis testing, and regression analysis.

Course Objectives: At the completion of the course, you are expected to be able to:

- Translate between plain English and statistical terms and concepts before applying statistical tools. In other words, you are expected to be able to identify key information in the description of the economic problem and write down this information in statistical language/notation;
- Select a suitable statistical approach to analyze a new situation;
- Represent data using tables and graphs, and summarize data using a variety of numerical measures;
- Understand (and implement) the process of statistical inference;
- Understand (and perform) basic model building using regression tools;
- Understand the role of underlying assumptions in statistical analyses;
- Use Excel to produce graphs and calculate numerical measures in relation to your analysis. Proficiently read outputs produced by Excel add-ins;
- Interpret quantitative results of statistical analyses for the audience in plain English.

Prerequisites: MATH-M 118 (or equivalent) is required.

Textbook

Recommended Textbook: Robert A. Donnelly. *Business Statistics*, Pearson. 3rd Edition, 2019 (ISBN-13: 978-0134685267).

You have access to the eText as a part of this course. Your copy is available on Canvas page and you can access it through the link *"IU eTexts (Unizin Engage)"* on the left-sidebar. For more information and the Engage e-reader tutorial, please review "The Student Guide to IU eTexts"[1].

You may purchase a print version of the textbook. The 2nd edition of the textbook is also available for purchase. Textbook material of the 2nd and 3rd editions are very similar. So, either edition will suit to study theoretical concepts of our class. However, examples and practice problems may differ between editions.

Technology and Software

Students are expected to have access to Canvas on a regular basis to keep abreast of course evolution as some important announcements and all assignments will be posted on Canvas. Additionally, students are expected to have access to *MS Excel* outside the class to be able to perform calculations in their assignments.

Excel: To perform cumbersome calculations, our class will utilize *MS Excel* (Office 2011 or later is recommended). Excel can be accessed for free through IUB Citrix Cloud (`https://uits.iu.edu/iuanyware`). Alternatively, you can download Microsoft Office through IUB at `https://iuware.iu.edu/`, which includes Excel for your platform.

Computers and Other Devices: I will use Excel during the class to demonstrate some calculations and Excel features. Lecture slides on Canvas (*Files* link, folder *Slides*) include information relevant to these discussions (screenshots, Excel function descriptions, etc.). Additionally, Excel files with solutions to all the exercises from the slides will be posted on Canvas (*Files* link, folder *Solutions to Excel Problems* (*Slides*)).

You are not required to perform Excel calculations during the lecture, so bringing a laptop to class is not mandatory. However, I strongly encourage you to bring your laptop and follow along with the Excel demonstrations. During the class, we will work on Excel assignments that you will need to submit for a grade. While you will have resources to complete these assignments outside of class, working on them during the lecture will help you practice in real-time, save time, make it easier to understand the material and get prompt feedback.

Note: No electronic devices are allowed during the exams except calculators.

Canvas: The course will use Canvas for posting class announcements, HWs, quizzes, grades, exam information, and any additional material. I will send messages through Canvas often, so please make sure to **read these messages carefully and check Canvas regularly**.

[1] `https://expand.iu.edu/browse/etexts/courses/the-student-guide-to-iu-etexts`

Course Assignments

Our course includes several types of assignments:

- Excel assignments. These assignments ask you to submit Excel files with your work for each chapter and are graded based *on completion*, meaning that the primary criterion for receiving a grade is that you complete all the assigned exercises.
    - I will demonstrate how to solve some or all of the exercises from the Excel assignments during class. Following along in real-time is a great way to save time, as I will be working through the exercises from your assignment. In most cases, I will complete the assignments in class, and you will only need to save your work and submit it on Canvas.
    - Excel files with suggested solutions will be posted on Canvas shortly after the deadline (folder *Solutions to Excel Problems (Slides)* under the *Files* link).
- Homeworks. Homework assignments will be graded *on accuracy*. These assignments are designed to prepare you for exams and may include various types of questions, including those that require short answers and detailed explanations. You might need to analyze problems analytically, graphically, or numerically using Excel. Suggested solutions for the HWs will be posted on Canvas shortly after the deadline.
- Exams. Exams are a culmination of your work on a particular topic (-s). Obviously, exams are graded *on accuracy*.

Collaboration: Discussing assignments with peers is permissible, encouraged, and can be highly beneficial. However, the answers you submit for grading must represent your own work. Note that **offering** or **accepting** Excel files with solutions or answers to assignment questions on Canvas from others (including classmates, former students, or any other people) constitutes academic misconduct and **all involved parties will be penalized** following IU Code of Student Rights, Responsibilities, & Conduct[2]. Please submit your own work!

NO COLLABORATION IS ALLOWED DURING EXAMS!!!

Course Grade

Your course grade will be based on:

- Final Exam (comprehensive, multiple choice, 31% of the grade);
- Two midterm exams (multiple choice, 21% of the grade for each exam, which is 42% of the grade in total);
- Nine homework assignments (2% of the grade for each one, which is 18% of the grade in total);
- Nine Excel assignments (1% of the grade for each one, which is 9% of the grade in total).

Missed assignments are counted as zero points towards your final grade.

Grade Scale: The final letter grade for the course will be based on the following scale:

[2]According to this policy, submitting Excel files previously posted by any E370/S370 instructors or created and used by former E370/S370 students is an academic misconduct and will be treated accordingly.

Grade	% Range	Grade	% Range
A+	(95% - 100%)	C+	(65% - 70%)
A	(88% - 95%)	C	(60% - 65%)
A-	(84% - 88%)	C-	(55% - 60%)
B+	(80% - 84%)	D+	(50% - 55%)
B	(75% - 80%)	D	(45% - 50%)
B-	(70% - 75%)	D-	(40% - 45%)
		F	(Below 40%)

I reserve a right to make *advantageous* adjustments to this scale in student's favor (curve). Such adjustments will NOT be applied on an individual basis and will only be applied to all students in the class if necessary. However, you should not rely on a possibility of such adjustments when forming your expectations about the grade because curving is neither guaranteed nor is a regular practice in this course.

Scores on the border of the letter grade are decided in student's favor towards a higher letter grade. Please, note that this rule applies only if your total points are **exactly** on the border of the letter grade.

Timing of the Assignments and Late Submissions

Timing: There is no time limit set on any assignments posted on Canvas in this class. This means that you do NOT need to complete HWs, quizzes, etc. in one sitting. For example, you can start working on a HW and leave it without submitting. Canvas will save your answers. Next time when you open your HW, you will see previously entered answers and will be able to continue working on the HW.

Late Submissions: HWs and Excel Assignments will be accepted late with a penalty. Assignments submitted after the deadline will receive a 15% of total points deduction (i.e., 3 points for HWs and 1.5 points for Excel Assignments) for each 24-hour period. After 48 hours, HWs and Excel Assignments will not be accepted.

Exam Dates

Exam dates are tentatively set in the syllabus and are subject to change in the extreme circumstances:

Exam 1	February, 20 (Th)	/ Week 6 of classes
Exam 2	April, 10 (Th)	/ Week 13 of classes
Final Exam	**May 7 (W), 10:20AM – 12:20PM**	/ Finals week

Topics covered in midterms will be specified prior to each exam. Midterms are NOT cumulative and cover only the part of the course that was not tested in the previous midterm (-s). The Final Exam is cumulative and covers all topics discussed in the class.

Please, notice that the final exam for our class is Department-wide. The time for the Departmental final exams is determined by the IU Office of the Registrar and is outside of my control. Therefore, no alternative schedule for the final exam will be offered (please, plan your travel carefully accounting for the schedule of your E370 final exam!).

Makeups: Students are expected to attend class and participate in all graded activities, including midterm and final examinations. Missing an assignment or exam earns zero points.

A student who is anticipating being absent from exam or not being able to submit their graded assignments before the deadline due to official religious holidays for which the work is not allowed or university-approved activities should provide a written notice to the instructor ahead of time (more information is provided in the section on class rule and policies below). Provided that the instructor was notified on time, students who miss their exam due to these reasons will be granted accommodations in the form of a makeup exam. The instructor will also determine if other graded assignments can be rescheduled or an equivalent work can be done as a makeup, as determined by the instructor.

If you have a hardship or other significant circumstances (including medical conditions) requiring long-term absences from classes and assignments, or have a death in your immediate family, please contact the Dean of Students Office to request an absence notification memo. The Office will verify documentation related to your absence and contact your instructors, including me, requesting to develop accommodations for these circumstances.

I reserve the right to determine the time and location for makeup exams based on proctor and classroom availability. While the topical coverage of the makeup exams is guaranteed to be the same as the original exams, makeup exams are not guaranteed to preserve the same format. Makeup exams might include short-answer and open-ended questions, whereas the original exams consist solely of multiple-choice questions. The extent of short-answer and open-ended questions on a makeup exam can range from 0% to 100% and may vary between exams.

It is imperative that your schedule permits you to take the final exam. No alternative schedule will be considered for the Final Exam in this class!!! Students who fail to attend the final exam because of catastrophic occurrence, which is beyond the student's control and necessitates their absence, and who have a passing grade up to that point should contact me as soon as possible.

Please bring your Indiana University ID to each exam!

Important Dates

Course Deadlines: You are responsible for changing your status in the course (drop or withdraw) within school established time period. I will not be able to drop the course for you if you miss the deadline. Some important deadlines are listed below and additional information is available at `https://calendars.registrar.indiana.edu/official-calendar/`.

Add/Drop Deadline (no W grade)	Jan 19, 2025
Course Withdrawal Deadline (automatic W)	Mar 16, 2025
Complete Session Withdrawal Deadline	May 3, 2025

Other Important Dates:

Spring Break	March 16 – March 23, 2025 (no classes)

Tentative Course Schedule[3]

Week	Topic	Assignments
Week 1	Course Introduction. Ch 1. Statistics and Data.	
Week 2	Ch 2. Displaying Descriptive Statistics.	Excel Assgnmt (Ch 2) HW1
Week 3	Ch 3. Calculating Descriptive Statistics.	Excel Assgnmt (Ch 3) HW2
Week 4	Finish Ch 3. Calculating Descriptive Statistics. Ch 4. Introduction to Probability. Ch 5. Discrete Probability Distributions (Binomial Distribution).	Excel Assgnmt (Ch 5) HW3
Week 5	Ch 6. Continuous Probability Distributions (Normal Distribution).	Excel Assgnmt (Ch 6) HW4
Week 6	Finish Ch 6. Continuous Probability Distributions (Normal Distribution). Exam 1.	
Week 7	Ch 7. Sampling and Sampling Distributions.	
Week 8	Ch 7. Sampling and Sampling Distributions. Start Ch 8. Interval Estimation.	Excel Assgnmt (Ch 7) HW5
Week 9	Ch 8. Interval Estimation.	Excel Assgnmt (Ch 8) HW6
Week 10	Spring Break	
Week 11	Ch 9. Hypothesis Testing, Single Parameter (Mean).	Excel Assgnmt (Ch 9, P1) HW7
Week 12	Ch 9. Hypothesis Testing, Single Parameter (Mean, Proportion).	Excel Assgnmt (Ch 9, P2) HW8
Week 13	Finish Ch 9. Hypothesis Testing, Single Parameter. Exam 2.	
Week 14	Ch 14. Simple Linear Regression.	
Week 15	Ch 14. Simple Linear Regression.	
Week 16	Ch 14. Simple Linear Regression. (If time permits) Ch 15. Multiple Regression.	Excel Assgnmt (Ch 14) HW9

[3]Schedule may be adjusted depending on our progress in class (changes will be announced in class and on Canvas).

Some Policies and Class Rules

Emails: All course-related emails need to be sent using your IU email or Canvas. Failing to use these tools for email communication might send your email to the spam folder.

While you are welcome to email me with questions about the material, some things are better discussed in person. For emails that require a lengthy explanation of the material, please consider attending office hours.

Responding to Emails:

- You should not expect an immediate response when you send me a message. Generally, 24-72 hours is considered a reasonable amount of time to receive a reply from me, but I do not typically respond to email after 5:00 PM or on weekends.
- Typically, the volume of emails increases substantially when a deadline or an exam is approaching. So, you should expect a slower response during these times.
- I reserve a right not to respond or reply with a short "Please, check the Canvas page" to the emails asking me to reiterate information from an announcement on Canvas.

Copyright: The instructor of the course holds the exclusive right to distribute, modify, post, reproduce, and link to course materials, including all notes, videos, lecture slides, assignments, Excel files with solutions, and exams. You cannot distribute, post, or alter this material. You are encouraged to take notes and make copies of course materials for your own educational use. But you may not, nor may you knowingly allow others, to re-post in other forums, distribute, or reproduce content from this course without the express written permission of the instructor (this also includes providing materials to commercial course material suppliers such as CourseHero and other similar services).

Any violation of this course rule will be reported to the appropriate university offices, including the Dean of Students, as academic misconduct.

Final Exam Policies: You can find IU Final Exam policies at `https://registrar.indiana.edu/grades/class-rosters/final-examinations.html` and should appeal to them if you 1) have more than three final exams in one day, 2) have final exams conflicts, 3) missed the final exam.

Accessible Educational Services: Accommodations will be made for students registered with Accessible Educational Services (AES) office. If you need an accommodation, then it is your responsibility to register with AES and contact me outside of class to present the written supporting memorandum of accommodation. Note that requests for AES accommodations must be received and authorized by your instructor no less than two weeks in advance of need, in order to allow adequate time to review and make appropriate arrangements. No accommodations should be assumed until authorized by your instructor. Additional information can be found at `https://studentlife.indiana.edu/student-support/iub-aes/register-for-services.html`.

Religious Accommodations: Accommodations will be made for students who want to observe their religious holidays provided that the student notifies the instructor no later than two weeks prior to the anticipated absence. Students needing accommodations for a religious observance must submit a request using officially approved form located here: `https://`

vpfaa.indiana.edu/faculty-resources/teaching-resources/religious-observances-information.html.

University-Approved Activities: Accommodations will be made for students who miss the schoolwork because of university-approved activities. If you are participating in a university-approved activity (https://studentaffairs.indiana.edu/student-support/dean-of-students/attendance.html), please let me know as early in the course as possible so that accommodations can be made (beginning of the semester or at least two weeks in advance of the absence).

Academic Integrity and Ethical Behavior: In addition to skills and knowledge, IU aims to teach you appropriate ethical and professional standards of conduct and inform you of obligations in upholding the highest standards of professional and ethical integrity. You will find an extensive information on these matters in IU Code of Student Rights, Responsibilities, and Conduct (http://studentcode.iu.edu/).

In line with these policies, dishonesty of any kind will not be tolerated in this course. Dishonesty includes, but is not limited to, cheating, plagiarizing, fabricating information, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with academic work of other students. Whenever in doubt, ask me about appropriateness of your actions. Students who are found dishonest will receive the most severe academic sanction consistent with IU polices.

Some Q&A's

Do I need to remember all formulas for the exams? No! You will be provided with the formula sheet including the most important formulas covered in the course up to the exam date. Sample formula sheets are already posted on Canvas (*Files* link, folder *Exams*). Adjustments are possible depending on the class progress towards the exam date.

How am I going to do complicated calculations that require Excel in the exam? Exam questions are designed to avoid complex and time-consuming calculations including those for which Excel is required. It is achieved through several channels. First, the numbers are selected such that calculations are easy to do on a calculator. Second, questions limit complexity of calculations by reducing the amount of data in the problem. Third, questions formulate a problem with "ready-to-use" numbers calculated in Excel (so that no additional Excel calculations are necessary) and ask you to focus on interpretation. Therefore, you should not worry about Excel calculations aspect of the exams.

Do I need to bring a calculator to the exam? Yes, it is recommended that you have a calculator during the exam. Majority of calculations in the exams can be done "by hand". But some of them might be time-consuming to perform manually. To save time (and avoid stress related to the calculation part), it is recommended that you have a calculator.