

FORDHAM UNIVERSITY

DEPARTMENT ECONOMICS

Instructor: Dr. John Loase

ECON 2142 STATISTICAL DECISION MAKING

Dr. Ben Fusaro, founder of the International Contest of Mathematical Modeling and the Environmental Mathematics discipline, asked John Loase "What is the most important college course"? I quickly answered. "STATISTICS". Ben agreed. This course will enable students to further their facility with hypothesis testing, confidence intervals, advanced tools such as ANOVA, multiple and single variable regression, Chi-Square analysis, and research projects of students' interests.

4 Credits

SEQUENCE OF COURSE CONTENT

REVIEW

Chapter 3

3.1 /3.2 Measures of Central Tendency- pp. 58-63, HW 3.3 3.4, 3.9

3.3 Measures of Dispersion-pp.67-74, HW 3.19, 3.20, 3.21

7.3 Normal Distribution/ Area under Z curve pp. 208-210, HW 7.9, 7.11,7.15,7.33

9.1/9.2 Point Estimates pp.271-273 ,HW 9.4,9.7

9.3/9.4 Confidence Interval Estimates of Mean, standard deviation known- HW 9.15, 9.19,9.20 Problem- We know the population standard deviation.

We will only use $n \geq 30$ for section 9.4. Assumptions of normality are very cumbersome to statistically test. We will see a Chi-square test of normality in Chapter 13.

9.5 Confidence Intervals for mean, standard deviation unknown-pp.281-286,HW 9.24,9.25,9.31,9.35,9.37

9.6 Confidence intervals for population proportions -pp.288-289,HW 9.43,9.47,9.50,9.51

9.7 Sample Size Mean-pp.293-296, HW 9.60,9.61,9.63,9.67

9.8 Finite Population Correction Read pp 298-301.

10.1 Hypothesis Testing pp. 312-314, HW 10.1,10.5, 10.7, 10.13
10.2 Basics Hypothesis Testing-pp. 317-318, HW 10.15, 10.17, 10.18
10.3 Testing Mean with population standard deviation known/ p value -
pp.320-325, HW 10.27, 10.29, 10.31 We consider $n \geq 30$ for homework.
10.4 Confidence Intervals and Hypothesis Testing Read p. 329
10.5 Testing Mean ,population standard deviation unknown. We will assume
population normally distributed enabling a t test for $n < 30$. pp. 330-334,
HW 10.40, 10.42,10.43,10.45, 10.47, 10.48,10.49.
10.6 Testing a proportion -pp.338-341, HW 10.63,10.67, 10.69, 10.71
10.7 POWER pp.346-351 Problems distributed in class.

MIDTERM TEST 1

11.1/11.2 Pooled Variance t test -independent samples pp.365-370, HW 11.3,
11.5, 11.7,11.10, 11.11. assume = variances.
11.3 Unequal Variances t test Read pp. 374-377.
11.4 Z test comparing means- 2 independent samples- pp. 380-382,HW
11.33,11.36, 11.37, 11.39, 11.40.
11.5 Comparing two dependent samples- pp.385-387, HW 11.45, 11.46, 11.47,
11.49
11.6 Comparing two sample proportions-pp.391-393, HW 11.53, 11.55, 11.57
11.7 Comparing Variances two Independent samples- pp.397-399,HW 11.66,
11.67, 11.70.
13.1/13.2/13.3 Chi-square testing- pp.468-476, HW 13.16, 13.17, 13.18, 13.22
13.4 Testing independence- 2 variables pp. 479-483, HW 13.33,13.34, 13.35,
13.37.
15.1 /15.4 Simple linear regression and correlation/ compute the least squares
regression line and correlation for homework-pp. 552-558, HW 15.9, 15.10,
15.11, 15.55, 15.57
15.5 Tests of Correlation pp.572-573, HW Test the correlations from HW
problems 15.9, 15.10, 15.11, 15.55, and 15.57 for
 $H_0: r=0$ and $H_a: r>0$
Also $H_0: r=0$ and $H_a: r \neq 0$.

MIDTERM Test 2

FINALE

12.1 /12.2/12.3 One Way Analysis of variance read pp. 412-427 SPSS Take Home Questions

16.1-16.4 Multiple Regression – read pp.600-624 SPSS Take Home Questions
If time allows-12.5 2 Way Analysis of Variance pp. 441-452

GRADING

40% Two midterm tests

20 % two one Page Response Essays , hypothesis test, computer assignment
All 5%.

30% Final Exam

10% Participation /Attendance

You may bring index cards to each test and Final exam. Late =Absence. Please be early for class.

If you earn below 70 on any test, you can gain bonus points by taking the missed questions again.

If you miss an exam the Final counts for that exam grade.

Mathematics is a participant sport , not a spectator's sport . Get involved. My courses have had high success rates, especially with 20 % of the grade based on two short essays you can revise for 100%, a hypothesis test research assignment of students' choice, and a take home multiple regression problem. Plagiarism or copying another's work results in 50% grade. A second offense results in 0 grade.

Text

Introduction to Business Statistics South Western/ Cengage Publishing 7th ed.

4 Written assignments. This is necessary in order to grant 4 credits for this course. Two page maximum. I will edit your paper on Aftershock and The Sigflunce Generation , so you can revise and hand them in at the last class before the Final for full credit.

- A. Read *Aftershock* by Robert Reich and listen to his 50 minute video on line. Also read "Fairer Deal" by Sebastian Mallaby . Discuss where you agree or disagree.What statistics did Dr. Reich use to support his thesis?

Next read *The Sigfluence Generation* at sigfluence.com. What does the book reveal about the younger generation-YOU? ?

What statistical tools did Loase use to uncover certain insights? Is sigfluence a value like outdoor work or independence (measures for career tests) or a fundamental need of humans (Loase) ? What is the relation between Loase's book and Reich's?

- B. Read *Richer than a Millionaire* (Van Ness and Danko) \$4 on Kindle. Invaluable guide for financial well-being. Estimate your total savings for retirement after the years of work for which you plan. My book, *Statistics Made Easy* (at sigfluence.com) , has step by step instructions on how to compute your annuity's cash balance in Chapter three. Your TI 83 can easily compute the value of your annuity as well. Discuss the author's philosophy on giving part of your wealth to others. What are you- frugal or a spender? Discuss.
- C. Any hypothesis you wish to test using the tools of the course. Most students will use difference of two means, difference of two proportions, or correlation. For correlation research, test whether $r=0$ or H_a . Write a one page paper summarizing your data, procedure, and conclusion.
- D. Use SPSS to compute a multiple regression equation with either real or made up data. Then split the data into two parts. Calculate the two new multiple regression equations. Are they significantly different equations?

HOMEWORK

Homework is essential for success. Work in homework teams of 4 or 5. That enables all students to thrive. The TI 83 calculator will be ideal for nearly all the classwork , except exercises using SPSS (at the later part of the course) and computer work(using the CD at the back of your textbook).

EXTRA HELP

I will be available to assist at office hours to be determined. Drop by and say hello.

ACADEMIC INTEGRITY

Students are bound by the University Code of Conduct, which includes, but not limited to the Standards of Academic Integrity.

DISABILITIES

Under the Americans with Disabilities Act, all members of the campus community are entitled to equal access to the programs and activities of Fordham University. If you have or think you have a disability that may impact your participation in the activities, coursework, or assessment of this course, you may be entitled to accommodations through the Office of Disability Services. They can be contacted at 718-817-0655 , disabilityservices@fordham.edu, or by visiting Lowenstein .

Whether or not you have documentation for accommodations, I will help to ensure your success in this course . Please see me early in the course, if you perceive a difficulty in your coursework.

Bibliography

Huff, D. (1982). *How to Lie with Statistics*. New York: WW Norton and Sons.

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Loase, John (May, 2009). "How to Excel at Math Transformation". Focus.

Loase, John (2015) *Statistical Modeling with SPSS, COMAP*.

Loase, John (2010) Statistics Made Easy, Graduate Group.

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Lynch, A. (1996). *Thought Contagion*. New York; Basic Books.

Pedersen, E. et al (Feb. 1978). . "A New Perspective on the Effects of First-Grade Teachers on Children's Subsequent Adult Status". *Harvard Educational Review*.

STATISTICS is vital for your personal and professional future. Please read my two articles, published in the Mathematical Association of America's journal -Focus. They are on my website, sigfluence.com.

Dr. John Loase

Prepared August 1 , 2021