ISyE 3770 Syllabus and Course Outline (SOUP)

Statistics and Applications

Course: ISyE 3770 — Statistics and Applications — Summer 2015 (May 11, 2015 through August 1, 2015)

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Course Website: http://www.isye.gatech.edu/academics/undergraduate/courses/ISYE3770.pdf ; TEXT is Applied Statistics and Probability for Engineers by Montgomery and Runger, 6th Edition. **Students are expected to have the current edition of the textbook**.

Class Times and Place: 10:00 - 11:45 AM TR – Virtual/On-Line

Office Hours: By appointment

Teaching Assistant: TBD

Course Objectives

Provide introduction to probability, probability distributions, point estimation, confidence intervals, hypothesis testing, linear regression, and analysis of variance. This course is cross-listed with MATH 3770 and CEE 3770.

Course Outcomes

Students should be able to:

1. Analyze and display sampling data, evaluate statistics, and estimate distribution parameters;

2. Draw conclusions about population parameters from experimental data by using proper statistical techniques;

3. Use proper statistical techniques (namely hypothesis testing) to draw sound statistical conclusions;

4. Use computer software (e.g. Microsoft Excel) to apply statistical methods to solve problems.

Prerequisites

MATH 2401 or 2411 or 24X1 (Calculus III), CS 1316 or equivalent.

Grading: Students are responsible for checking the posted grade. No adjustment of any grade posted will be made according to guidelines set below.

Letter Grade Minimum Averages Required: A: 90%; B: 80%; C: 70%; D: 60%

Assignments and Grade Components

Homework: 25%; Quizzes: 5% Exams: 30% Final Exam: 40%

Homework: Homework will be assigned approx. weekly. Some homework questions may be used on exams. The homework assignments are meant to be a practice tool; I encourage you to work together. Students may work in groups of up to five (5) and may submit one (1) document for the group. The name of each student in the group must be clearly written on the front page of the homework assignment in order for each student to receive credit. Names *cannot* be added to the homework assignment or changed once the assignment has been submitted. If more than five names are listed on a document no student in the group will receive credit for that assignment. Assignments must be submitted no later than 10:05 am on the due date (Official time will be the time shown on my computer or smart phone.). No late homework will be accepted without an institute-approved

absence, *NO EXCEPTIONS*.[♠] Expect a homework assignment to be due during dead week. *Every homework assignment will be graded. Some assignments will be graded as follows: 50% of the grade will be based on completion—making a good faith effort on every problem (i.e. work must be shown for credit; the TAs will use their discretion in determining what constitutes sufficient work and assign points accordingly)—the remaining 50% will be based on the accuracy (correctness) of two randomly selected problems*. DO NOT TAKE A CHANCE - complete the entire assignment, as it will help you in problem solving proficiency. IF NO GRADED HOMEWORK ASSIGNMENT IS GIVEN, STUDENTS ARE EXPECTED TO COMPLETE THE ODD-NUMBERED PROBLEMS IN ORDER TO BE PREPARED FOR THE LECTURE. There will be absolutely NO consideration for homework credit after 24 hours of the grade for that assignment being posted.

Quizzes: Quizzes may be administered via T-Square. Quizzes administered via T Square **must be** completed **individually** and submitted via T-Square before the posted due date. Students should be careful and make sure that they have submitted their quiz, not just saved it, by the posted due date, otherwise, they will not receive credit for the assignment. *No makeup quizzes will be given for any reason. No extensions. No exceptions.*

Exams: There will be in class exams. Students are allowed a calculator [**for calculations ONLY**] and a pencil for all exams. Students are allowed one (1) side of one (1) 8.5 inches by 11-inch sheet of paper as a NOTES sheet for each of the 3 in-class exams. NO OTHER things are allowed during in-class exams. For the final exam, students are allowed both sides of one (1) 8.5 inches by 11-inch sheet of paper. Any supplemental tables or resources that are needed will be provided.

There will be ***no make-up exams for any reason!*** If you have an official Georgia Tech accepted reason for missing an exam you must produce appropriate documentation justifying your absence prior to and no later than one week from the date of the exam. Your exam grade will then be calculated by applying equal weights to the remaining exams.

There will be absolutely NO consideration for exam score adjustments after 24 hours of the grade for that exam being posted to T Square.

Re-grade Policy

DO NOT submit re-grades for partial credit. If you believe that there has been an error in the grading of your exam, you have one week from the day it was returned to the class to submit it for a re-grade. (Note: one week is counted from the day the exam became available to the class; you do not get an extension if you chose to pick it up late.) When you resubmit the assignment, it must be accompanied by a written explanation of the suspected grading mistake *stapled to the original assignment*. Do not write on the original exam. The exam will not be re-graded if the procedures outlined here are not followed. Groveling for points you don't deserve is uncool; therefore, **if you submit a re-grade for an answer that is in fact incorrect you will lose an additional 5 points**.

Live Virtual Class Cell Phone and Laptop Policy

My preference is that you dedicate all of your energy to THIS class. Simple: Please be respectful of your classmates and our learning community. DO NOT use laptops or cell phones while the class in in progress for anything other than for this subject.

Email

All emails to the Instructor and/or Teaching Assistants must have [ISyE 3770] in the subject line. Failure to place this in the subject line could cause your email not to be read.

The instructor does not answer conceptual questions via email. Please stop by office hours or ask questions in class if you have a question about a topic or concept.

18-hour rule: During the 18-hour period before exams, the Instructor *will not* be responding to emails asking for clarification on concepts, topics, homework problems, or anything already discussed in class.

[♠] Students with an institute-approved absence must produce official documentation from the Office of Registrar or Dean of Students no more than one week after the absence in order to receive credit for a late homework assignment.

Miscellaneous

Students are responsible for all announcements made in class and those posted to T- Square. Students are responsible for all changes in the schedule that are posted on the class website.

All grades will be posted to T-Square. Please check it often to ensure your grades are correct. Graded assignments will be returned as soon as possible and will be brought to the classroom ONE TIME. You are responsible for going to the TA to get the assignment after that. All graded requirements that have not been picked up after two weeks of the grade being posted to T Square will be discarded.

HONOR CODE

All students are expected to be familiar with the Honor Code (http://www.honor.gatech.edu) and are bound by its requirements. You must observe the Honor Code with respect to examinations, assignments, and all other aspects of this course. In particular:

Exams and Homework: Exams are individual assignments. You may not consult or collaborate with anyone (human) or anything (non-approved materials including textbooks, cell phones, laptops, additional cheat sheets etc.) while taking an exam. Submission of your exam is an acknowledgment that you have complied with the Honor Code. Submission of your homework as an individual or a group acknowledges that you have NOT collaborated with anyone else. (i.e. You have not participated in any of the following: sharing of notes, programming of notes in calculators, sharing of information not allowed, collaboration outside your homework work group). Buzzcards are REQUIRED for all exams; have Buzzcards out on your desk during the exam.

Quizzes: Quizzes are an individual effort; students may not collaborate or work together on quizzes.

Any student found violating the honor code WILL be reported to the Office of Student Integrity, no exceptions. I have a *zero tolerance* policy when it comes to cheating so, DON'T CHEAT.

Topical Outline (Tentative)

Topic	Readings
Probability Intro	Ch. 2
Discrete Random Variables	Ch. 3
Continuous Random Variables	Ch. 4
Joint Probability Distributions	Ch. 5 (Sec 1,2,4)
Descriptive Statistics	Ch. 6
Sampling Distributions & Point Estimation	Ch. 7 (excl. 7-4)
Confidence Intervals	Ch. 8 (Sec 2-6)
Hypothesis Testing	Ch. 9 (excl. 9-9)
Statistical Inference for Two Samples	Ch. 10(Sec 1 -5)
Linear Regression, Multiple Linear Regression and ANOVA	Ch. 11 - 13

Exams (Dates Tentative excl. Final)

Exam 1: May 26th 10:00 am – 11:45 am

Exam 2: June 9th 10:00 am – 11:45 am

Exam 3: July 2nd 10:00 am – 11:45 am

Final Exam: Period 15 - 2:50 to 5:40 pm, 31 July Rules to follow reference proctor requirements.

ISyE 3770 Class Schedule -- Summer 2015

Lesson	Date	Topic	Reading	Recommended Problems	Notes
Lsn 1	12-May	Intro to ISyE 3770; Sample Spaces and Events,Counting Techniques, Probability; Rules of Probability	ISyE 3770 Syllabus; Chapter 1; Chapter 2, Secs 1 through 3	peruse and study the syllabus	Pay attention to Syllabus; ***Quiz#1 due 13 MAY 5pm;Clickers registered by 13 May 2015***
Lsn 2	14-May	Conditional Probability; Independence, Probability Rules, Bayes Theorem	Chapter 2, Secs 4 - 7		
Lsn 3	19-May	Discrete Random Variables, Discrete Distributions, PMFs,CDFs	Chapter 2, Sec 8 and Chapter 3, secs 1-3		
Lsn 4	21-May	CDFs; Mean and Variance of Discrete random variable; Binomial, Geometric and Negative Binomial Distributions; Hypergeometric Distribution	Chapter 3, Secs 3 through 8		
Lsn 5	26-May	EXAM #1		CHAPTER 2 , CHAPTER 3 through Sec 8	PROCTOR REQUIRED
Lsn 6	28-May	Poisson Distribution Functions ;Continuous Random Variables ,PDFs, CDFs; Mean, Var Continuous RV and Continuous Uniform Distributions; The Normal and Exponential Distributions	Ch 3, Sec 9; Chapter 4, Secs 1- 8		
Lsn 7	2-Jun	Joint Probability distributions (2 RVs)	Chapter 5, Secs 1 through 1.2		
Lsn 8	4-Jun	Joint Probability distributions (Conditional Prob, Indep); Covariance and Correlation; Linear Functions of R.Vs	Chapter 5, Secs 1.3 through 1.4; section 2; Sec 4		
Lsn 9	9-Jun	Exam #2		CHAPTERS 4,5	PROCTOR REQUIRED
Lsn 10	11-Jun	Descriptive Statistics	Chapter 6, Sections 1,2,4 and 6		
Lsn 11	16-Jun	Descriptive Statistics 2	Chapter 6		
Lsn 12	18-Jun	Point estimation; Sampling Distributions and Central Limit Theorem	Chapter 7, Secs 1-3		
Lsn 13	23-Jun	Confidence Interval on the Mean, Variance Known	Chapter 8, Sec 1		
Lsn 14	25-Jun	Confidence Intervals on Mean, Variance Unknown; Confidence Interval on variance and proportions	Chapter 8, Secs 2-5		
Lsn 15	30-Jun	Tolerance and Prediction Intervals; CI ON TWO SAMPLES; The F-distribution	Chapter 8, Sec 7; CHAPTER 10, Secs 1.1 through 2.2 and Section 5		
Lsn 16	2-Jul	EXAM #3		CHAPTERS 6-8; Chapter 10 Sec 1.1-2.2, Sec 5	PROCTOR REQUIRED
Lsn 17	7-Jul	Intro to Hypothesis Testing; Hypothesis Testing on Mean of a Normal Distro, Variance Known/Unknown	Chapter 9, Secs 1-3		
Lsn 18	9-Jul	Hypothesis Testing on Variance of Normal Distro and Proportion	Chapter 9, Secs 4-6		
Lsn 19	14-Jul	Hypothesis Testing on Mean, Variance and Proportion	Chapter 9, Sec 1-6		
Lsn 20	16-Jul	Intro to Simple Linear Regression	Chapter 11, ,Secs 1-2		
Lsn 21	21-Jul	Simple Linear Regression Least Squares Properties, Hypothesis Tests	Chapter 11, Secs 3-4		
Lsn 22	23-Jul	Simple Linear Regression Confidence Intervals; Predictions; R-Squared	Chapter 11, Secs 5-7		
Final Exam	31-Jul	FINAL EXAMINATION [PERIOD 15-2:50 - 5:40 pm]	Comprehensive, but weighted ≥ 50% to material after exam #3	Chapters 2-11, as covered	PROCTOR REQUIRED