STA 6166

Summer A 2017 (section OIDI'   )

Statistical Methods in Research I

MTWRF 3rd period 11:00-12:15, AND 134

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Course Website: e-Learning

Course Notes: http://www.stat .ufi. edu/~athienit/IntroStat/class_notes.pdf.

Course Communication:

- Piazza Q&A discussion forum.(Link available "Pages" under Canvas.)

- Office hours (posted on e-learning under "Pages").

- E-mail for questions regarding course policies. (Ensure that **6166** is in the subject line. Failure to do so may result in a non-response. If you are emailing about, something that requires access to your record please include your UFID).

All members of the class are expected to follow rules of common courtesy in all email messages, threaded discussion and chats. Please refer to expected class netiquette.

The instructor reserves the right to update any parts of this syllabus as necessary.
Students will promptly be notified of any changes.

Required Text(s): *An Introduction to Statistical Methods and Data Analysis*, **7th** Edition
Author(s): R. Lyman Ott, Michael **T.** Longnecker, **ISBN-13: 9780495017585**

Course Description: Introduce basic data, analysis tools and to train graduate students in statistical tools associated with hypothesis testing and linear models. The aim is to promote sound scientific research and experimentation based on good statistical thinking and practice. Class notes will be posted online.

Prerequisite(s): STA 2023

Credit Hours: 3

Software: You will need a computer for the homework assignments and practise. There will not be any lessons on how to use software, but questions are welcomed especially in office hours. The main software used in class will be R. You will be required to complete a short introductory course on R and submit your certificate. You can use other software if you wish as long as you yield similar results: Minitab is a user-friendly alternative, SPSS, SAS, JMP, Matlab etc. For more help visit `http: //www. stat .ufi. edu/~athienit/software .html`

Purpose of Course: To comprehend basic concepts of probability and statistics, and to make meaningful inferences on relevant datasets.

Course Goals and Objectives:

1. Access, manipulate and analyse data using statistical software.
2. Produce appropriate graphs and descriptive statistics for one and two variables, for both categorical and quantitative data.
3. Interpret graphs and descriptive statistics for one and two variables.
4. Know and apply the basic probability rules, the concepts of expected value and variance for discrete and continuous variables.
5. Know and apply the Central Limit Theorem, which is crucial for inference.
6. Understand confidence intervals and hypothesis tests.
7. Carry out and interpret one-sample and two-sample analyses for means and proportions.
8. Carry out and interpret statistical modeling using multiple regression and analysis of variance.

Course Policies

Assignments

- Students are expected to work independently, unless otherwise specified in writing. **Offering** and **accepting** solutions from others is an act. of **plagiarism,** which is a serious offense and **all involved parties will be penalized according to the Academic Honesty Policy.**
  Discussion amongst students is encouraged, but when in doubt, direct your questions to the instructor or teaching assistant.

- **No late assignments will be accepted under any circumstances.**

- Students are expected to show and explain how the answers were obtained. When asked to submit textbook problems/exercises, simply copying the solution manual without performing, showing and explaining your work is not sufficient for a grade and may be considered an act. of plagiarism. (There are software to test, for plagiarism).

- All electronically **submitted work must be in pdf format** or a. standard file format such as doc, jpeg, etc.

Homework/Quizzes

There will be homework assigned on a regular basis as *suggested homework* (not to be turned in) containing data analysis problems and/or book exercises. Suggested homework will be posted under "Assignments". A *timed* quiz assignment (based on the suggested homework) will be administered either as

- In-class (closed notes).

- Online (Only 1 attempt. It is highly encouraged to use a **reliable device** with a **reliable wired ethernet internet connection.** As soon as work is submitted a grade of 0 will show up as a placeholder until the assignment is graded.)

but which format will not be announced prior. For the best preparation students are encouraged to complete the full suggested homework set by the deadline posted on the suggested homework, indicating when you should ready to take the quiz.

Solutions to suggested homework will not be posted, but solutions to the quizzes will be.

Exams

There will be three (3) in-class exams that will comprise of multiple choice questions (approximately 70%) and some open-ended questions (30%). Exams will emphasise more on conceptual questions while HW/Quizzes will be more computational (not always).

Important dates:

Exam //T	May22
Introduction to R	May23
Exam $\phi 2$	June5
Exam $\phi \overline{b}$	June15

Grading

Change of grade: Grades will be changed only when an error has been made by the instructor.

Grade distribution:

Quizzes	25%) (lowest 2 scores are dropped)
Exams 1, 2 and 3	70%) (15%) lowest, 27.5%) two best)
Introduction to R certificate	5%,
Piazza activity	extra credit

Letter grade distribution:

		A	91 to 100	A-	87 to < 91
B+	84 to < 87	B	80 to < 84	B-	77 to < 80
c+	74 to < 77	C	70 to < 74	C−	67 to < 70
D+	64 to < 67	D	60 to < 64	D-	55 to < 60
E	< 55				

Final grades shown on Canvas are not accurate because they do not account for the conditional weighing of exams and quizzes.

There will be *no rounding up* of scores. To view the result of the letter grades to your GPA please visit UF registrar

Make-up policy: Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: **https://catalog**, **ufi.edu/ugrad/current/regulations/info/attendance.aspx**

(Additional) Make-up policy requirements:

- Every effort should be made to complete the assignment/exam during the open period. Only extreme situations will warrant a makeup. Contact the instructor prior to the exam - as soon as you realize you will be unable to take the assignment/exam at the scheduled time. Each case will be reviewed individually. Valid and detailed documentation is a prerequisite for scheduling a makeup under such extenuating circumstances.

- If you have an emergency on the day of the assignment/exam, the instructor must be contacted by midnight of the day of the assignment/exam.

- Additional Note: Being on vacation or booking a trip prior to the completion of the semester is not a valid reason to request a makeup. Please reference the Academic Calendar

Incomplete: An incomplete grade may be assigned at the discretion of the instructor as an interim grade for a course in which the student has completed a major portion of the course with a passing grade, been unable to complete course requirements before the end of the term because of extenuating circumstances, and obtained agreement from the instructor and arranged for resolution of the incomplete grade in the next term. Instructors are not required to assign incomplete grades. For complete details please visit the registrar's course policies.

Getting help

For issues with technical difficulties for e-learning in Canvas, please contact the UF Help desk at:

- `https ://lss.at.uf`1`.edu/help.shtml` or `http ://helpdesk.uf`1`.edu/`

- 352-392-4357 - select option 2

- e-mail at helpdesk@ufl.edu.

Any requests for make-ups due to technical issues MUST be accompanied by the **ticket number** received from e-Learning when the problem is reported to them. The ticket number will document the time and date of the problem. You MUST contact your instructor within 24 hours of the technical difficulty if you wish to request a make-up.

Complaints/Praises: Should you have any complaints/praises with your experience in this course you can always address them to the instructor at athienit@ufl.edu, or you may contact Ms. Tina Greenly tgreenly@ufl.edu of the Department of Statistics to submit a complaint. You may submit anonymous e-mail using:

- `http://anonymouse.org/anonemail.html` (No reply option, there is a time delay)

- `https://anonymousemail.me/` (Has optional reply option. Requires entry in the `From` field so put a fake address, e.g. fake@fake.com)

Both of these sites have been tested and no personal information or IP addresses are available. Feel free to test. them.

For complaints that are not satisfactorily resolved at the department level or which seem to be broader than one department, students are encouraged to review the UF Complaints Policy.

UF Policies

Accommodating Students with Disabilities: Students requesting accommodation for disabilities must first register with the Dean of Students Office. The Dean of Students will provide documentation to the students who must then provide this documentation to the instructor when requesting information. You must submit this documentation prior to submitting any assignments for which you are requesting accommodation.

Academic Misconduct: Students are held accountable to the UF Honor Code.

Evaluations: Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at **https://evaluations.ufl.edu.** Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at **https: //evaluations.uf1.edu/results/.**

Tentative Course Outline

Lecture videos will be provided but are only meant as a review and *are not meant replace the live in class lectures.*

* Additional topics included

Modules	Content	Class notes	Video	Textbook	Suggested HW/Quiz
1	Summary Statistics	5-7	1	3.4-3.5	1
	Graphical Summaries	8-13	2	3.3,3.6	
2	Sample Space, Events and Probability	14-18	3	4.2-4.3	2.1
	Conditional Probabilities and Independence	22-26	5	4.4-4.5	
	Random Variables: Properties (I)	27-30	6	4.6*	
	Random Variables: Properties (II)	31-34	7	4.6*, 4.10*	
	Random Variables: Properties (IV)	40-43 (skip ex 2.38, 2.39)	9	-*	2.2
	Random Variables: Common distributions	44-45, 48-51	10-11 combo	4.8(Bin.), 4.9-4.10	
	Central Limit Theorem	52-53	12	4.12-4.13	
	Normal Probability/Quantile Plot	54-55	13	4.14*	
Optional	Counting Methods	19-21	4	-*	
	Random Variables: Properties (III)	35-39	8	-*	
	Exam 1				
3	Inference for Population Mean (I)	57-61	14	5.2-5.3	3.1
	Inference for Population Mean (II)	62-67	15	5.4	
	Inference for Population Proportion	68-69	16	10.2	
	Inference for Population Variance	70-73	17	7.2	3.2
	Distribution Free Inference (I)	74-79	18	5.9*	
4	Inference for Population Means: Confidence Intervals	75-79	19	6.2, 6.4, 10.3	4.1
	Inference for Population Means: Hypothesis Tests	80-82	20	6.2, 6.4, 10.3	
	Inference for Population Variances	83-85	21	7.3	
	Distribution Free Inference (II)	86-90	22	6.3*, 6.5*, 7.4	4.2
	Contingency Tables: Tests of Independence	91-93	23	10.5	
	Exam 2				
5	Simple Linear Regression (I)	95-99	24	11.1-11.2	5.1
	Simple Linear Regression (II)	100-103	25	11.3-11.4	
	Checking Assumptions and Transforming Data	104-110	26	11.5*	
	Multiple Regression (I)	111-115	27	12.1-12.3	5.2
	Multiple Regression (II)	116-119	28	12.4-12.7	
	Qualitative Predictors	120-124	29	12.1*	
6	Completely Randomized Design (I)	125-128	30	14.1-14.2	6.1
	Completely Randomized Design (II)	129-131	31	14.5	
	Completely Randomized Design: Distribution Free	132-134	32	-*	
	Randomized Block Design	135-138	33	15.1-15.2	6.2
	Randomized Block Design: Distribution Free	139-140	34	15.5	
	Exam 3				